STATE OF WASHINGTON
**DEPARTMENT OF ECOLOGY**
PO Box 47600, Olympia, WA 98504-7600 • 360-407-6000

August 4, 2023

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

**Re: Water Quality Inspection with Sampling (Class II) on May 3, 2023**

Dear Craig McKinney:

Enclosed is a copy of the report for the water quality sampling inspection conducted by the Department of Ecology (Ecology) at Emerald Kalama Chemical, LLC (Emerald) on May 3, 2023. 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 portions of the main process area. The inspection also included a records review. Ecology took grab and composite samples at Outfalls 001 and 002. Emerald appeared to be in compliance with their NPDES permit at the time of the inspection.

I appreciate the assistance you and your staff provided during the inspection. If you have any questions, please contact me at (360) 407-6934 or greg.gould@ecy.wa.gov.

To request ADA accommodation for disabilities, or printed materials in a format for the visually impaired, contact Ecology at 360-280-4325 or ecyadacoordinator@ecy.wa.gov. Persons with impaired hearing may call Washington Relay Service at 711. Persons with a speech disability may call TTY at 800-833-6384.

Sincerely,

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

Inspection Report

DEPARTMENT OF
ECOLOGY
State of Washington

# Water Quality Compliance Inspection Report
# Industrial Section

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|---|---|
| **Facility Name & Address:** | Emerald Kalama Chemical, LLC<br>1296 Third Street NW<br>Kalama, Washington 98625 |
| **NPDES Permit Number:** | WA0000281 |
| **Dates of Inspection:** | May 3, 2023 |
| **Type of Inspection:** | Unannounced Compliance Inspection – With Sampling |
| **Time On Site:** | 9:45 AM to 12:32 PM |
| **Areas Evaluated:** | Permit, Records/Reports, Facility Site Review<br>Effluent/Receiving Waters, Flow Measurement<br>Self-Monitoring Program<br>Operations & Maintenance, Sludge Handling/Disposal<br>Stormwater |
| **Photographs Taken:** | No |
| **Ecology Representatives:** | Greg Gould (Lead Inspector), Ha Tran, and Sarah Penfield |
| **Facility Representatives:** | Craig McKinney, Environmental Engineer, (360) 673-0285<br>Mitch Louis, IPW Supervisor, (360) 673-2550 |
| **Report by:** | Greg Gould |
| **Supervisor Approval by:** | Shingo Yamazaki |
| **Report Date:** | August 4, 2023 |

Ha Tran, Sarah Penfield, and I arrived at Emerald Kalama Chemical, LLC (Emerald) at 9:45 AM on May 3, 2023 for an unannounced Class 2 (sampling) water quality inspection and site visit. We met with Craig McKinney and Mitch Louis, 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 portions of the main process area. We discussed the findings of the inspection with Craig McKinney and Mitch Louis, then exited the facility at 12:32 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 per the Consent Decree under the Model Toxics Control Act, 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 (tanks T-86, T-186, and T-286) and two clarifiers (tanks T-88 and T-188). 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 merge in-line with wastewater from tanks T-22 and T-90. Tanks T-22 and T-90 hold wastewater from the American Petroleum Institute (API) oil/water separator. ANTS effluent and wastewater from tanks T-22 and T-90 flows to the BIOX plant.

### Biological Treatment Plant (BIOX)

The BIOX plant consists of two aeration basins (tanks T-91A and T-92), three clarifiers (tanks T-96, T-96A, and T-93), and a waste activated sludge unit (tank T-91).

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 ($BOD_5$) loading of 5,006 pounds per day. Staff sample T-91A feed twice a day for $BOD_5$. They also monitor for ammonia, phosphorus, and mixed liquor suspended solids. Emerald controls the $BOD_5$ 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 tank T-91 and then to a SOMAT unit. The SOMAT dewaters the waste sludge to about 7 to 10 percent solids. Water removed by the SOMAT returns to aeration tank T-91A. The Washington State Department of Ecology (Ecology) and the EPA recently approved a petition from Emerald to delist the industrial wastewater biological solids from being a hazardous waste. The approvals state that Emerald can send the delisted sludge to a solid waste landfill under specific conditions in the approval.

## 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 and clarifier T-88 were offline for inspections and repairs if needed. I noted no issues with the ANTS at the time of inspection.

