pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

**Southwest Regional Office**
**CLEAN WATER PROGRAM**

| | | | |
|---|---|---|---|
| Application Type | **Renewal** | Application No. | **PA0003824** |
| Facility Type | **Industrial** | APS ID | **1010677** |
| Major / Minor | **Minor** | Authorization ID | **1304311** |

# NPDES PERMIT FACT SHEET INDIVIDUAL INDUSTRIAL WASTE (IW) AND IW STORMWATER

## Applicant and Facility Information

| | | | |
|---|---|---|---|
| Applicant Name | **Nalco Production LLC** | Facility Name | **Nalco Ellwood City Plant (North & South Plant)** |
| Applicant Address | PO Box 391 | Facility Address | 125 Nalco Way |
| | Ellwood City, PA 16117 | | Ellwood City, PA 16117 |
| Applicant Contact | Carrie Birckbichler-Smith | Facility Contact | Carrie Birckbichler-Smith |
| Applicant Phone | (724) 752-5047 | Facility Phone | (724) 752-5047 |
| Client ID | 354870 | Site ID | 239093 |
| SIC Code | 2899 | Municipality | Franklin Township |
| SIC Description | Manufacturing – Chemicals and Chemical Preparations | County | Beaver |
| Date Application Received | March 18, 2009 | EPA Waived? | Yes |
| Date Application Accepted | February 6, 2020 | If No, Reason | |
| Purpose of Application | NPDES Permit coverage renewal | | |

## Summary of Review

The Department received a timely renewal NPDES permit application from Nalco Company for facility located in Franklin Township of Beaver County on March 18, 2009. The facility is a chemical manufacturing plant with an SIC code of 2899.

Subsequent to the renewal application, the Department received a transfer application to change ownership from Nalco Company LLC to Nalco Production LLC as a part of the parent company, Ecolab Inc. undergoing an internal realignment of corporate entities. The application, received on January 24, 2020, noted no change to the flow or pollutant concentrations.

The current permit was issued on August 25, 2004 and became effective on September 1, 2004 through August 31, 2009. The permit is administratively extended.

The permit approved the discharge for non-contact cooling water and storm water runoff via Outfall 001. Additional outfalls consisted of storm water runoff only into the Connoquessing Creek (Outfalls 002, 003, 004, 005, 006, 014 and 015). Intake water for use at this facility is from the City of Ellwood. See Table 1. Outfalls current permit.

| Approve | Deny | Signatures | Date |
|---|---|---|---|
| X | | Angela Rohrer / Environmental Engineering Specialist | December 1, 2022 |
| X | | Michael E. Fifth, P.E. / Environmental Engineer Manager | December 7, 2022 |

**Summary of Review**

**Table 1. Outfalls current permit**

| Outfall No. | Latitude | | | Longitude | | | Name of Receiving Waters | Description |
|---|---|---|---|---|---|---|---|---|
| | Deg | Min | Sec | Deg | Min | Sec | | |
| 001 | 40 | 51 | 06 | -80 | 16 | 27 | Connoquenessing Creek | Non-contact cooling waters (NOCCW) and storm water runoff from the North Plant. NOCCW is generated from condensers (2), reactor jackets (3) and lab reactor (1). Storm waters discharged from the loading/unloading areas within the outfall drain to a collection sump. |
| 002 | 40 | 51 | 06 | -80 | 16 | 27 | UNT to Connoquenessing Creek | Discharges storm water runoff primarily from the Tank Farm area at the North Plant. |
| 003 | 40 | 51 | 05 | -80 | 16 | 27 | UNT to Connoquenessing Creek | Discharges storm water runoff primarily from the pit for the roadway culvert at the North Plant. All adjacent loading/unloading aeras drain into a separate waste sump. |
| 004 | 40 | 51 | 05 | -80 | 16 | 26 | UNT to Connoquenessing Creek | Discharges storm water runoff primarily from the surrounding yard and paved areas at the North Plant. |
| 005 | 40 | 51 | 03 | -80 | 16 | 34 | UNT to Connoquenessing Creek | Discharges storm water runoff only at the North Plant. This Outfall collects storm water from a large catch basin that is equipped with an air-actuates butterfly valve. |
| 007-012 | - | - | - | - | - | - | - | These outfalls have been combined and collectively discharge via a new storm water Outfall 014. |
| 013 | 40 | 40 | 30 | -80 | 16 | 29 | Connoquenessing Creek | Discharges storm water runoff only from the South Plant. Sheet flow from the parking lot is collected in a trench**.** |
| 014 | 40 | 40 | 30 | -80 | 16 | 29 | Connoquenessing Creek | Discharge is from a storm water pond, which collects all the storm water runoff from pervious areas identified as Outfalls 007 through 012. |
| 015 | 40 | 51 | 05 | -80 | 16 | 26 | UNT to Connoquenessing Creek | Discharges storm water runoff only at the North Plant. |

All discharges from the facility are now authorized by the facility's NPDES permit and any sumps remaining at the site either don't function as treatment systems and/or don't lead to point source discharges to waters of the Commonwealth. Therefore, Nalco requested termination of their WQM permits.

On August 30, 2021, the Department sent a Technical Deficiency Letter to Nalco Production, LLC. Nalco Production, LLC provided a response to the letter on October 8, 2021, including a permit renewal application and a Notice of Termination (NOT) for the four Water Quality Management permits.

- WQM Permit 0469405 – Issued in 1970 for an onsite sewage treatment plant. Since that time, the facility now routes to the municipal sanitary sewer. Any onsite sewage treatment was discontinued many years ago.

- WQM Permits 366I, 0475202, and 0476203 – Issued between 1966 and 1976 and authorized 1) the construction of various waste collection sumps (truck unloading area sump and sumps for reactor wash water, boiler blowdown, and spillage); and 2) discharges from those sumps to waters of the Commonwealth.
  The facility now operates such that all waste collected in the sumps are loaded onto a truck and transported offsite to an approved contracted waste treatment and disposal facility. Discharging activities from sumps to the waters of the Commonwealth were discontinued many years ago.

The Ellwood city plant is a batch manufacturing facility that formulate water treatment chemicals consisting of polymers, biocide dilutions, and latex polymers. The sites have 84 bulk tanks holding 893,350 gallons of raw materials and finished products. Shipping and Receiving operations occur at both sites. Hazardous materials are received by truck and railcar at the North Plant and by truck only at the South Plan. Oil storage in excess of 1,320 gallons occurs at both the North and South Plants combined.

