pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0004219**
Facility Type	**Industrial**	APS ID	**1060371**
Major / Minor	**Minor**	Authorization ID	**1391030**

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

Applicant and Facility Information

Applicant Name	**Langeloth Metallurgical Co. LLC**	Facility Name	**Langeloth Metallurgical Plant**
Applicant Address	PO Box 608	Facility Address	10 Langeloth Plant Drive Main Street
	Langeloth, PA 15054-0608		Langeloth, PA 15054
Applicant Contact	Matthew Lucas	Facility Contact	Matthew Lucas
Applicant Phone	(724) 947-2201	Facility Phone	(724) 947-2201
Client ID	79366	Site ID	500111
SIC Code	1061,2819,3313	Municipality	Smith Township
SIC Description	Manufacturing - Electrometallurgical Products, Manufacturing - Industrial Inorganic Chemicals, NEC, Mining - Ferroalloy Ores, Except Vanadium	County	Washington
Date Application Received	March 23, 2022	EPA Waived?	Yes
Date Application Accepted	April 20. 2022	If No, Reason	

Purpose of Application: Renewal of NPDES permit for industrial waste and stormwater.

Summary of Review

On March 23, 2022, Langeloth Metallurgical Company (LMC) submitted an NPDES permit renewal application for its Langeloth Plant, in Smith Township, Washington County.

The renewal application contains a request for changes in the permit conditions for stormwater and process monitoring sample locations as detailed below.

Langeloth Metallurgical has reviewed results for all of the existing permit monitoring locations and based upon benchmark stormwater concentrations and permit limitations, is requesting the following reduction in monitoring for the renewal permit. Over the past 5 years, considerable data has been generated that provides insight into plant performance and consistency of the LET plant performance.

We believe that the requested simplification in monitoring will help improve the economics of plant operations without jeopardizing environmental protection. Langeloth has found that each treatment process has certain key parameters, that if these parameters area well controlled, many of the other parameters will be controlled as well. These considerations were taken into account in making the request below:

1. *IMP 101 – Stormwater*
    a. *Eliminate sampling requirements for As, Cd, Cu, F, and Zn as the results are either non-detect or substantially below stormwater benchmark concentrations.*
2. *Outfall 002 – Stormwater*

Approve	Deny	Signatures	Date
X		Curtis Holes, P.E. / Environmental Engineer	February 13, 2023
X		Michael E. Fifth, P.E. / Environmental Engineer Manager	February 24, 2014

   a. *Eliminate sampling requirements for Al, As, Cd, Cu, F, Fe. Pb, Mn, and Zn as the results indicate that data taken for permit renewal are less than 10% of the benchmark concentrations.*
3. *Outfall 003 – Stormwater*
   a. *Eliminate sampling requirements for Al, As, Cd, Cu, F, Fe. Pb, Mn, and Zn as the results indicate that data taken for permit renewal are less than 10% of the benchmark concentrations.*
4. *Outfall 004 – Stormwater*
   a. *Eliminate sampling requirements for Al, As, Cd, Cu, F, Fe. Pb, Mn, and Zn as the results indicate that data taken for permit renewal are less than 10% of the benchmark concentrations, except for lead that is 15% of the benchmark concentration.*
5. *Outfall 006 – Stormwater*
   a. *Eliminate sampling requirements for arsenic and manganese as the results are less than 2% of the benchmark concentrations.*
6. *Outfall 001 – Combined Discharge*
   a. *Eliminate sampling requirements for parameters Cu, and Pb, as they are generally slightly above or not present above detection levels.*
7. *IMP 201 – NCCW*
   a. *No changes requested for IMP 201.*
8. *IMP 301 – LET Plant*
   a. *Eliminate sampling requirements for parameters Cd, Cu, Co, Pb, Zn, TI, Cr hex, Dissolved Fe, as they are generally not present at levels above detection, or at levels that are substantially below permit levels.*
   b. *Eliminate sampling requirements for parameters B, Cl, and Br, as they are not providing useful information beyond the historic data that has been generated over the past several years.*

The above request will be evaluated in each of the outfall's Development of Effluent Limitations discussion.

LMC operates multi-hearth roasters to produce trioxide and calcined metal oxides from nickel, cobalt copper concentrates, and other metal bearing materials. Pure molybdic oxides are produced by sublimation in electric-heated furnaces. Molybdic oxides are formed into briquettes. The manufacturing operations at this facility are classified under the following Standard Industrial Classification (SIC) codes:

- 1061 – Ferroalloy ores, except vanadium
- 2819 – Industrial Organic Chemicals (listed as the primary SIC code)
- 3313 – Electrometallurgical products, except steel

The facility is subject to the Federal Effluent Limitation Guidelines found at 40 CFR 421 – Nonferrous Metals Manufacturing Point Source Category, Subpart I – Metallurgical Acid Plants Subcategory. The provisions of this subpart are applicable to discharges resulting from or associated with the manufacturing of by-product sulfuric acid at primary molybdenum facilities. With the exception of slag, raw material products and wastes are generally stored in buildings, undercover, or in closed containers and are not exposed to stormwater under normal circumstances. Slag is stored outdoors in piles located along the northeast corner of the production facility.