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 Return Activated Sludge (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 Mitch Louis stated was normal. I observed the clarifier overflow water was clear. Mitch Louis stated that staff clean the algae along the outside of the clarifier on an as needed basis. Mitch Louis said that Emerald usually operates both clarifiers in the winter and often only one clarifier in the summer. At the time of the inspection, the SOMAT was running. We observed the SOMAT screw press that dewaters the sludge into the industrial wastewater biological solids. At the time of the inspection, the influent flow meters from T-22 to T-91A was 190.3 gpm and from T-103B to T-91A was 95.9 gpm.

We inspected the Modu-tanks T-103A (high COD) and T-103B (low COD). Modu-tank T-103B had some water, Modu-tank T-103A was empty, and both tanks appeared to be operating properly. Mitch Louis said Emerald uses Modu-tank T-103A for extra holding capacity in the event of a spill or high COD wastewater so the wastewater treatment plant is not upset. Mitch Louis said Emerald uses Modu-tank T-103B for stormwater and groundwater.

## 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. Craig McKinney said Emerald collects a 24-hour composite sample every day and stores the sample in the laboratory's refrigerator, but only samples the wastewater twice a week. The compositor unit also has a refrigerator to cool the sample. The digital thermometer in the refrigerator was 4.5°C (below the required 6.0°C) and Emerald has the thermometer calibrated every year. The flow and pH at Monitoring Point 002 were 260 gpm and 7.91 standard units. There is no effluent limit on flow, but the design criteria limit for the BIOX influent 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 21.3°C, which was below the permit limit of 40.7°C. Emerald sums the Monitoring Point 002 flow and Intake Cooling Water flow to determine the Outfall 001 flow to the Columbia River.

As noted below, the Intake Cooling Water flow fluctuated around 8,310 gpm at the time of inspection. This means the approximate Outfall 001 flow to the Columbia River was approximately 8,570 gpm.

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 observed Emerald was operating three traveling screens and three pumps at the time of inspection. Craig McKinney said Emerald was not operating the fourth pump because Emerald uses it as a backup. The Intake Cooling Water flow fluctuated around 8,310 gpm at the time of inspection. I noted no issues with the intake cooling water structure at the time of inspection.

### Process Areas

Craig McKinney and Mitch Louis 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.

## Records Review

Craig McKinney sent me calibration meter records by email on May 22, 2023. I reviewed the calibration meter records for intake flow, Outfall 001 temperature, Outfall 002 flow, and Outfall 002 pH. The temperature and flow meters are calibrated annually, and the pH meter is calibrated monthly. As of May 22, 2023, the Outfall 001 temperature meter was last calibrated on March 16, 2023, the Outfall 002 pH meter was last calibrated on May 15, 2023, and the intake and Outfall 002 flow meters were last calibrated on May 20, 2023. I noted no issues with the calibration meter records.

## Sampling

Craig McKinney and Mitch Louis accompanied us during sample collection. We collected grab samples at Outfall 001 for benzene, toluene, ethylbenzene, and xylene (BTEX); and at Outfall 002 for low-level mercury, base/neutrals acids (BNA), and volatile organic analysis (VOA). Emerald staff retrieved the 24-hour composite sample from Outfall 002 at 8:00 AM on the morning of the inspection and saved the sample in the laboratory's refrigerator.

We sampled the composite sample in the laboratory for biological oxygen demand 5-day ($BOD_5$), total suspended solids (TSS), and priority pollutant metals (except mercury).

I sent the following wastewater samples to Manchester Environmental Laboratory: Outfall 001 BTEX; Outfall 002 TSS, priority pollutant metals (except mercury), low-level mercury, BNA, and VOA. After the inspection, we drove the following sample to ALS in Kelso (as of July 18, 2023, accreditation #: C544-22, expiration date: 7/8/2023): $BOD_5$.

I used the information submitted by Emerald in their May 2023 DMR to determine the 24-hour effluent flow rate associated with the Outfall 002 composite sample. The flow rate associated with the composite sample was 274 gpm (0.394 MGD). Even though the BNA and VOA samples were grab, I decided to use the higher composite flow (compared to the flow during the inspection of 260 gpm) to conservatively calculate the loading.

## Results

Tables 1 and 2 show Ecology and Emerald's sample results with any applicable maximum daily permit limits. Values of "-" for the Emerald's Results column means Emerald did not sample at the same time as Ecology.