**Summary of Review**

According to the application submitted in 2021, the outfall inventory changed, See Table 2. Outfalls 002, 003, 004 and 015 were consolidated with Outfall 001 (See Picture 1. Blue dots depict previous outfalls 002, 003, 004, 015. Blue arrow indicates waterflow direction). Outfalls 016, 017 and 018, were not previously identified.

**Picture 1. Previous outfalls 002, 003, 004, 015**

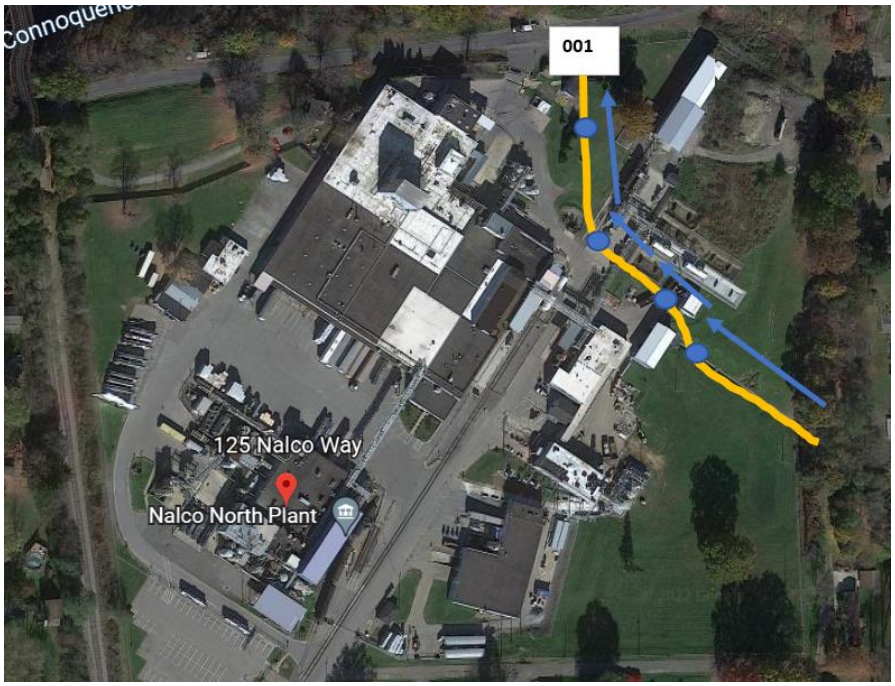



**Table 2. Outfalls inventory**

| Outfall No. | Latitude | | | Longitude | | | Name of Receiving Waters | Description |
|---|---|---|---|---|---|---|---|---|
| | Deg | Min | Sec | Deg | Min | Sec | | |
| 001 | 40 | 51 | 07.90 | -80 | 16 | 18.75 | Connoquenessing Creek | North Plant Non-Contact Cooling Weir, Stormwater-Tank Farm, yard and paved areas, roof drains. |
| 005 | 40 | 51 | 02.37 | -80 | 16 | 31.89 | | North Plant stormwater yard and paved areas, roof drains. |
| 006 | 40 | 50 | 33.99 | -80 | 16 | 33.21 | | South Plant, stormwater parking lot and yard. |
| 013 | 40 | 50 | 26.40 | -80 | 16 | 32.10 | | South Plant, stormwater tank farm, yard and paved areas, roof drains. |
| 014 | 40 | 50 | 27.19 | -80 | 16 | 33.26 | | South Plant, Stormwater roof drains and paved areas. |
| 016 | 40 | 50 | 31.96 | -80 | 16 | 33.31 | | South Plant, Stormwater roof drains and yard. |
| 017 | 40 | 50 | 31.43 | -80 | 16 | 33.37 | | South Plant, Stormwater roof drains and yard. |
| 018 | 40 | 50 | 30.52 | -80 | 16 | 33.39 | | South Plant, Stormwater roof drains and yard. |

On September 29, 2022, the Department requested a detailed description of the discharge from Outfall 001 regarding the non-contact cooling water. The permittee stated, “As for the non-contact cooling water, historically we would utilize once-through non-contact cooling water in one of our processes. However, a cooling tower was installed approx. 15 years ago, which eliminated the need for this once-through non-contact cooling water. In the unlikely event that the cooling tower would malfunction during a batch reaction we need the capability to cool it down, which is why we’ve maintained the ability to cool using the city water. However, I surveyed our production folks and no one can recall a time when we’ve used the city water for cooling since the cooling tower has been in place”. In the event that the cooling tower does malfunction, and the non-contact cooling water does discharge, the discharge flow rate would be 235 gpm for approximately 15-20 minutes.

| **Summary of Review** |
| --- |
| Public Participation<br><br>DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge. |

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 001 (IMP 101) | Design Flow (MGD) | 0.34 |
| Latitude | 40º 51' 07.90" | Longitude | -80º 16' 18.75" |
| Quad Name | Beaver Falls | Quad Code | 1203 |
| Wastewater Description: | Noncontact Cooling Water (NCCW), Stormwater | | |
| Receiving Waters | Connoquenessing Creek (WWF) | Stream Code | 34025 |
| NHD Com ID | 126216405 | RMI | 6.61 |
| Drainage Area | 418 square miles | Yield (cfs/mi$^2$) | 0.033 |
| $Q_{7-10}$ Flow (cfs) | 13.9 | $Q_{7-10}$ Basis | USGS StreamStats |
| Elevation (ft) | 889 | Slope (ft/ft) | 0.001 |
| Watershed No. | 20-C | Chapter 93 Class. | WWF |
| Existing Use | | Existing Use Qualifier | |
| Exceptions to Use | | Exceptions to Criteria | |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Metals, Pathogens, pH. | | |
| Source(s) of Impairment | Acid mine drainage. | | |
| TMDL Status | | Name | |
| Nearest Downstream Public Water Supply Intake | Beaver Falls Municipality Authority (Intake 16.8 MGD) | | |
| PWS Waters | Beaver River | Flow at Intake (cfs) | 640 |
| PWS RMI | 5.69 | Distance from Outfall (mi) | 13.6 |

**Changes Since Last Permit Issuance:** Outfalls 002, 003, 004 and 015 were consolidated with Outfall 001

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 005 | Design Flow (MGD) | 0 |
| Latitude | 40º 51' 02.37" | Longitude | -80º 16' 31.89" |
| Quad Name | Beaver Falls | Quad Code | 1203 |
| Wastewater Description: | North Plant stormwater yard and paved areas, roof drains. | | |
| Receiving Waters | Connoquenessing Creek (WWF) | Stream Code | 34025 |
| NHD Com ID | 126216403 | RMI | 6.61 |
| Watershed No. | 20-C | Chapter 93 Class. | WWF |
| Existing Use | | Existing Use Qualifier | |
| Exceptions to Use | | Exceptions to Criteria | |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Metals, Pathogens, pH | | |
| Source(s) of Impairment | Acid mine drainage | | |
| TMDL Status | | Name | |

