pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0009466**
Facility Type	**Industrial**	APS ID	**563407**
Major / Minor	**Minor**	Authorization ID	**1182825**

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

Applicant and Facility Information

Applicant Name	**Vale Wood Farms**	Facility Name	**Vale Wood Dairy**
Applicant Address	517 Vale Wood Road	Facility Address	517 Vale Wood Road
	Loretto, PA 15940-6605		Loretto, PA 15940-6605
Applicant Contact	Carissa Westrick	Facility Contact	Carissa Westrick
Applicant Phone	(814) 886-7171	Facility Phone	(814) 886-7171
Client ID	25297	Site ID	244507
SIC Code	2026 & 2024	Municipality	Munster Township
SIC Description	Manufacturing - Fluid Milk & Ice Cream	County	Cambria
Date Application Received	May 1, 2017	EPA Waived?	Yes
Date Application Accepted	May 02, 2019	If No, Reason	

Purpose of Application: Renewal of NPDES permit for discharge of treated Industrial Waste.

Summary of Review

Vale Wood Dairy had an Individual Permit for the treatment and discharge of process wastewater at its facility located in Munster Township, Cambria County. The previous cycle of permit coverage expired on October 31, 2017. The Department received the routine renewal application on May 1, 2017. The SIC codes of the facility are 2026 – Fluid Milk Manufacturing and 2024 – Ice Cream Manufacturing.

The existing permit identifies two (2) Outfalls (001 and 002). Outfall 001 is the primary outfall discharging the industrial process wastewater. Outfall 002 was the boiler blow-down, which has been routed to Outfall 001 per Department suggestion. The renewal application requested that Outfall 002 be maintained as an emergency discharge of the boiler blow-down.

The facility was issued a Water Quality Management Permit (No. 56314) on May 27, 1963 for waste stabilization ponds. There are three small earthen stabilization ponds followed by two larger earthen ponds, a chlorinator, a chlorine contact tank, and then discharge.

Facility Overview

Vale Wood Dairy Farms processes milk 3-4 days per week typically. The source of the milk is from their own farm and several other local farms. Many dairy products are made onsite and shipped to customers. The products can also be purchased at the on-site store.

Vale Wood Dairy produces fluid milk and ice cream, and in the process creates process wastes resulting from cleaning and water flushes. The process waste flows to 5 facultative lagoons, 3 small lagoons and two larger lagoons, before entering a

Approve	Deny	Signatures	Date
X		Curtis Holes, P.E. / Environmental Engineering	March 07, 2024
X		Michael E. Fifth, P.E. / Environmental Engineer Manager	March 19, 2024

Summary of Review

chlorine contact tank before discharge. The facility is not presently using chlorination and is able to meet the fecal coliform limits without it.

Review of the DMR's from March 2020 to 2022 revealed nineteen (19) effluent violations. The Department conducted a Wastewater Treatment System Site Assessment on September 18, 2023, Jeremy D. Miller, Wastewater Treatment Operations Advisor, Thomas Brown, Water Program Specialist (Annuitant), Kristen Gearhart, Water Quality Specialist and Curt Holes, Environmental Engineer, met with Carissa Westrik, Director of Business Development, at the site to discuss issues with effluent discharge exceedances the process wastewater treatment plant.

Vale Wood Dairy produces fluid milk and ice cream, and in the process creates process wastes resulting from cleaning and water flushes. The process waste flows to 5 facultative lagoons, 3 small lagoons and two larger lagoons, before entering a chlorine contact tank before discharge. The facility is not presently using chlorination and is able to meet the fecal coliform limits without it.

Milk and milk byproducts contain a high concentration of dissolved BOD. In the treatment lagoon, bacteria feed on the BOD and remove it from the waste stream producing treated effluent with reduced BOD values. Keeping the bacteria healthy and alive in the lagoon is critically important to the success of this treatment. Being a food processor, the dairy is utilizing strong disinfectants to clean the food processing equipment. This disinfectant is being washed into the drains and ultimately into the lagoons where it continues to kill and destroy bacteria.

Lagoons are designed to contain the wastewater and allow bacteria to digest and eat the BOD in the wastewater before discharge. Removing the food/waste also reduces the dissolved and suspended solids creating a clear effluent for discharge. Clear water in a lagoon is likely to start growing algae. Algae in water behaves like BOD_5 as it respirates naturally and can also add to TSS values in the discharge.

Recommendations from the September 18, 2023 Wastewater Treatment System Site Assessment are to determine if the cause of the BOD and TSS exceedances are from insufficient treatment, i.e. bacteria dying off in the lagoon from the disinfectant, or algae. It is recommended that a filtered BOD_5 test be conducted. Once the water is filtered for TSS, use the filtrate for a BOD_5 test. If the filtered BOD_5 test and non-filtered BOD_5 test are the same, the issue is with incomplete treatment in the lagoons, if the values differ substantially the issue are likely algae.

- It is recommended that a cBOD5 test be conducted after each lagoon so that the efficiency of each lagoon can be measured. For this test grab samples taken relatively close in time to each other would be sufficient.

- The NPDES permit only requires grab samples to determine compliance with effluent limits. 24-hour composite samples may help show a better average of what the plant is discharging and what the stream is receiving. Purchasing a compositor and installing it at the outfall is recommended.

- The chlorine contact tank is full of solids. Although the process is not being utilized, the solids could affect the discharge. It is recommended that the tank be pumped and cleaned. The three smaller, upfront lagoons are cleaned every spring. A sludge profile of each lagoon should be conducted to determine if cleaning should be scheduled more often than yearly.

The facility started running a standard BOD_5 test along with filtering the sample prior to the BOD_5 test and the data confirms that the elevated TSS and BOD_5 is from algae in the lagoons not from the industrial process wastewater. The Technical Assistance sample data yielded the following results. The Outfall 001 effluent BOD_5 was 26.6 $^{mg}/_{L}$, of which 5.82 $^{mg}/_{L}$ was soluble BOD. This means that 80% of the total BOD in the sample result was caused by algae in the lagoon not poorly treated wastewater. The Outfall 001 effluent TSS was 57 mg/L, which approximately 80% or more of this concentration is likely from the algae in the lagoon as well.

Vale Wood Dairy produces fluid milk, ice cream, cottage cheese, butter, and sour cream/dip, and in the process creates process wastes resulting from cleaning and water flushes. The process flow diagram is presented in Appendix A. The historic average annual production is 858,267 gallons of milk processed. The anticipated average annual production for the next five years is 925,000 gallons of milk processed. The facility states that their milk sales and processing capacity should remain steady for the next five years.

Summary of Review

According to the application, the facility produces four products with federal ELGs contained in the Dairy Products Processing point source category. The ELGs include:

- Fluid Product Subcategory (Subpart B) found at 40 CFR 405.22(b) (BPT);
- Butter Subcategory (Subpart D) found at 40 CFR 405.42(b) (BPT);
- Cottage Cheese and Cultured Cream Cheese Subcategory (Subpart E) found at 40 CFR 405.52(b) (BPT); and
- Ice Cream, Frozen Desserts, Novelties and Other Dairy Desserts Subcategory (Subpart H) found at 40 CFR 405.82(b) (BPT).

The facility has a cooling water intake structure that uses groundwater as a source of cooling water with a flow below 2 MGD. Less than 25% of the water withdrawn is used for cooling purposes. Therefore, 316(b) federal requirements do not apply to the facility.

Non-contact cooling water from compressor systems, steam condensate overflows, and process wastes resulting from cleaning and water flushes are collected in a central discharge basin. The wastewater flows through a series of three smaller settling ponds, and then finally through two larger ponds. The effluent is then discharged through Outfall 001.