**Table 1 Ecology and Emerald's Sample Results for Outfall 001**

| Sample Type [a] | Parameter | Unit | Ecology's Results | Emerald's Results | Maximum Daily Permit Limit |
|---|---|---|---|---|---|
| Grab | Benzene | µg/L | 1 U [b] | - | - |
| Grab | Toluene | µg/L | 1 U | - | - |
| Grab | Ethylbenzene | µg/L | 1 U | - | - |
| Grab | m,p-Xylene | µg/L | 2 U | - | - |
| Grab | o-Xylene | µg/L | 1 U | - | - |

**Table 2 Ecology and Emerald's Sample Results for Outfall 002**

| Sample Type [a] | Parameter | Unit | Ecology's Results | Emerald's Results | Maximum Daily Permit Limit |
|---|---|---|---|---|---|
| Composite | $BOD_5$ | mg/L | 4 U | 2 U | - |
| Calculated | $BOD_5$ | lbs/day | 13 | 6.4 | 304 |
| Composite | TSS | mg/L | 4 | - | - |
| Calculated | TSS | lbs/day | 13 | - | 453 |
| Composite | Antimony | µg/L | 0.3 U | - | - |
| Composite | Arsenic | µg/L | 0.81 | - | - |
| Composite | Beryllium | µg/L | 0.1 U | - | - |
| Composite | Cadmium | µg/L | 0.1 U | - | - |
| Composite | Chromium | µg/L | 0.4 | - | - |

| Sample Type [a] | Parameter | Unit | Ecology's Results | Emerald's Results | Maximum Daily Permit Limit |
|---|---|---|---|---|---|
| Composite | Copper | µg/L | 3.38 | 3.86 | - |
| Calculated | Copper | lbs/day | 0.011 | 0.012 | 0.958 |
| Composite | Lead | µg/L | 0.1 U | - | - |
| Grab | Mercury | µg/L | 0.0005 U | - | - |
| Composite | Nickel | µg/L | 16.2 | 18.0 | - |
| Calculated | Nickel | lbs/day | 0.053 | 0.058 | 1.242 |
| Composite | Selenium | µg/L | 0.1 U | - | - |
| Composite | Silver | µg/L | 0.1 U | - | - |
| Composite | Thallium | µg/L | 0.1 U | - | - |
| Composite | Zinc | µg/L | 9.4 | 10.2 | - |
| Calculated | Zinc | lbs/day | 0.031 | 0.033 | 0.740 |
| Composite | Acenaphthene | µg/L | 0.082 U | - | - |
| Calculated | Acenaphthene | lbs/day | 0.0003 | - | 0.168 |
| Composite | Acenaphthylene | µg/L | 0.082 U | - | - |
| Calculated | Acenaphthylene | lbs/day | 0.0003 | - | 0.168 |
| Composite | Anthracene | µg/L | 0.164 U | - | - |
| Calculated | Anthracene | lbs/day | 0.001 | - | 0.168 |
| Composite | Benzene | µg/L | 1 U | - | - |
| Calculated | Benzene | lbs/day | 0.003 | - | 0.387 |
| Composite | Benz(a)anthracene | µg/L | 0.164 U | - | - |
| Calculated | Benz(a)anthracene | lbs/day | 0.001 | - | 0.168 |
| Composite | 3,4-Benzofluoranthene | µg/L | 0.082 U | - | - |
| Calculated | 3,4-Benzofluoranthene | lbs/day | 0.0003 | - | 0.173 |
| Composite | Benzo(k)fluoranthene | µg/L | 0.082 U | - | - |
| Calculated | Benzo(k)fluoranthene | lbs/day | 0.0003 | - | 0.168 |
| Composite | Benzo(a)pyrene | µg/L | 0.082 U | - | - |
| Calculated | Benzo(a)pyrene | lbs/day | 0.0003 | - | 0.173 |
| Composite | Bis(2-Ethylhexyl) Phthalate | µg/L | 1.64 U | - | - |
| Calculated | Bis(2-Ethylhexyl) Phthalate | lbs/day | 0.005 | - | 0.793 |
| Composite | Carbon Tetrachloride | µg/L | 1 U | - | - |
| Calculated | Carbon Tetrachloride | lbs/day | 0.003 | - | 0.108 |
| Composite | Chlorobenzene | µg/L | 1 U | - | - |
| Calculated | Chlorobenzene | lbs/day | 0.003 | - | 0.080 |
| Composite | Chloroethane | µg/L | 1 UJ [c] | - | - |
| Calculated | Chloroethane | lbs/day | 0.003 | - | 0.762 |
| Composite | Chloroform | µg/L | 1 U | - | - |
| Calculated | Chloroform | lbs/day | 0.003 | - | 0.131 |
| Composite | 2-Chlorophenol | µg/L | 0.328 U | - | - |