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 006 | Design Flow (MGD) | 0 |
| Latitude | 40º 50' 33.99" | Longitude | -80º 16' 33.21" |
| Quad Name | Beaver Falls | Quad Code | 1203 |
| Wastewater Description: | South Plant, stormwater parking lot and yard. | | |
| Receiving Waters | Connoquenessing Creek (WWF) | Stream Code | 34025 |
| NHD Com ID | 126216352 | RMI | 7.2 |
| Watershed No. | 20-C | Chapter 93 Class. | WWF |
| Existing Use | | Existing Use Qualifier | |
| Exceptions to Use | | Exceptions to Criteria | |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Metals, Pathogens, pH | | |
| Source(s) of Impairment | Acid mine drainage | | |
| TMDL Status | | Name | |

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 013 | Design Flow (MGD) | 0 |
| Latitude | 40º 50' 26.40" | Longitude | -80º 16' 32.10" |
| Quad Name | | Quad Code | 12.03 |
| Wastewater Description: | South Plant, stormwater tank farm, yard and paved areas, roof drains. | | |
| Receiving Waters | Connoquenessing Creek (WWF) | Stream Code | 34025 |
| NHD Com ID | 126216352 | RMI | 8.38 |
| Watershed No. | 20-C | Chapter 93 Class. | WWF |
| Existing Use | | Existing Use Qualifier | |
| Exceptions to Use | | Exceptions to Criteria | |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Metals, Pathogens, pH | | |
| Source(s) of Impairment | Acid mine drainage | | |
| TMDL Status | | Name | |

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 014 | Design Flow (MGD) | 0 |
| Latitude | 40º 50' 27.19" | Longitude | -80º 16' 33.26" |
| Quad Name | Beaver Falls | Quad Code | 1203 |
| Wastewater Description: | South Plant, Stormwater roof drains and paved areas. | | |
| Receiving Waters | Connoquenessing Creek (WWF) | Stream Code | 34025 |
| NHD Com ID | 126216352 | RMI | 8.38 |
| Watershed No. | 20-C | Chapter 93 Class. | WWF |
| Existing Use | | Existing Use Qualifier | |
| Exceptions to Use | | Exceptions to Criteria | |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Metals, Pathogens, pH | | |
| Source(s) of Impairment | Acid mine drainage | | |
| TMDL Status | | Name | |

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 016 | Design Flow (MGD) | 0 |
| Latitude | 40º 50' 31.96" | Longitude | -80º 16' 33.31" |
| Quad Name | Beaver Falls | Quad Code | 1203 |
| Wastewater Description: | South Plant, Stormwater roof drains and yard. | | |
| Receiving Waters | Connoquenessing Creek (WWF) | Stream Code | 34025 |
| NHD Com ID | 126216405 | RMI | 7.30 |
| Watershed No. | 20-C | Chapter 93 Class. | WWF |
| Existing Use | | Existing Use Qualifier | |
| Exceptions to Use | | Exceptions to Criteria | |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Metals, Pathogens, pH | | |
| Source(s) of Impairment | Acid mine drainage | | |
| TMDL Status | | Name | |

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 017 | Design Flow (MGD) | 0 |
| Latitude | 40º 50' 31.43" | Longitude | -80º 16' 33.37" |
| Quad Name | Beaver Falls | Quad Code | 1203 |
| Wastewater Description: | South Plant, Stormwater roof drains and yard. | | |
| Receiving Waters | Connoquenessing Creek (WWF) | Stream Code | 34025 |
| NHD Com ID | 126216403 | RMI | 7.43 |
| Watershed No. | 20-C | Chapter 93 Class. | WWF |
| Existing Use | | Existing Use Qualifier | |
| Exceptions to Use | | Exceptions to Criteria | |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Metals, Pathogens, pH | | |
| Source(s) of Impairment | Acid mine drainage | | |
| TMDL Status | | Name | |

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 018 | Design Flow (MGD) | 0 |
| Latitude | 40º 50' 30.52" | Longitude | -80º 16' 33.39" |
| Quad Name | Beaver Falls | Quad Code | 1203 |
| Wastewater Description: | South Plant, Stormwater roof drains and yard. | | |
| Receiving Waters | Connoquenessing Creek (WWF) | Stream Code | 34025 |
| NHD Com ID | 126216403 | RMI | 8.37 |
| Watershed No. | 20-C | Chapter 93 Class. | WWF |
| Existing Use | | Existing Use Qualifier | |
| Exceptions to Use | | Exceptions to Criteria | |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Metals, Pathogens, pH | | |
| Source(s) of Impairment | Acid mine drainage | | |
| TMDL Status | | Name | |

**Development of Effluent Limitations**

| | | | |
|---|---|---|---|
| **Outfall No.** | 001 | **Design Flow (MGD)** | 0.34 |
| **Latitude** | 40º 51' 07.90" | **Longitude** | -80º 16' 18.75" |

**Wastewater Description:** Noncontact Cooling Water (NCCW), Stormwater

The non-contact cooling water discharges will be regulated at the Internal Monitoring Point 101.

**Technology-Based Limitations**

Outfall 001 will be subject to PAG-03 General Stormwater Permit conditions as a minimum requirement because the outfall discharges stormwater associated with industrial activity. Based on the site's SIC code, the corresponding appendix that would apply to the facility is Appendix F of the PAG-03. The proposed monitoring requirements are shown in Table 3 below. The benchmark values list below are not effluent limitation, and exceedances do not constitute permit violations. However, if the permittee's sampling demonstrates exceedances of benchmark values for two consecutive monitoring periods, the permit shall submit a Corrective Action Plan. This requirement will be included in Part C of the permit.