Vale Wood Dairy previously had two outfalls (Outfalls 001 and 002). Outfall 001 discharged process wastewater from cleaning and non-contact cooling water, and steam condensate overflows. Outfall 002 discharged boiler blow-down. Recently, because of the nature of the Outfall 002 discharge (batch-emergency only), the facility has started to route the water through Outfall 001 with the advice of the DEP Water Quality Specialist assigned for the site. During the current renewal, Outfall 002 will be maintained as an emergency only outfall. Outfall 001 will eventually discharge to Clearfield Creek which is classified as warm water fishery (WWF) per Chapter 93 Designated Use.

As documented in the previous Fact Sheet and historical inspection reports, it appears as though there was a “septic tank discharge” at one time, although this was not explained well in the historical documents. The area of the septic tank was identified during the site visit, but it was impossible to determine if there was a discharge due to excessive vegetation. The facility said that the septic tank drains into a leach field, but the area of septic tank appears to be in a marsh/wetland area and also near a stormwater discharge point, which does not appear to flow into the stream.

Chemical Additives

Vale Wood Dairy does not use any chemical additives for the settling treatment in the facility.

Department Inspection

The last inspection conducted by the Department was on March 20, 2023 by Kristin Gearhart and no violations noted.

Conclusion

There are no current open violations by Client ID. Permit issuance is recommended.

Public Participation

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.

Compliance History

DMR Data for Outfall 001 (from May 1, 2021 to April 30, 2022)

Parameter	Limit	APR-22	MAR-22	FEB-22	JAN-22	DEC-21	NOV-21	OCT-21	SEP-21	AUG-21	JUL-21	JUN-21	MAY-21
Flow (MGD) Average Monthly	**Report**	0.015	0.012	0.008	0.010	0.014	0.022	0.025	0.020	0.014	0.012	0.024	0.020
pH (S.U.) Minimum	**6.0**	7.2	7.0	6.9	6.9	7.0	7.3	7.9	7.8	8.1	7.7	7.8	7.5
pH (S.U.) Maximum	**9.0**	8.1	8.0	7.5	7.5	7.4	7.5	8.3	8.4	8.5	8.1	8.3	8.6
TRC (mg/L) Average Monthly	**0.5**	0.05	0.05	0.05	0.05	0.05	0.13	0.09	0.08	0.3	0.5	0.14	0.3
TRC (mg/L) Instantaneous Maximum	**1.6**	0.12	0.05	0.05	0.05	0.05	0.19	0.18	0.18	0.5	0.5	0.5	0.5
BOD5 (lbs/day) Average Monthly	**4.8**	4.3	3.0	**9.8**	**10.6**	4.6	4.7	4.6	3.4	4.6	2.1	4.6	4.7
BOD5 (lbs/day) Daily Maximum	**9.6**	6.7	6.0	**11.0**	**12.3**	7.4	5.4	5.7	3.8	5.2	2.5	7.4	6.1
BOD5 (mg/L) Average Monthly	**40.3**	34.6	30.0	**148.0**	**128.0**	40.0	25.8	22.4	20.8	39.9	21.6	23.4	27.9
BOD5 (mg/L) Daily Maximum	**80.7**	53.9	60.4	**165.0**	**148.0**	63.3	29.6	27.2	23.0	44.1	24.7	37.1	36.4
TSS (lbs/day) Average Monthly	**7.2**	6.2	4.0	3.0	4.3	5.8	6.0	4.8	6.0	5.2	2.2	4.7	5.6
TSS (lbs/day) Daily Maximum	**14.4**	7.1	4.8	4.5	5.3	6.5	7.7	5.4	8.8	7.0	3.9	6.4	9.2
TSS (mg/L) Average Monthly	**60.5**	50.0	40.0	45.0	52.0	50.0	32.8	23.2	36.0	44.3	22.4	23.8	33.5
TSS (mg/L) Daily Maximum	**121.0**	57.0	48.0	68.0	63.0	56.0	42.0	26.0	53.0	60.0	39.0	32.0	55.0
Fecal Coliform (No./100 ml) Geometric Mean	**2,000**	135	178	913	597	30	25	31	124	90	25	34	140
Fecal Coliform (No./100 ml) Instantaneous Maximum	**10,000**	331	231	1720	708	52	31	41	175	197	41	52	285

DMR Data for Outfall 001 (from May 1, 2021 to April 30, 2022), Continued

Parameter	Limit	APR-22	MAR-22	FEB-22	JAN-22	DEC-21	NOV-21	OCT-21	SEP-21	AUG-21	JUL-21	JUN-21	MAY-21
Ammonia (mg/L) Daily Maximum	**Report**					4.9						6.17	
Total Nitrogen (mg/L) Daily Maximum	**Report**					5.935						7.9	
Total Phosphorus (mg/L) Daily Maximum	**Report**					3.32						4.02	
Total Aluminum (mg/L) Daily Maximum	**Report**					< 0.10						0.24	
Total Iron (mg/L) Daily Maximum	**Report**					2.13						< 4.0	
Total Manganese (mg/L) Daily Maximum	**Report**					0.23						0.17	

Compliance History

Effluent Violations for Outfall 001, from: June 1, 2021 To: April 30, 2022

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
BOD5	02/28/22	Avg Mo	9.8	lbs/day	4.8	lbs/day
BOD5	01/31/22	Avg Mo	10.6	lbs/day	4.8	lbs/day
BOD5	01/31/22	Daily Max	12.3	lbs/day	9.6	lbs/day
BOD5	02/28/22	Daily Max	11.0	lbs/day	9.6	lbs/day
BOD5	01/31/22	Avg Mo	128.0	mg/L	40.3	mg/L
BOD5	02/28/22	Avg Mo	148.0	mg/L	40.3	mg/L
BOD5	02/28/22	Daily Max	165.0	mg/L	80.7	mg/L
BOD5	01/31/22	Daily Max	148.0	mg/L	80.7	mg/L

Other Comments: The BOD5 and TSS elevated were confirmed to be caused by the algae in the lagoons.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.012
Latitude	40º 28' 36"	Longitude	-78º 38' 07"
Quad Name		Quad Code	
Wastewater Description:	IW Process Effluent with ELG, Noncontact Cooling Water (NCCW), Stormwater		
Receiving Waters	Clearfield Creek (WWF)	Stream Code	26107
NHD Com ID	61839257	RMI	71.40
Drainage Area	1.14 sq. miles	Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	0.0814	Q_{7-10} Basis	Streamstats
Elevation (ft)	1948.6	Slope (ft/ft)	0.0001
Watershed No.	8-C	Chapter 93 Class.	WWF
Existing Use	**WWF**	Existing Use Qualifier	
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Impaired		
Cause(s) of Impairment	Metals		
Source(s) of Impairment	ACID MINE DRAINAGE		
TMDL Status	Final	Name	Clearfield Creek
Nearest Downstream Public Water Supply Intake	Amsbry Water Authority (25,000 GPD)		
PWS Waters	Clearfield Creek	Flow at Intake (cfs)	2.12
PWS RMI	64.50	Distance from Outfall (mi)	6.9

Changes Since Last Permit Issuance: Outfall 002 will discharge through Outfall 001.

Other Comments: None.

Drainage Area

Development of Effluent Limitations

Outfall No.	001	**Design Flow (MGD)**	0.012
Latitude	40º 28' 36"	**Longitude**	-78º 38' 07"
Wastewater Description:	IW Process Effluent with ELG, Noncontact Cooling Water (NCCW), Stormwater		

Process Water Overview

Outfall 001 discharges treated industrial process wastewater from cleaning and water flushes, non-contact cooling water from compressor systems, and steam condensate overflows from the dairy production facility. Boiler blowdown discharges from Outfall 002 have been directed to also discharge through Outfall 001. The discharge through Outfall 001 is continuous with intermittent (batch) discharges joining from Outfall 002. The average flow during production is 0.012 MGD and the maximum flow during production is 0.05 MGD.