A description of wastewater or stormwater that discharges to each outfall is as follows:

IMP 101 – Stormwater from the stormwater retention pond.
IMP 201 (old Outfall 002) – Non-contact cooling water and miscellaneous wastewater.
IMP 301 (old Outfall 003) – Process wastewater from the acid treatment plant, subject to Effluent Guideline Limitations in the Nonferrous Metals Manufacturing Category at 40 CFR Part 421, Subpart I.
Outfall 001 – Combined wastewater from IMPs 101-301 (IW Process Effluent, NCCW and Stormwater).
Outfall 002 – Stormwater from drainage swale along Vance Road, located near the contractor's gate.
Outfall 003 – Stormwater outfall located near the sulfur storage tank.
Outfall 004 – Concrete elbow that receives stormwater from the stormwater retention pond emergency overflow and the sulfuric acid storage farm dike.
Outfall 006 – Stormwater outfall located behind the sulfuric acid tank farm.

The plant has a Water Quality Management (WQM) Part II Permit, No. 6377204-A3, for the operation of the LET Plant (IMP 301).

Determination of low flow $Q_{7\text{-}10}$

Burgetts Fork feeds into Raccoon Creek, which has a stream gauge station (05030101). The gauge is located at Lat 40º37'40", Long 80º20'16" on the left bank at downstream side of highway bridge at Moffatts Mill. During the previous permit cycle, the $Q_{7\text{-}10}$ from this station has been used in the Water-Quality Base Effluent Limit (WQBEL) evaluation.

The previous permit cycle used the $Q_{7\text{-}10}$ flow of 9.1 cfs. Review of the current station flow data has a $Q_{7\text{-}10}$ of 11 cfs and since the station started (1920) through current (2019) the $Q_{7\text{-}10}$ is 5.6 cfs. During this permit development cycle, the stream gauge station $Q_{7\text{-}10}$ that will be used to develop effluent limits is 9.1 cfs to ensure proper protection of the environment is maintained.

A $Q_{7\text{-}10}$ flow of 0.567 cfs was calculated using flow data from USGS Gage 03108000 during the previous permit cycle. The station $Q_{7\text{-}10}$ and station drainage area are ratioed to the facility $Q_{7\text{-}10}$ and facility drainage area. The calculation is below:

$$\frac{Flow_{gage}}{Drainage\ Area_{gage}} = \frac{Flow_{Burgetts\ Fork}}{Drainage\ Area_{\ Burgetts\ Fork}}$$

$$\frac{9.1\ cfs}{178\ mi^2} = \frac{Q_{7-10}}{11.1\ mi^2}$$

It is recommended that a draft permit be published for public comment in response to this application.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.024
Latitude	40º 21' 53.8"	Longitude	-80º 23' 52.4"
Quad Name	Avella	Quad Code	1602
Wastewater Description:	IW Process Effluent with ELG, Noncontact Cooling Water (NCCW)		
Receiving Waters	Unnamed Tributary to Burgetts Fork	Stream Code	33846
NHD Com ID	99690494	RMI	2.48
Drainage Area	11.1	Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	0.567	Q_{7-10} Basis	USGS Gage 03108000
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	METALS, PH		
Source(s) of Impairment	ACID MINE DRAINAGE, ACID MINE DRAINAGE		
TMDL Status	Final	Name	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>40

Changes Since Last Permit Issuance: None

Other Comments: None

Discharge, Receiving Waters and Water Supply Information

Outfall No.	101	Design Flow (MGD)	0
Latitude	40º 21' 48.3"	Longitude	-80º 24' 09.5"
Quad Name	Avella	Quad Code	1602
Wastewater Description:	Stormwater		
Receiving Waters	Unnamed Tributary of Burgetts Fork via Outfall 001	Stream Code	33846
NHD Com ID	99690678	RMI	
Drainage Area	11.1	Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	0.567	Q_{7-10} Basis	USGS Gage 03108000
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		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	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>40

Changes Since Last Permit Issuance:

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	201	Design Flow (MGD)	0.06
Latitude	40º 21' 48.2"	Longitude	-80º 24' 10"
Quad Name	Avella	Quad Code	1602
Wastewater Description:	Non-Contact Cooling Water		
Receiving Waters	Unnamed Tributary of Burgetts Fork via Outfall 001	Stream Code	33846
NHD Com ID	99690678	RMI	
Drainage Area	11.1	Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	0.567	Q_{7-10} Basis	USGS Gage 03108000
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		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	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>40