**Table 3. PAG-03 Appendix (F) Monitoring Requirements**

| Parameters | Monitoring Requirements | | Benchmark Values |
|---|---|---|---|
| | Minimum Measurement Frequency | Sample Type | |
| pH (S.U)) | 1 / 6 Months | Grab | XXX |
| Chemical Oxygen Demand (COD) (mg/L) | 1 / 6 Months | Grab | 120 |
| Total Suspended Solids (TSS) (mg/L) | 1 / 6 Months | Grab | 100 |
| Nitrate + Nitrite-Nitrogen (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Phosphorus (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Lead | 1 / 6 Months | Grab | XXX |
| Total Zinc (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Iron (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Aluminum (mg/L) | 1 / 6 Months | Grab | XXX |

**Water Quality-Based Effluent limitations**:

Water quality analyses are typically performed under low-flow (Q7-10) conditions. Stormwater discharges occur at variable rates and frequencies but not however during Q7-10 conditions. Since the discharges from Outfall 001 are composed of stormwater only, a formal water quality analysis cannot be accurately conducted. Accordingly, water quality-based effluent limitations based on water quality analyses are not proposed.

**Anti-Backsliding**

Previous limits can be used pursuant to EPA's anti-backsliding regulation, 40 CFR 122.44(l) and are displayed below in Table 4. These limitations are currently imposed on Outfall 001.

**Table 4. Current Limitations at Outfall 001**

| Parameter | Monthly Average | Daily Maximum | Measurement Frequency | Sample Type |
|---|---|---|---|---|
| Flow (mgd) | Monitor | Monitor | 1/Week | Measured |
| Temperature (ºF) | Monitor | 110 | 1/Week | I-s |
| Total Residual Chlorine | Monitor | Monitor | 1/Week | Grab |
| pH (S.U) | Not less than 6.0 nor greater than 9.0 | | 1/Week | Grab |

**Proposed Final Effluent Limitations**

The proposed effluent monitoring requirements for Outfall 001 are displayed in Table 5 below, they are the most stringent values from the above effluent limitation development. * The monitoring frequency for the existing monitoring requirements has been changed from 1/week to semi-annually to reflect that monitoring frequency in the PAG-03 general permit. The flow monitoring requirement has been removed from the permit because flow monitoring on stormwater discharges is generally not practical. The Draft Permit requires submission of a Corrective Action Plan when there are two consecutive exceedances of the benchmark values, which are also included in the Part C condition. The benchmark values are displayed below in Table 5. These values are not effluent limitations, an exceedance of the benchmark value is not a violation. As described above, if there are two consecutive exceedances of the benchmark value, a Corrective Action Plan must be conducted to evaluate site stormwater controls and BMPs. Benchmark monitoring is a feedback tool, along with routine inspections and visual assessments, for assessing the effectiveness of stormwater controls and BMPs. An exceedance of the benchmark provides permittees with an indication that the facility's controls may not be sufficiently controlling pollutants in stormwater.

*The previous limits are not going to be imposed because the limits were developed for non-contact cooling water contributions to outfall 001, however, the non-contact cooling water to Outfall 001 is now monitored separately at IMP 101, these previous limitations will be considered when developing the limitations at IMP 101.

**Table 5. Proposed Effluent Monitoring Requirements for Outfall 001**

| Parameter | Max Daily Concentration | Benchmark Values (mg/L) | Measurement Frequency | Sample Type |
|---|---|---|---|---|
| pH (S.U)) | Report | XXX | 1/6 Months | Grab |
| Chemical Oxygen Demand (COD) (mg/L) | Report | 120 | 1/6 Months | Grab |
| Total Suspended Solids (TSS) (mg/L) | Report | 100.0 | 1/6 Months | Grab |
| Nitrate + Nitrite-Nitrogen (mg/L) | Report | XXX | 1/6 Months | Grab |
| Total Phosphorus (mg/L) | Report | XXX | 1/6 Months | Grab |
| Total Lead | Report | XXX | 1/6 Months | Grab |
| Total Zinc (mg/L) | Report | XXX | 1/6 Months | Grab |
| Total Iron (mg/L) | Report | XXX | 1/6 Months | Grab |
| Total Aluminum (mg/L) | Report | XXX | 1/6 Months | Grab |

## Development of Effluent Limitations

**IMP No.** 101 **Design Flow (MGD)** 0.34
**Latitude** 40º 51' 07.90" **Longitude** -80º 16' 18.75"
**Wastewater Description:** Noncontact Cooling Water (NCCW)

### Technology Based Limitations

Regulatory Effluent Standards and Monitoring Requirements

Flow monitoring is required pursuant to 25 Pa. Code § 92a.61(d)(1).

Temperature limits will be imposed per the Department's "*Implementation Guidance for Temperature Criteria*." As a policy, DEP normally imposes a maximum temperature limit of 110°F on discharges that contain residual heat. The limit is intended as a safety measure to protect sampling personnel or anyone who may come into contact with the heated discharge where it enters the receiving water.

Pennsylvania regulations at 25 Pa. Code § 92a.48(b) require the imposition of technology-based TRC limits for facilities that use chlorination and that are not already subject to TRC limits based on applicable federal ELGs or a facility-specific BPJ evaluation.

Effluent standards for pH are also imposed on industrial wastes by 25 Pa. Code § 95.2(1) as indicated in Table 6.

**Table 6. Regulatory Effluent Standards and Monitoring Requirements for IMP 101**

| Parameter | Monthly Average | Daily Maximum | IMAX | Units |
|---|---|---|---|---|
| Flow | Monitor and Report | | XXX | MGD |
| Total Residual Chlorine | 0.5 | 1.0 | XXX | mg/L |
| Temperature | XXX | XXX | 110 | °F |
| pH | Not less than 6.0 nor greater than 9.0 | | | S.U. |

### Water Quality-Based Limitations

Toxic Pollutants Water Quality Analysis

The discharges from IMP 101 are non-contact cooling water and are non-process discharges, therefore a toxic pollutant water quality analysis was not conducted for the discharge from IMP 101.

Thermal WQBELs for Heated Discharges

Thermal WQBELs are evaluated using a DEP program called "Thermal Discharge Limit Calculation Spreadsheet" created with Microsoft Excel for Windows. The program calculates temperature WLAs through the application of a heat transfer equation, which takes two forms in the program depending on the source of the facility's cooling water. In Case 1, intake water to a facility is from the receiving stream. In Case 2, intake water is from a source other than the receiving stream (e.g., municipal water supply). The determination of which case applies to a given discharge is determined by the input data which include the receiving stream flow rate ($Q_{7-10}$ or the minimum regulated flow for large rivers), the stream intake flow rate, external source intake flow rates, consumptive flow rates and site-specific ambient stream temperatures. Case 1 limits are generally expressed as heat rejection rates while Case 2 limits are usually expressed as temperatures.