Technology-Based Effluent Limits (TBELs)

Outfall 001 effluent is comprised of treated dairy waste, non-contact cooling water, and steam condensate. Therefore, the process wastewater effluent is subject to the requirements of 40 CFR Part 405 – Dairy Products Processing Point Source Category.

The Department has recently commenced a new monitoring program targeting per and polyfluoroalkyl substances (PFAS), which is a multipronged strategy to better characterize and control PFAS in permitted discharges to surface waters by implementing monitoring and other requirements in National Pollutant Discharge Elimination System (NPDES) permits.

The PFAS Policy incorporates monitoring for PFAS parameters, PFOA, PFOS, HFPO-DA and PFBS, as a part of the screening analysis for all NPDES Individual Permit Facilities. ATI's renewed permit will include the following footnote: The permittee may discontinue monitoring for PFOA, PFOS, HFPO-DA, and PFBS if the results of 4 consecutive monitoring periods indicate non-detect results at or below Quantitation Limits of 4.0 ng/L for PFOA, 3.7 ng/L for PFOS, 3.5 ng/L for PFBS and 6.4 ng/L for HFPO-DA. When monitoring is discontinued, permittees must enter a No Discharge Indicator (NODI) Code of "GG" on DMRs.

According to the application, the facility produces four products with federal ELGs contained in the Dairy Products Processing point source category. The ELGs include:

- Fluid Product Subcategory (Subpart B) found at 40 CFR 405.22(b) (BPT);
- Butter Subcategory (Subpart D) found at 40 CFR 405.42(b) (BPT);
- Cottage Cheese and Cultured Cream Cheese Subcategory (Subpart E) found at 40 CFR 405.52(b) (BPT); and
- Ice Cream, Frozen Desserts, Novelties and Other Dairy Desserts Subcategory (Subpart H) found at 40 CFR 405.82(b) (BPT).
- Sour Cream/Dip, Cultured Products Subcategory (Subpart C) fount at 40 CFR 405.32 (b) (BPT).

From the renewal application and the February 2, 2024 email, the lists the following production for each ELG Subcategory:

- Fluid Milk – 925,000 gallons;
- Butter – 30,000 gallons;
- Cottage Cheese – 35,000 gallons;
- Ice Cream - 28,000 gallons;
- Sour Cream/Dip – 32,000 gallons;

Each product is not produced daily; however, the effluent is a continuous discharge. Therefore, the production rates will each be based on a 365 day/year production schedule. The daily production rates for the technology-based effluent limits analysis are:

- Fluid milk – [(925,000 gallons) / (365 days)] * (8.6 pounds per gallon milk) = 21,795 lbs M.E./day;
- Butter – [(30,000 gallons) / (365 days)] * (8.6 pounds per gallon milk) = 707 lbs M.E./day;
- Cottage Cheese – [(35,000 gallons) / (365 days)] * (8.6 pounds per gallon milk) = 825 lbs M.E./day;
- Ice Cream - [(28,000 gallons) / (365 days)] * (8.6 pounds per gallon milk) = 660 lbs M.E./day; and
- Sour Cream – [(32,000 gallons) / (365 days)] * (8.6 pounds per gallon milk) = 754 lbs M.E./day;

The milk equivalent (ME) rates were first converted to BOD_5 input rates:

Milk – 21,795 lbs M.E./day x (25,900 lbs BOD_5 input / 250,000 lb M.E./day) = 2,267 lbs BOD_5 input/day
Butter – 707 lbs M.E./day x (18,180 lbs BOD_5 input / 175,000 lbs M.E./day) = 8.5 lbs BOD_5 input/day
Cottage Cheese – 825 lbs M.E./day x (2,600 lbs BOD_5 input / 25,000 lbs M.E./day) =10.0 lb BOD_5 input/day
Ice Cream – 660 lbs M.E./day x (8,830 lbs BOD_5 input/ 85,000 lbs M.E./day) = 8.0 lbs BOD_5 input/day
Sour Cream - 754 lbs M.E./day x (6,200 lbs BOD_5 input/ 60,000 lbs M.E./day) = 9.1 lbs BOD_5 input/day

The Daily Maximum and Average Monthly limits for BOD5 and TSS were calculated as follows:

Daily Maximum:

BOD5:

Milk - 0.450 lb /100 lbs BOD input x 2,267 lbs BOD input /day = 10.20 lbs/day
Butter - 0.183 lb /100 lbs BOD input x 8.5 lbs BOD input/day = 0.02 lb/day
Cottage Cheese - 0.893 lb /100 lbs BOD input x 10.0 lbs BOD input/day = 0.09 lb/day
Ice Cream - 0.613 lb /100 lbs BOD input x 8.0 lbs BOD input/day = 0.05 lb/day
Sour Cream - 0.450 lb /100 lbs BOD input x 9.1 lbs BOD input /day = 0.04 lb/day

Total – 10.20 lbs/day + 0.02 lb/day + 0.09 lb/day + 0.05 lb/day + 0.04 lb/day = **10.39 lbs/day**

Daily Maximum mg/L = (10.39 lbs/day) / [(8.34) * (0.012 MGD)] = 103.8 mg/L

TSS:

Milk - 0.675 lb/100 lbs BOD input x 2,267 lbs BOD input/day = 15.30 lbs/day
Butter - 0.274 lb/100 lbs BOD input x 8.5 lb BOD input/day = 0.02 lb/day
Cottage Cheese - 1.339 lb/100 lbs BOD input x 10.0 lbs BOD input/day = 0.13 lbs/day
Ice Cream - 0.919 lb/100 lbs BOD input x 8.0 lbs BOD input/day = 0.07 lb/day
Sour Cream - 0.675 lb/100 lbs BOD input x 9.1 lbs BOD input/day =0.06 lb/day

Total – 15.30 lbs/day + 0.02 lb/day + 0.13 lb/day + 0.07 lb/day + 0.06 lb/day = **15.59 lbs/day**

Daily Maximum mg/L = (15.59 lbs/day) / [(8.34) * (0.012 MGD)] = 155.9 mg/L

Average Monthly:

BOD5:

Milk - 0.225 lb /100 lbs BOD input x 2,267 lbs BOD input /day = 5.10 lbs/day
Butter - 0.091 lb /100 lbs BOD input x 8.5 lbs BOD input/day = 0.01 lb/day
Cottage Cheese - 0.446 lb/100 lbs BOD input x 10.0 lbs BOD input/day = 0.04 lb/day
Ice Cream - 0.306 lb/100 lbs BOD input x 8.0 lbs BOD input/day = 0.02 lb/day
Sour Cream - 0.225 lb /100 lbs BOD input x 9.1 lbs BOD input /day = 0.02 lb/day

Total – 5.10 lbs/day + 0.01 lb/day + 0.04 lb/day + 0.02 lb/day + 0.02 lb/day = **5.20 lbs/day**

Daily Maximum mg/L = (5.20 lbs/day) / [(8.34) * (0.012 MGD)] = 51.9 mg/L

TSS:

Milk - 0.338 lb /100 lbs BOD input x 2,267 lbs BOD input/day = 7.66 lbs/day
Butter - 0.137 lb /100 lbs BOD input x 8.5 lbs BOD input/day = 0.01 lb/day
Cottage Cheese - 0.669 lb /100 lbs BOD input x 10.0 lbs BOD input/day = 0.07 lb/day
Ice Cream - 0.459 lb /100 lbs BOD input x 8.0 lbs BOD input/day = 0.04 lb/day
Sour Cream - 0.338 lb /100 lbs BOD input x 9.1 lbs BOD input/day = 0.03 lb/day

Total – 7.66 lbs/day + 0.01 lb/day + 0.07 lb/day + 0.04 lb/day + 0.03 = **7.81 lbs/day**

Daily Maximum mg/L = (7.81 lbs/day) / [(8.34) * (0.012 MGD)] = 78.0 mg/L

These limits have changed slightly from the existing limits in the permit, due to the increase in estimated production quantities.