| Sample Type [a] | Parameter | Unit | Ecology's Results | Emerald's Results | Maximum Daily Permit Limit |
|---|---|---|---|---|---|
| Calculated | 2-Chlorophenol | lbs/day | 0.001 | - | 0.279 |
| Composite | Chrysene | µg/L | 0.164 U | - | - |
| Calculated | Chrysene | lbs/day | 0.001 | - | 0.168 |
| Composite | Di-n-butyl phthalate | µg/L | 0.328 U | - | - |
| Calculated | Di-n-butyl phthalate | lbs/day | 0.001 | - | 0.162 |
| Composite | 1,2-Dichlorobenzene | µg/L | 0.082 U | - | - |
| Calculated | 1,2-Dichlorobenzene | lbs/day | 0.0003 | - | 0.464 |
| Composite | 1,3-Dichlorobenzene | µg/L | 0.082 U | - | - |
| Calculated | 1,3-Dichlorobenzene | lbs/day | 0.0003 | - | 0.125 |
| Composite | 1,4-Dichlorobenzene | µg/L | 0.082 U | - | - |
| Calculated | 1,4-Dichlorobenzene | lbs/day | 0.0003 | - | 0.080 |
| Composite | 1,1-Dichloroethane | µg/L | 1 U | - | - |
| Calculated | 1,1-Dichloroethane | lbs/day | 0.003 | - | 0.168 |
| Composite | 1,2-Dichloroethane | µg/L | 1 U | - | - |
| Calculated | 1,2-Dichloroethane | lbs/day | 0.003 | - | 0.600 |
| Composite | 1,1-Dichloroethylene | µg/L | 1 U | - | - |
| Calculated | 1,1-Dichloroethylene | lbs/day | 0.003 | - | 0.071 |
| Composite | 1,2-trans-Dichloroethylene | µg/L | 1 U | - | - |
| Calculated | 1,2-trans-Dichloroethylene | lbs/day | 0.003 | - | 0.154 |
| Composite | 2,4-Dichlorophenol | µg/L | 0.82 U | - | - |
| Calculated | 2,4-Dichlorophenol | lbs/day | 0.003 | - | 0.319 |
| Composite | 1,2-Dichloropropane | µg/L | 1 U | - | - |
| Calculated | 1,2-Dichloropropane | lbs/day | 0.003 | - | 0.654 |
| Composite | Diethyl phthalate | µg/L | 0.164 U | - | - |
| Calculated | Diethyl phthalate | lbs/day | 0.001 | - | 0.577 |
| Composite | 2,4-Dimethylphenol | µg/L | 0.82 U | - | - |
| Calculated | 2,4-Dimethylphenol | lbs/day | 0.003 | - | 0.102 |
| Composite | Dimethyl phthalate | µg/L | 0.164 U | - | - |
| Calculated | Dimethyl phthalate | lbs/day | 0.001 | - | 0.134 |
| Composite | 4,6-Dinitro-o-cresol | µg/L | 1.64 U | - | - |
| Calculated | 4,6-Dinitro-o-cresol | lbs/day | 0.005 | - | 0.788 |
| Composite | 2,4-Dinitrophenol | µg/L | 0.82 U | - | - |
| Calculated | 2,4-Dinitrophenol | lbs/day | 0.003 | - | 0.350 |
| Composite | 2,4-Dinitrotoluene | µg/L | 0.328 U | - | - |
| Calculated | 2,4-Dinitrotoluene | lbs/day | 0.001 | - | 0.811 |
| Composite | 2,6-Dinitrotoluene | µg/L | 0.328 U | - | - |
| Calculated | 2,6-Dinitrotoluene | lbs/day | 0.001 | - | 1.823 |
| Composite | Ethylbenzene | µg/L | 1 U | - | - |
| Calculated | Ethylbenzene | lbs/day | 0.003 | - | 0.307 |
| Composite | Fluoranthene | µg/L | 0.164 U | - | - |