Since the temperature criteria from 25 Pa. Code Chapter 93.7(a) are expressed on monthly and semi-monthly bases for three different aquatic life-uses—cold water fishes, warm water fishes and trout stocking—the program generates monthly and semi-monthly limits for each use. DEP selects the output that corresponds to the aquatic life-use of the receiving stream and consequently which limits apply to the discharge. Temperature WLAs are bounded by an upper limit of 110°F for the safety of sampling personnel and anyone who may come into contact with the heated discharge where it enters the receiving water. If no WLAs below 110°F are calculated, an instantaneous maximum limit of 110°F is recommended by the program.

Discharges from IMP 101 are classified under Case 2 because water is obtained from water supply. The flow rate used for modeling is the maximum discharge flow reported from IMP 101, 0.34 MGD. The results of the thermal analysis, included in Attachment B, indicate that no WQBELs for temperature are required at IMP 101.

Total Residual Chlorine

To determine if WQBELs are required for discharges containing total residual chlorine (TRC), a discharge evaluation is performed using a DEP program called TRC_CALC created with Microsoft Excel for Windows. TRC_CALC calculates TRC Waste Load Allocations (WLAs) through the application of a mass balance model which considers TRC losses due to stream and discharge chlorine demands and first-order chlorine decay. Input values for the program include flow rates and chlorine demands for the receiving stream and the discharge, the number of samples taken per month, coefficients of TRC variability, partial mix factors, and an optional factor of safety. The mass balance model calculates WLAs for acute and chronic criteria that are then converted to long term averages using calculated multipliers. The multipliers are functions of the number of samples taken per month and the TRC variability coefficients (normally kept at default values unless site specific information is available). The most stringent limitation between the acute and chronic long-term averages is converted to an average monthly limit for comparison to the BAT average monthly limit of 0.5 mg/l from 25 Pa. Code § 92a.48(b)(2). The more stringent of these average monthly TRC limitations is imposed in the permit. The results of the modeling, included in Attachment C, indicate that no WQBELs are required for TRC.

**Anti-backsliding**

Previous limits can be used pursuant to EPA's anti-backsliding regulation, 40 CFR 122.44(l) and are displayed below in Table 7. The non-contact cooling water at Outfall 001 is now monitored at IMP 101.

**Table 7. Existing Effluent Limitations at Outfall 001**

| Parameter | Monthly Average | Daily Maximum | Instantaneous Maximum | Measurement Frequency | Sample Type |
|---|---|---|---|---|---|
| Flow (MGD) | Monitor | Monitor | XXX | 1/Week | Measure |
| Temperature (°F) | XXX | XXX | 110 | 1/Week | I-S |
| Total Residual Chlorine | Monitor | Monitor | XXX | 1/Week | Grab |
| pH (S.U.) | Not less than 6.0 nor greater than 9.0 | | | 1/Week | Grab |

**Proposed Effluent Limitations for IMP 101**

The proposed effluent limitations and monitoring requirements for IMP 101 are shown below in Table 8. The limits are the most stringent values from the above limitation analysis.

**Table 8. Proposed Effluent Limitations at IMP 101**

| Parameter | Instant. Minimum | Monthly Average | Daily Maximum | Instant. Maximum | Measurement Frequency | Sample Type |
|---|---|---|---|---|---|---|
| Flow (MGD) | XXX | Monitor | Monitor | XXX | 1/discharge | Measure |
| Total Residual Chlorine (mg/L) | XXX | 0.5 | 1.0 | XXX | 1/discharge | Grab |
| Temperature (°F) | XXX | XXX | XXX | 110 | 1/discharge | I-S |
| pH (S.U.) | 6.0 | XXX | XXX | 9.0 | 1/discharge | Grab |

**Development of Effluent Limitations**

| | | | |
|---|---|---|---|
| **Outfall No.** | 005 | **Design Flow (MGD)** | 0 |
| **Latitude** | 40º 51' 02.37" | **Longitude** | -80º 16' 31.89" |
| **Outfall No.** | 006 | **Design Flow (MGD)** | 0 |
| **Latitude** | 40º 50' 33.99" | **Longitude** | -80º 16' 33.21" |
| **Outfall No.** | 013 | **Design Flow (MGD)** | 0 |
| **Latitude** | 40º 50' 26.40" | **Longitude** | -80º 16' 32.10" |
| **Outfall No.** | 014 | **Design Flow (MGD)** | 0 |
| **Latitude** | 40º 50' 27.19" | **Longitude** | -80º 16' 33.26" |
| **Outfall No.** | 016 | **Design Flow (MGD)** | 0 |
| **Latitude** | 40º 50' 31.96" | **Longitude** | -80º 16' 33.31" |
| **Outfall No.** | 017 | **Design Flow (MGD)** | 0 |
| **Latitude** | 40º 50' 31.43" | **Longitude** | -80º 16' 33.37" |
| **Outfall No.** | 018 | **Design Flow (MGD)** | 0 |
| **Latitude** | 40º 50' 30.52" | **Longitude** | -80º 16' 33.39" |

**Wastewater Description:** Stormwater

**Technology-Based Limitations**

Stormwater Technology Limits

Outfalls 005, 006, 013, 014, 016, 017 and 018 will be subject to PAG-03 General Stormwater Permit conditions as a minimum requirement because each outfall discharges stormwater associated with industrial activity. Based on the site's SIC code, the corresponding appendix that would apply to the facility is Appendix F of the PAG-03. The proposed monitoring requirements are shown in Table 9 below. The benchmark values list below are not effluent limitation, and exceedances do not constitute permit violations. However, if the permittee's sampling demonstrates exceedances of benchmark values for two consecutive monitoring periods, the permit shall submit a Corrective Action Plan. This requirement will be included in Part C of the permit.

**Table 9. PAG-03 Appendix (F) Monitoring Requirements**

| Parameters | Monitoring Requirements | | Benchmark Values |
|---|---|---|---|
| | Minimum Measurement Frequency | Sample Type | |
| pH (S.U)) | 1 / 6 Months | Grab | XXX |
| Chemical Oxygen Demand (COD) (mg/L) | 1 / 6 Months | Grab | 120 |
| Total Suspended Solids (TSS) (mg/L) | 1 / 6 Months | Grab | 100 |
| Nitrate + Nitrite-Nitrogen (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Phosphorus (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Lead | 1 / 6 Months | Grab | XXX |
| Total Zinc (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Iron (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Aluminum (mg/L) | 1 / 6 Months | Grab | XXX |

## Water Quality-Based Limitations

Stormwater WQBELs

Water quality analyses are typically performed under low-flow (Q7-10) conditions. Stormwater discharges occur at variable rates and frequencies but not however during Q7-10 conditions. Since the discharges from Outfalls 005, 006, 013, 014, 016, 017 and 0018 are composed entirely of stormwater, a formal water quality analysis cannot be accurately conducted. Accordingly, water quality-based effluent limitations based on water quality analyses are not proposed.