Outfall 001 has had Fecal Coliform limits imposed from the old septic system malfunction. The facility expanded sewage needs by adding the office and additional bathrooms. At that time the septic system was replaced, and the old system decommissioned. The facility does not have sewage directed to the treatment lagoons. The plume caused by the malfunction of the old septic tank has passed from reviewing of the Fecal Coliform concentrations reported in the previous permit cycle. The previously imposed Fecal Coliform effluent limitations will be removed from monitoring requirements of the NPDES Permit.

The existing limits for pH will remain in the permit.

The facility has a chlorinator and chlorine contact tank following the stabilization ponds, but chlorine is not currently used. This is acceptable if the facility is able to meet its fecal coliform limits. Nonetheless, technology-based TRC limit will be included in the permit to comply with 92a.48(b)(2). A water quality analysis (see **Attachment C**) revealed that tech-based limits of 0.5 mg/l (AML) and 1.6 mg/l (IMAX) are adequate to protect water quality.

Water-Quality Based Effluent Limitations (WQBELs)

TMDL Considerations

Although the TMDL for Clearfield Creek does not anticipate non-mining point sources, and does not expect that reductions from such sources are needed to achieve the TMDL limits, it is recommended that monitoring twice per year for the TMDL parameters of Total Iron, Total Aluminum and Total Manganese be specified in the renewed permit. The elevated value for Total Manganese should be confirmed with more recent data before further controls are considered.

Toxics Management Analysis

The Department's Toxics Management Spreadsheet (TMS) was utilized to facilitate calculations necessary for completing a reasonable potential analysis and determine Water Quality-Based Effluent Limitations (WQBELs) for discharges containing toxic pollutant concentrations. TMS combines the functionality of two (2) of the Department's analysis tools, Toxics Screening Analysis Spreadsheet and PENTOXSD water quality model.

DEP's procedures for evaluating reasonable potential are as follows:

1. For IW discharges, the design flow to use in modeling is the average flow during production or operation and may be taken form the permit application.

2. Perform a Toxics Screening Analysis to identify toxic pollutants of concern. All toxic pollutants, as reported in the permit application or on DMRs, are modeled by the TMS to determine the parameters of concern. [This includes pollutants reported as "Not Detectable" or as "<MDL" where the method detection limit for the analytical method used by the applicant is greater than the most stringent water quality criterion].

    - Establish limits in the draft permit where the maximum reported concentration equals or exceeds 50% of the WQBEL. Use the average monthly and maximum daily limits for the permit as recommended by TMS. Establish an IMAX limit at 2.5 times the average monthly limit.

    - For non-conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL.

- For conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 10% - 50% of the WQBEL.

Discharges from Outfall 001 are evaluated based on concentrations reported on the application and contained in the DMRs; data from those sources are used as inputs into the TMS. A summary of TMS Inputs is contained in Table 1 below.

Table 1. TMS Inputs

Parameter	Value
Discharge Inputs	
Facility	Vale Wood Dairy
Evaluation Type	Industrial
NPDES Permit No.	PA0009466
Wastewater Description	Treated Industrial Wastewater
Outfall ID	001
Design Flow (MGD)	0.012
Hardness ($^{mg}/_{L}$)	157
pH (S.U.)	7.85
Partial Mix Factors	Unknown – Calculated by TMS
Complete Mix Times	
Q_{7-10} (min)	
Q_h (min)	
Stream Inputs	
Receiving Surface Water	Clearfield Creek
Number of Reaches to Model	1
Stream Code	026107
RMI	71.4
Elevation (ft)	1948/1945*
Drainage Area (mi^2)	1.14
Slope (ft/ft)	
PWS Withdrawal (MGD)	0.00025
Apply Fish Criteria	Yes
Low Flow Yield (cfs/mi^2)	
Flows	
Stream (cfs)	0.0814
Tributary (cfs)	N/A
Width (ft)	
Stream Hardness ($^{mg}/_{L}$)	
Stream pH (S.U.)	

***** Denotes discharge location/downstream location values.

The TMS Model WQBEL recommendations at Outfall 001 are summarized below in Table 2. Analysis Report from the TMS run is included in Attachment B.

Table 2. TMS WQBEL Recommendations

Parameter	Average Monthly ($^{\mu g}/_{L}$)	Maximum Daily ($^{\mu g}/_{L}$)
Dissolved Iron	Report	Report

Dissolved Iron will be added to the semi-annual monitoring list of parameters to evaluate if an effluent limitation is required for the facility.

<u>WQM 7.0 Model</u>

WQM 7.0 for Windows determines wasteload allocations and effluent limitations for dissolved oxygen (DO), carbonaceous BOD ($CBOD_5$), and ammonia nitrogen (NH_3-N) for single and multiple point source discharge scenarios. To accomplish this, the model simulates two basic processes (NH_3-N and DO modules). In the NH_3-N module, the model simulates the mixing and degradation of NH_3-N in the stream and compares calculated instream NH_3-N concentrations to NH_3-N water quality criteria. In the DO module, the model simulates the mixing and consumption of DO in the stream due to the degradation of $DBOD_5$ and NH_3-N, and compares calculated instream DO concentrations to DO water quality criteria. WQM 7.0 then determines the highest pollutant loadings that the stream can assimilate while still meeting water quality criteria under design conditions.

In addition to flow and load mixing, WQM 7.0 models deoxygenation, reaeration, and nitrification in calculating instream NH_3-N, $CBOD_5$, and DO concentrations. Temperature effects in these processes are considered and two (2) models (Summary and Winter) are run. These models are setup to reflect the varying stream and discharge temperatures.

Discharges from Outfall 001 are evaluated based on the initial default values (Discharge Temperature, $CBOD_5$, DO, NH_3-N, and Stream Temperature). The WQM 7.0 model is run with the discharge and receiving stream characteristics shown in Table 3.

Table 3: WQM 7.0 Inputs

		Basin/Stream Characteristics	
Parameter	**Value**	**Parameter**	**Value**
River Mile Index	71.4	Area (mi^2)	1.14
Discharge Flow (MGD)	0.012	Q_{7-10} (cfs)	0.0814
Discharge Temp.		Low-flow yield (cfs/mi^2)	0.0714
Summer (°C)	20.0	Elevation (ft)	1948
Winter (°C)	15.0	Slope	
$CBOD_5$ ($^{mg}/_{L}$)	41.54	Stream Temp. (WWF)	
DO ($^{mg}/_{L}$)	4.0	Summer Temp. (°C)	25.0
NH_3-N ($^{mg}/_{L}$)	25.0	Winter Temp. (°C)	5.0

- $CBOD_5$ Daily Maximum Concentration for the ELG was used for the WQM 7.0 Model to confirm that the ELG concentration meet water quality criteria of the receiving stream.

WQM 7.0 modeling recommends effluent limits as summarized below in Table 4. Analysis Report from the WQM 7.0 model runs are included in Attachment C.

Table 4: WQM 7.0 Effluent Limitations

Parameter	Average Monthly
CBOD5 ($^{mg}/_{L}$)	51.9
DO ($^{mg}/_{L}$)	4.0 (minimum)
NH_3-N ($^{mg}/_{L}$)	25.0

The WQM Model was run, resulting in an average monthly limit of 25.0 mg/L for Ammonia. The eDMR concentrations show levels well below this value, therefore a limit will not be included in the permit but monitoring twice per year is recommended.

While limits for nutrient parameters are not required, the Chesapeake Bay Phase 2 WIP Supplement for Wastewater, submitted to EPA as an addendum to the Phase 2 WIP, indicates that non-significant industrial waste dischargers should generally include monitoring requirements in their permits for nutrients. The document recommends a monitoring frequency of 1/month for food processing discharges, but considering the low volume of the discharge, the permit writer will recommend monitoring twice per year for TN and TP.