| Sample Type [a] | Parameter | Unit | Ecology's Results | Emerald's Results | Maximum Daily Permit Limit |
|---|---|---|---|---|---|
| Calculated | Fluoranthene | lbs/day | 0.001 | - | 0.193 |
| Composite | Fluorene | µg/L | 0.082 U | - | - |
| Calculated | Fluorene | lbs/day | 0.0003 | - | 0.168 |
| Composite | Hexachlorobenzene | µg/L | 0.082 U | - | - |
| Calculated | Hexachlorobenzene | lbs/day | 0.0003 | - | 0.080 |
| Composite | Hexachlorobutadiene | µg/L | 0.164 U | - | - |
| Calculated | Hexachlorobutadiene | lbs/day | 0.001 | - | 0.139 |
| Composite | Hexachloroethane | µg/L | 0.082 U | - | - |
| Calculated | Hexachloroethane | lbs/day | 0.0003 | - | 0.154 |
| Composite | Methyl Chloride | µg/L | 0.56 J [d] | - | - |
| Calculated | Methyl Chloride | lbs/day | 0.002 | - | 0.540 |
| Composite | Methylene Chloride | µg/L | 1 U | - | - |
| Calculated | Methylene Chloride | lbs/day | 0.003 | - | 0.253 |
| Composite | Naphthalene | µg/L | 0.164 U | - | - |
| Calculated | Naphthalene | lbs/day | 0.001 | - | 0.168 |
| Composite | Nitrobenzene | µg/L | 0.082 U | - | - |
| Calculated | Nitrobenzene | lbs/day | 0.0003 | - | 0.193 |
| Composite | 2-Nitrophenol | µg/L | 0.164 U | - | - |
| Calculated | 2-Nitrophenol | lbs/day | 0.001 | - | 0.196 |
| Composite | 4-Nitrophenol | µg/L | 0.82 U | - | - |
| Calculated | 4-Nitrophenol | lbs/day | 0.003 | - | 0.353 |
| Composite | Phenanthrene | µg/L | 0.164 U | - | - |
| Calculated | Phenanthrene | lbs/day | 0.001 | - | 0.168 |
| Composite | Phenol | µg/L | 0.328 U | - | - |
| Calculated | Phenol | lbs/day | 0.001 | - | 0.074 |
| Composite | Pyrene | µg/L | 0.164 U | - | - |
| Calculated | Pyrene | lbs/day | 0.001 | - | 0.191 |
| Composite | Tetrachloroethylene | µg/L | 1 U | - | - |
| Calculated | Tetrachloroethylene | lbs/day | 0.003 | - | 0.159 |
| Composite | Toluene | µg/L | 1 U | - | - |
| Calculated | Toluene | lbs/day | 0.003 | - | 0.228 |
| Composite | 1,2,4-Trichlorobenzene | µg/L | 0.082 U | - | - |
| Calculated | 1,2,4-Trichlorobenzene | lbs/day | 0.0003 | - | 0.398 |
| Composite | 1,1,1-Trichloroethane | µg/L | 1 U | - | - |
| Calculated | 1,1,1-Trichloroethane | lbs/day | 0.003 | - | 0.154 |
| Composite | 1,1,2-Trichloroethane | µg/L | 1 U | - | - |
| Calculated | 1,1,2-Trichloroethane | lbs/day | 0.003 | - | 0.154 |
| Composite | Trichloroethylene | µg/L | 1 U | - | - |
| Calculated | Trichloroethylene | lbs/day | 0.003 | - | 0.154 |
| Composite | Vinyl Chloride | µg/L | 1 U | - | - |

| Sample Type [a] | Parameter | Unit | Ecology's Results | Emerald's Results | Maximum Daily Permit Limit |
|---|---|---|---|---|---|
| Calculated | Vinyl Chloride | lbs/day | 0.003 | - | 0.762 |

Footnotes for Tables 1 and 2:

a Composite means the 24-hour composite sample from Outfall 002 that Emerald staff retrieved at 8:00 AM on May 3, 2023. Calculated means loading determined by multiplying the concentration, flow, and conversion factor. Grab means an individual sample collected over a 15 minute, or less, period.

b U means the parameter was not detected at or above the reported result.

c UJ means the parameter was not detected at or above the reported estimated result.

d J means the parameter was positively identified and the associated numerical value is the approximate concentration of the parameter in the sample.

Ecology and Emerald's sample results compared well, even though minor differences are shown in Tables 1 and 2. The results show that the discharge was within applicable permit limits. Emerald is accredited for $BOD_5$ at the on-site laboratory (accreditation #: I615-23, expiration date: 2/9/2024). Emerald sent the copper, nickel, and zinc samples to Specialty Analytical in Clackamas, OR (accreditation #: C804-22, expiration date: 10/4/2023).

## Conclusion

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