## Anti-Backsliding

Previous limits at Outfall 005, 006, 013, 014, 016, 017 and 0018 can be used pursuant to EPA's anti-backsliding regulation, 40 CFR 122.44(l); however, these outfalls did not have any limitations in the current permit.

## Proposed Effluent Monitoring Requirements

The proposed effluent requirements for Outfall 005, 006, 013, 014, 016, 017 and 0018 are displayed in Table 10 below. A Part C condition is included in the Draft permit requiring submission of Corrective Action Plan when there are two consecutive exceedances of the benchmark values. The benchmark values are displayed below in Table 10, and also included in the Part C condition. These values are from EPA's Multisector General Permit document. These values are not effluent limitations, and exceedance of the benchmark values is not a violation. As described above, if there are two consecutive exceedances of the benchmark value, a Corrective Action Plan must be conducted to evaluate site stormwater controls and BMPs. Benchmark monitoring is a feedback tool, along with routine inspections and visual assessments, for assessing the effectiveness of stormwater controls and BMPs. An exceedance of the benchmark provides permittees with an indication that the facility's controls may not be sufficiently controlling pollutants in stormwater.

**Table 10. PAG-03 Appendix (F) Monitoring Requirements**

| Parameters | Monitoring Requirements | | Benchmark Values |
|---|---|---|---|
| | Minimum Measurement Frequency | Sample Type | |
| pH (S.U)) | 1 / 6 Months | Grab | XXX |
| Chemical Oxygen Demand (COD) (mg/L) | 1 / 6 Months | Grab | 120 |
| Total Suspended Solids (TSS) (mg/L) | 1 / 6 Months | Grab | 100 |
| Nitrate + Nitrite-Nitrogen (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Phosphorus (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Lead | 1 / 6 Months | Grab | XXX |
| Total Zinc (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Iron (mg/L) | 1 / 6 Months | Grab | XXX |
| Total Aluminum (mg/L) | 1 / 6 Months | Grab | XXX |

| Tools and References Used to Develop Permit | |
|---|---|
| | |
| ☐ | WQM for Windows Model (see Attachment) |
| ☐ | Toxics Management Spreadsheet (see Attachment) |
| ☒ | TRC Model Spreadsheet (see Attachment B) |
| ☒ | Temperature Model Spreadsheet (see Attachment C) |
| ☐ | Water Quality Toxics Management Strategy, 361-0100-003, 4/06. |
| ☐ | Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97. |
| ☐ | Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98. |
| ☐ | Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96. |
| ☐ | Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97. |
| ☐ | Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97. |
| ☐ | Pennsylvania CSO Policy, 385-2000-011, 9/08. |
| ☐ | Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03. |
| ☐ | Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97. |
| ☐ | Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97. |
| ☐ | Implementation Guidance Design Conditions, 391-2000-006, 9/97. |
| ☐ | Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004. |
| ☐ | Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997. |
| ☐ | Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99. |
| ☐ | Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004. |
| ☐ | Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97. |
| ☐ | Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008. |
| ☐ | Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994. |
| ☐ | Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09. |
| ☐ | Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97. |
| ☐ | Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97. |
| ☐ | Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99. |
| ☐ | Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999. |
| ☐ | Design Stream Flows, 391-2000-023, 9/98. |
| ☐ | Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98. |
| ☐ | Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97. |
| ☐ | Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07. |
| ☐ | SOP: |
| ☐ | Other: |

## Attachments

Attachment A: USGS Streams Stats Report

Attachment B: IMP 101 Temperature Model Spreadsheet Evaluation

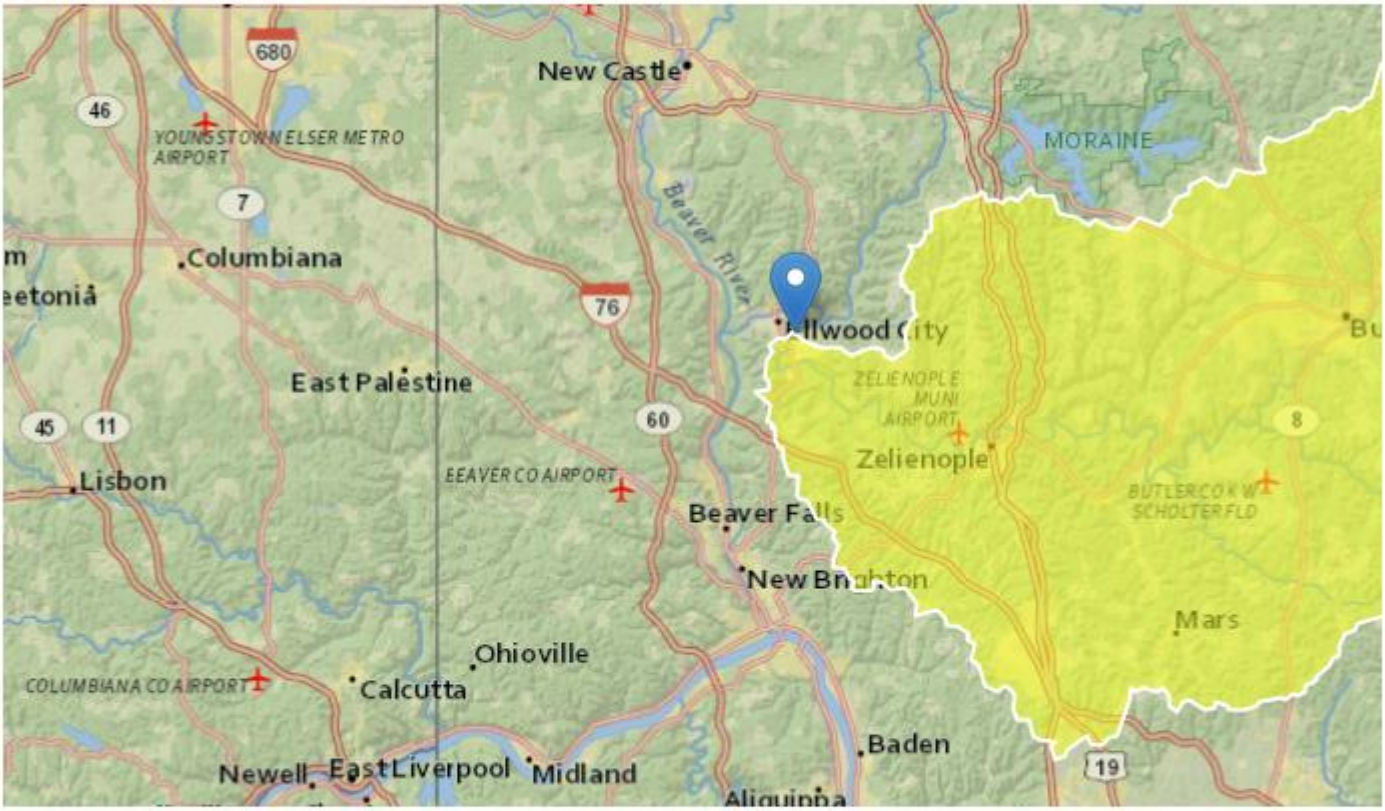
Attachment C: IMP 101 TRC Spreadsheet Evaluation