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 discharge chlorine demands for the receiving stream, 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 then proposed. The results of the modeling, included in Attachment D, indicate that BAT/BPJ are required for TRC.

Anti-Backsliding

Section 402(o) of the Clean Water Act (CWA), enacted in the Water Quality Act of 1987, establishes anti-backsliding rules governing two situations. The first situation occurs when a permittee seeks to revise a Technology-Based effluent limitation based on BPJ to reflect a subsequently promulgated effluent guideline which is less stringent. The second situation addressed by Section 402(o) arises when a permittee seeks relaxation of an effluent limitation which is based upon a State treatment standard of water quality standard.

Previous limits can be used pursuant to EPA's anti-backsliding regulation 40 CFR 122.44 **(l) Reissued permits. (1) Except as provided in paragraph (l)(2) of this section when a permit is renewed or reissued. Interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under §122.62). (2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.**

The facility is not seeking to revise the previously permitted effluent limits.

Effluent Limitations and Monitoring Requirements for Outfall 001

Effluent limits applicable at Outfall 001 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements as summarized in Table 5. The applicable limits and monitoring requirements provided below are based on discussions above.

Table 5. Effluent Limits and Monitoring Requirements for Outfall 001

Parameter	Mass (lbs/day)		Concentration (mg/L)		Basis
	Average Monthly	Daily	Average Monthly	Daily Maximum	
Flow (MGD)	Report	-	-	-	25 Pa. Code § 92a.61(b)
pH	-	-	Within the range of 6.0 to 9.0		25 Pa. Code § 92a.48(a)(2) & 25 Pa. Code § 95.2
TSS	7.8	15.6	78.0	155.8	40 CFR 405
BOD_5	5.2	10.4	51.9	103.8	40 CFR 405
Total Residual Chlorine (TRC)	-	-	0.5	1.6 (IMAX)	40 CFR 122.44(l)
Iron (Total)	-	-	-	Report	40 CFR 122.44(l)
Aluminum (Total)	-	-	-	Report	40 CFR 122.44(l)
Manganese (Total)	-	-	-	Report	40 CFR 122.44(l)
Dissolved Iron	-	-	-	Report	WQBEL
Ammonia-Nitrogen	-	-	-	Report	WQBEL
Total Nitrogen	-	-	-	Report	WQBEL
Total Phosphorus	-	-	-	Report	WQBEL
PFOA	-	-	-	Report	25 Pa. Code § 92.a.61(b)
PFOS	-	-	-	Report	25 Pa. Code § 92.a.61(b)
HFPO-DA	-	-	-	Report	25 Pa. Code § 92.a.61(b)
PFBS	-	-	-	Report	25 Pa. Code § 92.a.61(b)

Monitoring Frequency for Outfall 001

Monitoring requirements are based on the previous permits monitoring requirements for Vale Wood Dairy along with recommendations from the Performance-Based Reduction Analysis and displayed in Table 6 below.

Table 6: Monitoring Requirements for Outfall 001

Parameter	Sample Type	Minimum Sample Frequency
Flow	Estimate	1/week
pH	Grab	1/week
TSS	Grab	2/month
BOD_5	Grab	2/month
Total Residual Chlorine (TRC)	Grab	2/month
Iron (Total)	Grab	1/semi-annual
Aluminum (Total)	Grab	1/semi-annual
Manganese (Total)	Grab	1/semi-annual
Dissolved Iron	Grab	1/semi-annual
Ammonia-Nitrogen	Grab	1/semi-annual
Total Nitrogen	Grab	1/semi-annual
Total Phosphorus	Grab	1/semi-annual
PFOA	Grab	1/year
PFOS	Grab	1/year
HFPO-DA	Grab	1/year
PFBS	Grab	1/year

Discharge, Receiving Waters and Water Supply Information

Outfall No.	Outfall 002	Design Flow (MGD)	0
Latitude	40º 28' 43.85"	Longitude	-78º 38' 25.87"
Quad Name		Quad Code	
Wastewater Description:	Emergency Discharge, Boiler Blowdown		
Receiving Waters	Clearfield Creek (WWF)	Stream Code	26107
NHD Com ID	61839257	RMI	71.40
Drainage Area	1.14 sq. miles	Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	0.0754	Q_{7-10} Basis	Streamstats
Elevation (ft)	1948.6	Slope (ft/ft)	0.0001
Watershed No.	8-C	Chapter 93 Class.	WWF
Existing Use	**WWF**	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Metals		
Source(s) of Impairment	ACID MINE DRAINAGE		
TMDL Status	Final	Name	Clearfield Creek
Nearest Downstream Public Water Supply Intake	Amsbry Water Authority		
PWS Waters	Clearfield Creek	Flow at Intake (cfs)	0.0387
PWS RMI	64.50	Distance from Outfall (mi)	6.9

Changes Since Last Permit Issuance: Outfall 002 has been directed to the treatment system and ultimate discharge via Outfall 001.

Other Comments: None.

Development of Effluent Limitations

Outfall No. 002 **Design Flow (MGD)** 0.0
Latitude 40° 28’ 45” **Longitude** -78° 38’ 24”
Wastewater Description: Boiler blowdown

Technology-Based Limitations

The following technology-based limitations apply, subject to water quality analysis and BPJ where applicable:

Parameter	Limit (mg/l)	SBC	Federal Regulation	State Regulation
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)

The discharge of Outfall 002 has been routed to Outfall 001 per Department suggestion during the last permit cycle. The renewal application request that Outfall 002 be maintained as an emergency discharge of the boiler blow-down. Since Outfall 002 will only discharge on an emergency bases, the above limit from the previous permit will be maintained and monitored 1/discharge.

Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment **C**)
☒	TMS for Windows Model (see Attachment B)
☒	TRC Model Spreadsheet (see Attachment **D**)
☐	Temperature Model Spreadsheet (see Attachment)
☐	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.
☒	Other: 40 CFR 405 ELGs
☒	Other: Phase 2 WIP Wastewater Supplement for Chesapeake Bay