## Attachment A.

## USGS Streams Stats Report

# PA0003824 - StreamStats Report - Outfall 001

**Region ID:** PA
**Workspace ID:** PA20221014175148641000
**Clicked Point (Latitude, Longitude):** 40.85308, -80.27279
**Time:** 2022-10-14 13:52:10 -0400




Collapse All

## Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| CARBON | Percentage of area of carbonate rock | 0 | percent |
| DRNAREA | Area that drains to a point on a stream | 418 | square miles |

## Attachment B.

## IMP 101 Temperature Model Spreadsheet Evaluation

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Facility:** | **Nalco Products LLC** | | | | | | | |
| **Permit Number:** | PA0003824 | | | | | | | **PMF** |
| **Stream Name:** | Connoquenessing Creek | | | | | | | 0.25 |
| **Analyst/Engineer:** | Angela Rohrer | | | | | | | |
| **Stream Q7-10 (cfs):** | 13.9 | | | | | | | |
| | | | | | | | | |
| | **Facility Flows** | | | | | **Stream Flows** | | |
| | Intake (Stream) (MGD) | Intake (External) (MGD) | Consumptive Loss (MGD) | Discharge Flow (MGD) | | Upstream Stream Flow (cfs) | Adjusted Stream Flow (cfs) | Downstream Stream Flow (cfs) |
| Jan 1-31 | 0 | 0.34 | 0 | 0.34 | | 44.48 | 11.12 | 11.65 |
| Feb 1-29 | 0 | 0.34 | 0 | 0.34 | | 48.65 | 12.16 | 12.69 |
| Mar 1-31 | 0 | 0.34 | 0 | 0.34 | | 97.30 | 24.33 | 24.85 |
| Apr 1-15 | 0 | 0.34 | 0 | 0.34 | | 129.27 | 32.32 | 32.84 |
| Apr 16-30 | 0 | 0.34 | 0 | 0.34 | | 129.27 | 32.32 | 32.84 |
| May 1-15 | 0 | 0.34 | 0 | 0.34 | | 70.89 | 17.72 | 18.25 |
| May 16-30 | 0 | 0.34 | 0 | 0.34 | | 70.89 | 17.72 | 18.25 |
| Jun 1-15 | 0 | 0.34 | 0 | 0.34 | | 41.70 | 10.43 | 10.95 |
| Jun 16-30 | 0 | 0.34 | 0 | 0.34 | | 41.70 | 10.43 | 10.95 |
| Jul 1-31 | 0 | 0.34 | 0 | 0.34 | | 23.63 | 5.91 | 6.43 |
| Aug 1-15 | 0 | 0.34 | 0 | 0.34 | | 19.46 | 4.87 | 5.39 |
| Aug 16-31 | 0 | 0.34 | 0 | 0.34 | | 19.46 | 4.87 | 5.39 |
| Sep 1-15 | 0 | 0.34 | 0 | 0.34 | | 15.29 | 3.82 | 4.35 |
| Sep 16-30 | 0 | 0.34 | 0 | 0.34 | | 15.29 | 3.82 | 4.35 |
| Oct 1-15 | 0 | 0.34 | 0 | 0.34 | | 16.68 | 4.17 | 4.70 |
| Oct 16-31 | 0 | 0.34 | 0 | 0.34 | | 16.68 | 4.17 | 4.70 |
| Nov 1-15 | 0 | 0.34 | 0 | 0.34 | | 22.24 | 5.56 | 6.09 |
| Nov 16-30 | 0 | 0.34 | 0 | 0.34 | | 22.24 | 5.56 | 6.09 |
| Dec 1-31 | 0 | 0.34 | 0 | 0.34 | | 33.36 | 8.34 | 8.87 |

*Please forward all comments to Tom Starosta at 717-787-4317, tstarosta@state.pa.us.*

Version 2.0 -- 07/01/2005 Reference: Implementation Guidance for Temperature Criteria, DEP-ID: 391-2000-017

NOTE: The user can only edit fields that are blue.

NOTE: MGD x 1.547 = cfs.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Facility: | **Nalco Products LLC** | | | | | | |
| Permit Number: | PA0003824 | | | | | | |
| Stream: | Connoquenessing Creek | | | | | | |
| | **WWF Criteria** | **CWF Criteria** | **TSF Criteria** | **316 Criteria** | | **Q7-10 Multipliers** | **Q7-10 Multipliers** |
| | (ºF) | (ºF) | (ºF) | (ºF) | | (Used in Analysis) | (Default - Info Only) |
| Jan 1-31 | 40 | 38 | 40 | 0 | | 3.2 | 3.2 |
| Feb 1-29 | 40 | 38 | 40 | 0 | | 3.5 | 3.5 |
| Mar 1-31 | 46 | 42 | 46 | 0 | | 7 | 7 |
| Apr 1-15 | 52 | 48 | 52 | 0 | | 9.3 | 9.3 |
| Apr 16-30 | 58 | 52 | 58 | 0 | | 9.3 | 9.3 |
| May 1-15 | 64 | 54 | 64 | 0 | | 5.1 | 5.1 |
| May 16-30 | 72 | 58 | 68 | 0 | | 5.1 | 5.1 |
| Jun 1-15 | 80 | 60 | 70 | 0 | | 3 | 3 |
| Jun 16-30 | 84 | 64 | 72 | 0 | | 3 | 3 |
| Jul 1-31 | 87 | 66 | 74 | 0 | | 1.7 | 1.7 |
| Aug 1-15 | 87 | 66 | 80 | 0 | | 1.4 | 1.4 |
| Aug 16-31 | 87 | 66 | 87 | 0 | | 1.4 | 1.4 |
| Sep 1-15 | 84 | 64 | 84 | 0 | | 1.1 | 1.1 |
| Sep 16-30 | 78 | 60 | 78 | 0 | | 1.1 | 1.1 |
| Oct 1-15 | 72 | 54 | 72 | 0 | | 1.2 | 1.2 |
| Oct 16-31 | 66 | 50 | 66 | 0 | | 1.2 | 1.2 |
| Nov 1-15 | 58 | 46 | 58 | 0 | | 1.6 | 1.6 |
| Nov 16-30 | 50 | 42 | 50 | 0 | | 1.6 | 1.6 |
| Dec 1-31 | 42 | 40 | 42 | 0 | | 2.4 | 2.4 |
| NOTES: | | | | | | | |
| WWF= Warm water fishes | | | | | | | |
| CWF= Cold water fishes | | | | | | | |
| TSF= Trout stocking | | | | | | | |