Attachment A – Process Flow Diagram

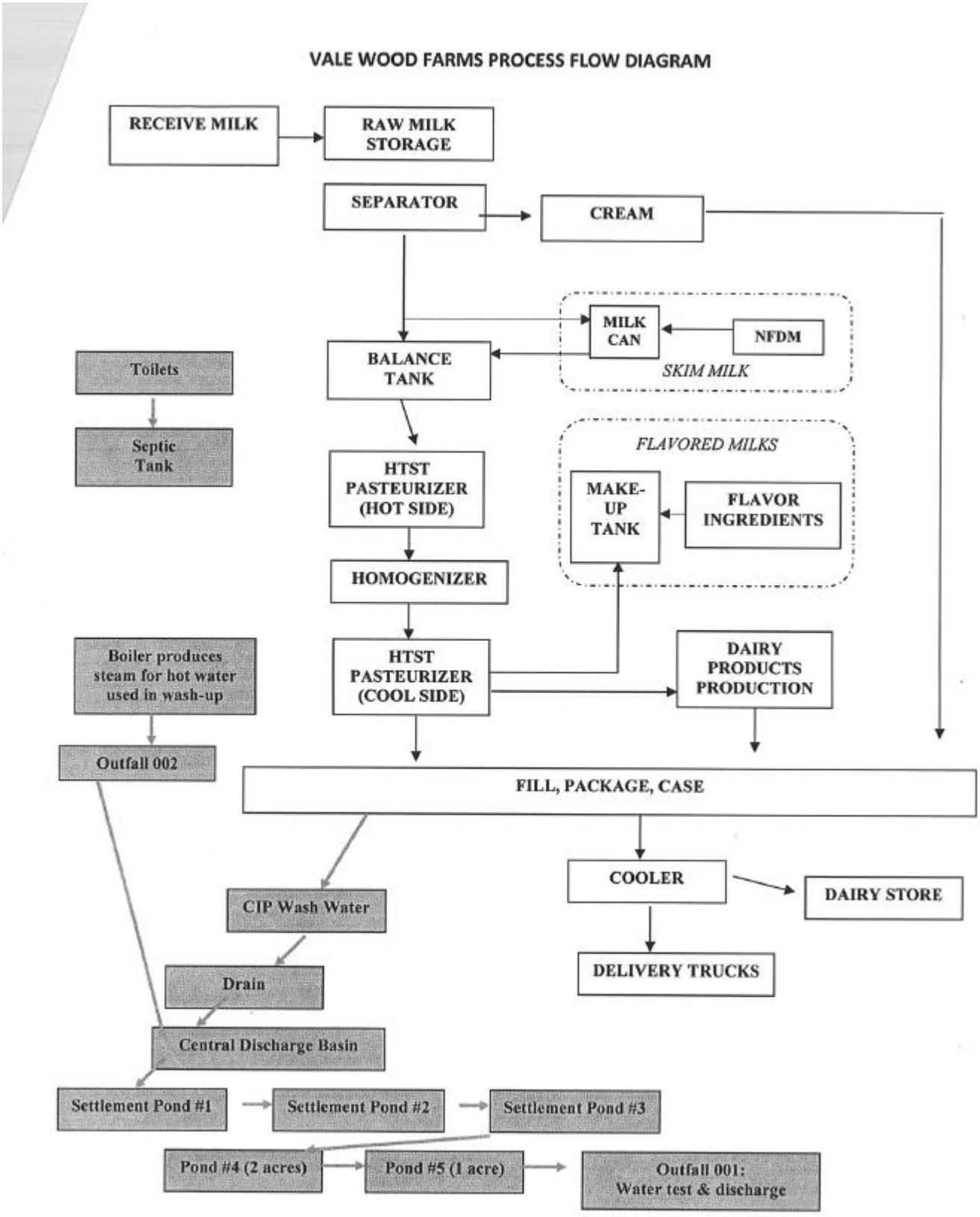
Attachment B – TMS Model Summary

Attachment C – WQM 7.0 Summary

Attachment D – TRC Model

Attachment E - StreamStats

Attachment A
Process Flow Diagram


VALE WOOD FARMS PROCESS FLOW DIAGRAM
RECEIVE MILK
RAW MILK STORAGE
SEPARATOR
CREAM
MILK CAN
NFDM
SKIM MILK
BALANCE TANK
Toilets
Septic Tank
FLAVORED MILKS
HTST PASTEURIZER (HOT SIDE)
MAKE-UP TANK
FLAVOR INGREDIENTS
HOMOGENIZER
Boiler produces steam for hot water used in wash-up
HTST PASTEURIZER (COOL SIDE)
DAIRY PRODUCTS PRODUCTION
Outfall 002
FILL, PACKAGE, CASE
COOLER
DAIRY STORE
CIP Wash Water
DELIVERY TRUCKS
Drain
Central Discharge Basin
Settlement Pond #1
Settlement Pond #2
Settlement Pond #3
Pond #4 (2 acres)
Pond #5 (1 acre)
Outfall 001: Water test & discharge

Attachment B
TMS Model Summary

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Vale Wood Dairy** NPDES Permit No.: **PA0009466** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Treated Industrial Wastewater**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.012	157	7.85						

					0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		468									
	Chloride (PWS)	mg/L		115									
	Bromide	mg/L	<	0.072									
	Sulfate (PWS)	mg/L		9.2									
	Fluoride (PWS)	mg/L		0.541									
Group 2	Total Aluminum	µg/L		59.1									
	Total Antimony	µg/L		0.076									
	Total Arsenic	µg/L											
	Total Barium	µg/L		77.6									
	Total Beryllium	µg/L	<	0.135									
	Total Boron	µg/L	<	0.0565									
	Total Cadmium	µg/L	<	0.025									
	Total Chromium (III)	µg/L	<	1									
	Hexavalent Chromium	µg/L	<	0.25									
	Total Cobalt	µg/L		0.496									
	Total Copper	mg/L		0.00119									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L	<	0.006									
	Dissolved Iron	µg/L		250									
	Total Iron	µg/L		630									
	Total Lead	µg/L		0.265									
	Total Manganese	µg/L		114									
	Total Mercury	µg/L	<	0.104									
	Total Nickel	µg/L		1.64									
	Total Phenols (Phenolics) (PWS)	µg/L		8									
	Total Selenium	µg/L	<	0.335									
	Total Silver	µg/L	<	0.274									
	Total Thallium	µg/L	<	0.014									
	Total Zinc	mg/L		0.0025									
	Total Molybdenum	µg/L		0.378									
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L											

Group 3	Carbon Tetrachloride	µg/L	<										
	Chlorobenzene	µg/L	<										
	Chlorodibromomethane	µg/L	<										
	Chloroethane	µg/L	<										
	2-Chloroethyl Vinyl Ether	µg/L	<										
	Chloroform	µg/L											
	Dichlorobromomethane	µg/L	<										
	1,1-Dichloroethane	µg/L	<										
	1,2-Dichloroethane	µg/L	<										
	1,1-Dichloroethylene	µg/L	<										
	1,2-Dichloropropane	µg/L	<										
	1,3-Dichloropropylene	µg/L	<										
	1,4-Dioxane	µg/L	<										
	Ethylbenzene	µg/L	<										
	Methyl Bromide	µg/L	<										
	Methyl Chloride	µg/L	<										
	Methylene Chloride	µg/L	<										
	1,1,2,2-Tetrachloroethane	µg/L	<										
	Tetrachloroethylene	µg/L	<										
	Toluene	µg/L	<										
	1,2-trans-Dichloroethylene	µg/L	<										
	1,1,1-Trichloroethane	µg/L	<										
	1,1,2-Trichloroethane	µg/L	<										
	Trichloroethylene	µg/L	<										
	Vinyl Chloride	µg/L											
Group 4	2-Chlorophenol	µg/L	<										
	2,4-Dichlorophenol	µg/L	<										
	2,4-Dimethylphenol	µg/L	<										
	4,6-Dinitro-o-Cresol	µg/L	<										
	2,4-Dinitrophenol	µg/L	<										
	2-Nitrophenol	µg/L	<										
	4-Nitrophenol	µg/L	<										
	p-Chloro-m-Cresol	µg/L	<										
	Pentachlorophenol	µg/L	<										
	Phenol	µg/L	<										
	2,4,6-Trichlorophenol	µg/L	<										
Group 5	Acenaphthene	µg/L	<										
	Acenaphthylene	µg/L	<										
	Anthracene	µg/L	<										
	Benzidine	µg/L	<										
	Benzo(a)Anthracene	µg/L	<										
	Benzo(a)Pyrene	µg/L	<										
	3,4-Benzofluoranthene	µg/L	<										
	Benzo(ghi)Perylene	µg/L											
	Benzo(k)Fluoranthene	µg/L	<										
	Bis(2-Chloroethoxy)Methane	µg/L	<										
	Bis(2-Chloroethyl)Ether	µg/L	<										
	Bis(2-Chloroisopropyl)Ether	µg/L	<										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<										
	4-Bromophenyl Phenyl Ether	µg/L	<										
	Butyl Benzyl Phthalate	µg/L	<										
	2-Chloronaphthalene	µg/L	<										
	4-Chlorophenyl Phenyl Ether	µg/L	<										
	Chrysene	µg/L											
	Dibenzo(a,h)Anthrancene	µg/L	<										
	1,2-Dichlorobenzene	µg/L	<										
	1,3-Dichlorobenzene	µg/L	<										
	1,4-Dichlorobenzene	µg/L	<										
	3,3-Dichlorobenzidine	µg/L	<										
	Diethyl Phthalate	µg/L	<										
	Dimethyl Phthalate	µg/L	<										
	Di-n-Butyl Phthalate	µg/L	<										
	2,4-Dinitrotoluene	µg/L	<										