| Facility: | **Nalco Products LLC** | | | | | | |
|---|---|---|---|---|---|---|---|
| Permit Number: | PA0003824 | | | | | | **PMF** |
| Stream: | Connoquenessing Creek | | | | | | 0.25 |
| | **WWF** Ambient Stream Temperature (°F) (Default) | Ambient Stream Temperature (°F) (Site-specific data) | Target Maximum Stream Temp.[1] (°F) | **WWF** Daily WLA[2] (Million BTUs/day) | | **WWF** Daily WLA[3] (°F) | at Discharge Flow (MGD) |
| Jan 1-31 | 35 | 0 | 40 | N/A -- Case 2 | | 110.0 | 0.34 |
| Feb 1-29 | 35 | 0 | 40 | N/A -- Case 2 | | 110.0 | 0.34 |
| Mar 1-31 | 40 | 0 | 46 | N/A -- Case 2 | | 110.0 | 0.34 |
| Apr 1-15 | 47 | 0 | 52 | N/A -- Case 2 | | 110.0 | 0.34 |
| Apr 16-30 | 53 | 0 | 58 | N/A -- Case 2 | | 110.0 | 0.34 |
| May 1-15 | 58 | 0 | 64 | N/A -- Case 2 | | 110.0 | 0.34 |
| May 16-30 | 62 | 0 | 72 | N/A -- Case 2 | | 110.0 | 0.34 |
| Jun 1-15 | 67 | 0 | 80 | N/A -- Case 2 | | 110.0 | 0.34 |
| Jun 16-30 | 71 | 0 | 84 | N/A -- Case 2 | | 110.0 | 0.34 |
| Jul 1-31 | 75 | 0 | 87 | N/A -- Case 2 | | 110.0 | 0.34 |
| Aug 1-15 | 74 | 0 | 87 | N/A -- Case 2 | | 110.0 | 0.34 |
| Aug 16-31 | 74 | 0 | 87 | N/A -- Case 2 | | 110.0 | 0.34 |
| Sep 1-15 | 71 | 0 | 84 | N/A -- Case 2 | | 110.0 | 0.34 |
| Sep 16-30 | 65 | 0 | 78 | N/A -- Case 2 | | 110.0 | 0.34 |
| Oct 1-15 | 60 | 0 | 72 | N/A -- Case 2 | | 110.0 | 0.34 |
| Oct 16-31 | 54 | 0 | 66 | N/A -- Case 2 | | 110.0 | 0.34 |
| Nov 1-15 | 48 | 0 | 58 | N/A -- Case 2 | | 110.0 | 0.34 |
| Nov 16-30 | 42 | 0 | 50 | N/A -- Case 2 | | 110.0 | 0.34 |
| Dec 1-31 | 37 | 0 | 42 | N/A -- Case 2 | | 110.0 | 0.34 |

[1] This is the maximum of the WWF WQ criterion or the ambient temperature. The ambient temperature may be either the design (median) temperature for WWF, or the ambient stream temperature based on site-specific data entered by the user. A minimum of 1°F above ambient stream temperature is allocated.

[2] The WLA expressed in Million BTUs/day is valid for Case 1 scenarios, and disabled for Case 2 scenarios.

[3] The WLA expressed in °F is valid only if the limit is tied to a daily discharge flow limit (may be used for Case 1 or Case 2). WLAs greater than 110°F are displayed as 110°F.

## Attachment C.

## IMP 101 TRC Spreadsheet Evaluation

## TRC EVALUATION

| | | | |
|---|---|---|---|
| 13.9 | = Q stream (cfs) | 0.5 | = CV Daily |
| 0.34 | = Q discharge (MGD) | 0.5 | = CV Hourly |
| 4 | = no. samples | 0.25 | = AFC_Partial Mix Factor |
| 0.3 | = Chlorine Demand of Stream | 0.25 | = CFC_Partial Mix Factor |
| 0 | = Chlorine Demand of Discharge | 15 | = AFC_Criteria Compliance Time (min) |
| 0.5 | = BAT/BPJ Value | 720 | = CFC_Criteria Compliance Time (min) |
| | = % Factor of Safety (FOS) | | =Decay Coefficient (K) |

| Source | Reference | AFC Calculations | Reference | CFC Calculations |
|---|---|---|---|---|
| TRC | 1.3.2.iii | WLA afc = 2.127 | 1.3.2.iii | WLA cfc = 2.066 |
| PENTOXSD TRG | 5.1a | LTAMULT afc = 0.373 | 5.1c | LTAMULT cfc = 0.581 |
| PENTOXSD TRG | 5.1b | LTA_afc= 0.792 | 5.1d | LTA_cfc = 1.201 |

| Source | | Effluent Limit Calculations | |
|---|---|---|---|
| PENTOXSD TRG | 5.1f | AML MULT = 1.720 | |
| PENTOXSD TRG | 5.1g | AVG MON LIMIT (mg/l) = 0.500 | BAT/BPJ |
| | | INST MAX LIMIT (mg/l) = 1.170 | |

| | |
|---|---|
| WLA afc | **(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...** **...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)** |
| LTAMULT afc | EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5) |
| LTA_afc | wla_afc*LTAMULT_afc |
| **WLA_cfc** | **(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc) )...** **...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)** |
| LTAMULT_cfc | EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5) |
| **LTA_cfc** | wla_cfc*LTAMULT_cfc |
| AML MULT | EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1)) |
| AVG MON LIMIT | MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT) |
| INST MAX LIMIT | **1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)** |

**(0.011/EXP(-K*CFC_tc/1440))+(((CFC_Yc*Qs*0.011)/(1.547*Qd)....**
**....*EXP(-K*CFC_tc/1440)))+Xd+(CFC_Yc*Qs*Xs/1.547*Qd))*(1-FOS/100)**