	2,6-Dinitrotoluene	µg/L	<										
	Di-n-Octyl Phthalate	µg/L	<										
	1,2-Diphenylhydrazine	µg/L	<										
	Fluoranthene	µg/L	<										
	Fluorene	µg/L											
	Hexachlorobenzene	µg/L	<										
	Hexachlorobutadiene	µg/L	<										
	Hexachlorocyclopentadiene	µg/L	<										
	Hexachloroethane	µg/L	<										
	Indeno(1,2,3-cd)Pyrene	µg/L	<										
	Isophorone	µg/L	<										
	Naphthalene	µg/L	<										
	Nitrobenzene	µg/L	<										
	n-Nitrosodimethylamine	µg/L	<										
	n-Nitrosodi-n-Propylamine	µg/L	<										
	n-Nitrosodiphenylamine	µg/L	<										
	Phenanthrene	µg/L	<										
	Pyrene	µg/L	<										
	1,2,4-Trichlorobenzene	µg/L	<										
Group 6	Aldrin	µg/L	<										
	alpha-BHC	µg/L	<										
	beta-BHC	µg/L	<										
	gamma-BHC	µg/L	<										
	delta BHC	µg/L	<										
	Chlordane	µg/L	<										
	4,4-DDT	µg/L	<										
	4,4-DDE	µg/L	<										
	4,4-DDD	µg/L	<										
	Dieldrin	µg/L	<										
	alpha-Endosulfan	µg/L	<										
	beta-Endosulfan	µg/L	<										
	Endosulfan Sulfate	µg/L	<										
	Endrin	µg/L	<										
	Endrin Aldehyde	µg/L	<										
	Heptachlor	µg/L	<										
	Heptachlor Epoxide	µg/L	<										
	PCB-1016	µg/L	<										
	PCB-1221	µg/L	<										
	PCB-1232	µg/L	<										
	PCB-1242	µg/L	<										
	PCB-1248	µg/L	<										
	PCB-1254	µg/L	<										
	PCB-1260	µg/L	<										
	PCBs, Total	µg/L	<										
	Toxaphene	µg/L	<										
	2,3,7,8-TCDD	ng/L	<										
Group 7	Gross Alpha	pCi/L											
	Total Beta	pCi/L	<										
	Radium 226/228	pCi/L	<										
	Total Strontium	µg/L	<										
	Total Uranium	µg/L	<										
	Osmotic Pressure	mOs/kg											

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Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

Vale Wood Dairy, NPDES Permit No. PA0009466, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: _____ No. Reaches to Model: 1

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	026107	71.4	1948	1.14			Yes
End of Reach 1	026107	71	1945	1.5		0.000025	Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	71.4	0.1	0.0814									100	7		
End of Reach 1	71	0.1	2.12												

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	71.4														
End of Reach 1	71														

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Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Vale Wood Dairy, NPDES Permit No. PA0009466, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All ○ Inputs ○ Results ○ Limits

Hydrodynamics

Wasteload Allocations

AFC CCT (min): 3.135 PMF: 1 Analysis Hardness (mg/l): 110.59 Analysis pH: 7.08

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	4,039	
Total Antimony	0	0		0	1,100	1,100	5,923	
Total Barium	0	0		0	21,000	21,000	113,081	
Total Boron	0	0		0	8,100	8,100	43,617	
Total Cadmium	0	0		0	2.221	2.36	12.7	Chem Translator of 0.94 applied
Total Chromium (III)	0	0		0	618.704	1,958	10,543	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	87.7	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	512	
Total Copper	0	0		0	14.776	15.4	82.9	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	72.046	92.8	500	Chem Translator of 0.776 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	8.87	Chem Translator of 0.85 applied
Total Nickel	0	0		0	509.838	511	2,751	Chem Translator of 0.998 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	3.825	4.5	24.2	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	350	
Total Zinc	0	0		0	127.609	130	703	Chem Translator of 0.978 applied

CFC CCT (min): 3.135 PMF: 1 Analysis Hardness (mg/l): 110.59 Analysis pH: 7.08

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	1,185	
Total Barium	0	0		0	4,100	4,100	22,078	
Total Boron	0	0		0	1,600	1,600	8,616	
Total Cadmium	0	0		0	0.264	0.29	1.57	Chem Translator of 0.905 applied
Total Chromium (III)	0	0		0	80.481	93.6	504	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	56.0	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	102	
Total Copper	0	0		0	9.760	10.2	54.7	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	8,077	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.808	3.62	19.5	Chem Translator of 0.776 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	4.88	Chem Translator of 0.85 applied
Total Nickel	0	0		0	56.627	56.8	306	Chem Translator of 0.997 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	4.600	4.99	26.9	Chem Translator of 0.922 applied
Total Silver	0	0		0	N/A	N/A	N/A	Chem Translator of 1 applied
Total Thallium	0	0		0	13	13.0	70.0	
Total Zinc	0	0		0	128.652	130	703	Chem Translator of 0.986 applied

THH CCT (min): 3.135 THH PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A PWS PMF: 1

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	57,599,763	WQC applied at RMI 71 with a design stream flow of 2.12 cfs
Chloride (PWS)	0	0		0	250,000	250,000	28,799,881	WQC applied at RMI 71 with a design stream flow of 2.12 cfs
Sulfate (PWS)	0	0		0	250,000	250,000	28,799,881	WQC applied at RMI 71 with a design stream flow of 2.12 cfs
Fluoride (PWS)	0	0		0	2,000	2,000	230,399	WQC applied at RMI 71 with a design stream flow of 2.12 cfs
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	30.2	
Total Barium	0	0		0	2,400	2,400	12,924	
Total Boron	0	0		0	3,100	3,100	16,693	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	

Dissolved Iron	0	0		0	300	300	1,615	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	5,385	
Total Mercury	0	0		0	0.050	0.05	0.27	
Total Nickel	0	0		0	610	610	3,285	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	576	WQC applied at RMI 71 with a design stream flow of 2.12 cfs
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	0.24	0.24	1.29	
Total Zinc	0	0		0	N/A	N/A	N/A	

CRL CCT (min): 1.103 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Barium	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

Recommended WQBELs & Monitoring Requirements

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Dissolved Iron	Report	Report	Report	Report	Report	µg/L	1,615	THH	Discharge Conc > 10% WQBEL (no RP)

Other Pollutants without Limits or Monitoring

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	57,600	mg/L	Discharge Conc ≤ 10% WQBEL
Chloride (PWS)	28,800	mg/L	Discharge Conc ≤ 10% WQBEL
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	28,800	mg/L	Discharge Conc ≤ 10% WQBEL
Fluoride (PWS)	230	mg/L	Discharge Conc ≤ 10% WQBEL
Total Aluminum	2,589	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	30.2	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	12,924	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	8,616	µg/L	Discharge Conc < TQL
Total Cadmium	1.57	µg/L	Discharge Conc < TQL
Total Chromium (III)	504	µg/L	Discharge Conc < TQL
Hexavalent Chromium	56.0	µg/L	Discharge Conc < TQL
Total Cobalt	102	µg/L	Discharge Conc ≤ 10% WQBEL
Total Copper	0.053	mg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Total Iron	8,077	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	19.5	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	5,385	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	0.27	µg/L	Discharge Conc < TQL
Total Nickel	306	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)	576	µg/L	Discharge Conc ≤ 10% WQBEL
Total Selenium	26.9	µg/L	Discharge Conc < TQL
Total Silver	15.5	µg/L	Discharge Conc < TQL
Total Thallium	1.29	µg/L	Discharge Conc < TQL
Total Zinc	0.45	mg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS

Attachment C
WQM 7.0 Summary

Summer Model

Winter Model

Summer Model

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
08C	26107	CLEARFIELD CREEK	71.400	1948.00	1.14	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.08	0.000	0.000	10.0	0.00	0.00	20.00	7.00	25.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Vaile Wood Dair	PA0009466	0.0000	0.0120	0.0000	0.000	20.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	51.90	2.00	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
08C	26107	CLEARFIELD CREEK	71.000	1945.00	1.50	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.09	0.000	0.000	10.0	0.00	0.00	20.00	7.00	25.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	0.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
08C	26107	CLEARFIELD CREEK

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
71.400	0.08	0.00	0.08	.0186	0.00142	.367	5.37	14.64	0.05	0.484	24.07	7.00
Q1-10 Flow												
71.400	0.05	0.00	0.05	.0186	0.00142	NA	NA	NA	0.04	0.587	23.68	7.00
Q30-10 Flow												
71.400	0.11	0.00	0.11	.0186	0.00142	NA	NA	NA	0.06	0.419	24.28	7.00

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	6		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
08C	26107	CLEARFIELD CREEK

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
71.400	Vaile Wood Dair	12.35	46.85	12.35	46.85	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
71.400	Vaile Wood Dair	1.43	9.93	1.43	9.93	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
71.40	Vaile Wood Dair	51.9	51.9	9.93	9.93	4	4	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
08C	26107	CLEARFIELD CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
71.400	0.012	24.068	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
5.371	0.367	14.640	0.051
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
11.30	1.186	1.85	0.957
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.452	20.667	Owens	6
Reach Travel Time (days)			
0.484			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.048	10.55	1.77	7.17
0.097	9.84	1.69	7.12
0.145	9.19	1.61	7.16
0.194	8.57	1.54	7.23
0.242	8.00	1.47	7.30
0.290	7.47	1.40	7.37
0.339	6.97	1.34	7.44
0.387	6.50	1.28	7.50
0.435	6.07	1.22	7.56
0.484	5.66	1.17	7.62

Winter Model

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
08C	26107	CLEARFIELD CREEK	71.400	1948.00	1.14	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.08	0.000	0.000	10.0	0.00	0.00	20.00	7.00	5.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Vaile Wood Dair	PA0009466	0.0000	0.0120	0.0000	0.000	15.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	51.90	2.00	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
08C	26107	CLEARFIELD CREEK	71.000	1945.00	1.50	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.09	0.000	0.000	10.0	0.00	0.00	20.00	7.00	5.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	0.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
08C	26107	CLEARFIELD CREEK

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
71.400	0.08	0.00	0.08	.0186	0.00142	.367	5.37	14.64	0.05	0.484	6.86	7.00
Q1-10 Flow												
71.400	0.05	0.00	0.05	.0186	0.00142	NA	NA	NA	0.04	0.587	7.64	7.00
Q30-10 Flow												
71.400	0.11	0.00	0.11	.0186	0.00142	NA	NA	NA	0.06	0.419	6.44	7.00

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	6		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
08C	26107	CLEARFIELD CREEK

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
71.400	Vaile Wood Dair	24.1	50	24.1	50	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
71.400	Vaile Wood Dair	4.36	25	4.36	25	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
71.40	Vaile Wood Dair	51.9	51.9	25	25	4	4	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
08C	26107	CLEARFIELD CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
71.400	0.012	6.865	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
5.371	0.367	14.640	0.051
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
11.30	1.244	4.66	0.255
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.452	13.743	Owens	6
Reach Travel Time (days)			
0.484			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.048	10.94	4.60	8.24
0.097	10.58	4.55	8.24
0.145	10.24	4.49	8.24
0.194	9.91	4.44	8.24
0.242	9.59	4.38	8.24
0.290	9.28	4.33	8.24
0.339	8.98	4.28	8.24
0.387	8.69	4.22	8.24
0.435	8.41	4.17	8.24
0.484	8.13	4.12	8.24

Attachment D
TRC Model

TRC_CALC Vale Wood Dairy

TRC EVALUATION

0.0814	= Q stream (cfs)	0.5	= CV Daily
0.012	= Q discharge (MGD)	0.5	= CV Hourly
4	= no. samples	0.705	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= 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 = 1.005	1.3.2.iii	WLA cfc = 1.375
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.375	5.1d	LTA_cfc = 0.799

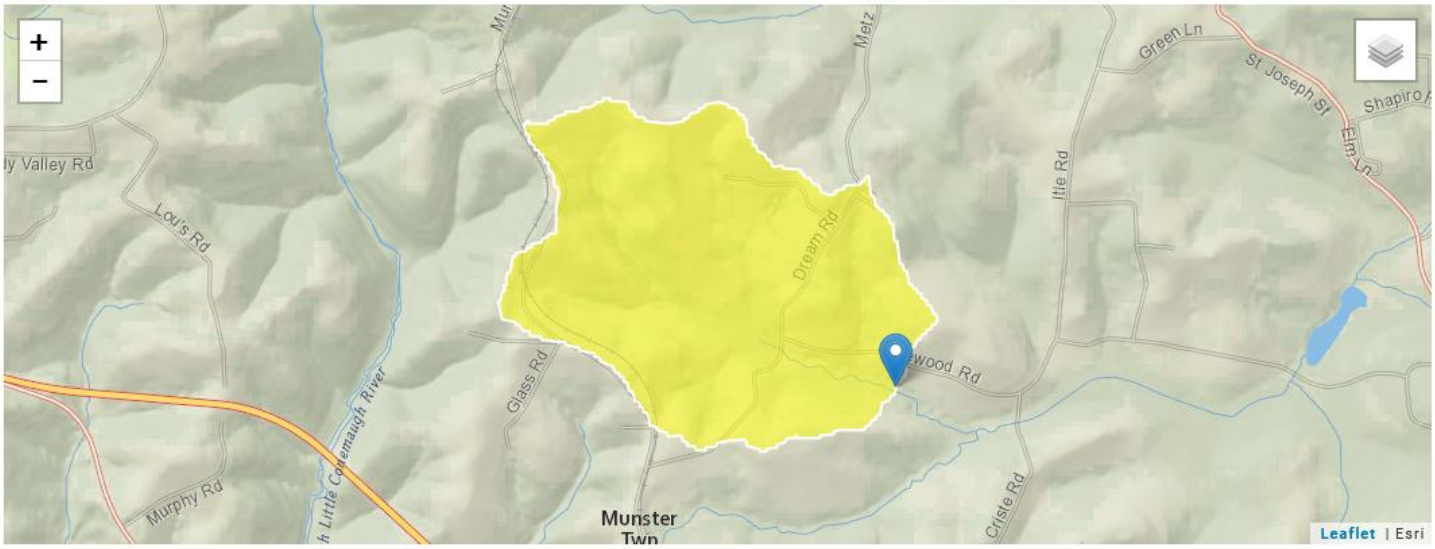
Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.720	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500	BAT/BPJ
		INST MAX LIMIT (mg/l) = 1.170	

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)**

Attachment E
StreamStats

StreamStats Report

Region ID:	PA
Workspace ID:	PA20190516151125470000
Clicked Point (Latitude, Longitude):	40.47831, -78.63870
Time:	2019-05-16 11:11:44 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	1.14	square miles
ELEV	Mean Basin Elevation	1948.6	feet
PRECIP	Mean Annual Precipitation	47	inches

Low-Flow Statistics Parameters [Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.14	square miles	2.33	1720
ELEV	Mean Basin Elevation	1948.6	feet	898	2700
PRECIP	Mean Annual Precipitation	47	inches	38.7	47.9

Low-Flow Statistics Disclaimers [Low Flow Region 3]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report [Low Flow Region 3]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.168	ft^3/s
30 Day 2 Year Low Flow	0.25	ft^3/s
7 Day 10 Year Low Flow	0.0754	ft^3/s
30 Day 10 Year Low Flow	0.103	ft^3/s
90 Day 10 Year Low Flow	0.152	ft^3/s

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p.