Changes Since Last Permit Issuance:

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	301	Design Flow (MGD)	0.024
Latitude	40º 21' 47.1"	Longitude	-80º 24' 08.8"
Quad Name	Avella	Quad Code	1602
Wastewater Description:	Process Wastewater, Non-contact cooling water, miscellaneous wastewater		
Receiving Waters	Unnamed Tributary of Burgetts Fork via Outfall 001	Stream Code	33846
NHD Com ID	99690678	RMI	
Drainage Area	11.1	Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)	0.567	Q_{7-10} Basis	USGS Gage 03108000
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		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	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>40

Changes Since Last Permit Issuance:

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	002	Design Flow (MGD)	0
Latitude	40º 21' 52.9"	Longitude	-80º 24' 10.0"
Quad Name	Avella	Quad Code	1602
Wastewater Description:	Stormwater		
Receiving Waters	Unnamed Tributary of Burgetts Fork	Stream Code	33858
NHD Com ID	99690678	RMI	0.2300
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		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	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>40

Changes Since Last Permit Issuance:

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	003	Design Flow (MGD)	0
Latitude	40º 21' 49.8"	Longitude	-80º 24' 10.6"
Quad Name	Avella	Quad Code	1602
Wastewater Description:	Stormwater		
Receiving Waters	Unnamed Tributary of Burgetts Fork	Stream Code	33858
NHD Com ID	99690678	RMI	0.2000
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		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	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>40

Changes Since Last Permit Issuance:

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	004	Design Flow (MGD)	0
Latitude	40º 21' 44.3"	Longitude	-80º 24' 10.1"
Quad Name	Avella	Quad Code	1602
Wastewater Description:	Stormwater		
Receiving Waters	Unnamed Tributary of Burgetts Fork	Stream Code	33858
NHD Com ID	99690678	RMI	0.1500
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		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	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>40

Changes Since Last Permit Issuance:

Other Comments:

Discharge, Receiving Waters and Water Supply Information

Outfall No.	006	Design Flow (MGD)	0
Latitude	40º 21' 33.1"	Longitude	-80º 24' 03"
Quad Name	Avella	Quad Code	1602
Wastewater Description:	Stormwater		
Receiving Waters	Unnamed Tributary of Burgetts Fork	Stream Code	33858
NHD Com ID	99690678	RMI	0.0500
Drainage Area		Yield (cfs/mi^2)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	20-D	Chapter 93 Class.	WWF
Existing Use		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	Raccoon Creek Watershed
Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>40

Changes Since Last Permit Issuance:

Other Comments:

Treatment Facility Summary

Treatment Facility Name: Washington Plant

WQM Permit No.	Issuance Date
6377204	May 2, 1977
6377204 T-1	November 11, 1998
6377204 A-2	February 27, 2007
6377204 A-3	January 31, 2022

The Liquid Effluent Treatment (LET) System utilizes the follow unit operations:

- Collection of wastewater streams from the acid plant operations.
- Oxidation of the collected water with hydrogen peroxide.
- Sulfide precipitation with sodium hydrosulfide focused on sulfide forming metals including molybdenum.
- Pressure filtration to remove sulfide precipitates, including molybdenum.
- Neutralization to remove metals and to neutralize free acid.
- Pressure filtration of the neutralized stream to remove particulates.
- Ferric Sulfate ($FeSO_4$) Dosing.
- Tertiary Bag-Filter System.

Changes Since Last Permit Issuance: **The Ferric Sulfate dosing and Tertiary Bag-Filter System were added in Amendment 3 to enhance arsenic removal.**

Other Comments: **None**

Compliance History	
Summary of DMRs:	Due to matrix affects caused by the industrial wastewater, Permit condition Part C.V - WQBELs Below Quantitation Limits has also been added to the permit to capture the non-detect aspect of the MDL 1.0 $^{mg}/_{L}$.
Summary of Inspections:	The Department by Quinten Cameron last inspected the facility on July 12, 2019 with no violations noted.

Other Comments: **None**

Compliance History

DMR Data for Outfall 001 (from January 1, 2022 to November 31, 2022)

Parameter	Limit	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
Flow (MGD) Average Monthly	**Report**	0.032	0.019	0.051	0.058	0.043	0.046	0.034	0.017	0.044	0.026	0.036
Flow (MGD) Daily Maximum	**Report**	0.032	0.019	0.051	0.058	0.043	0.046	0.034	0.017	0.044	0.026	0.036
pH (S.U.) Instantaneous Minimum	**6.0**	7.8	8.2	8.3	7.9	7.8	7.6	7.8	7.8	7.3	7.7	7.4
pH (S.U.) Instantaneous Maximum	**9.0**	7.8	8.2	8.3	7.9	7.8	7.6	7.8	7.8	7.3	7.7	7.4
TSS (mg/L) Daily Maximum	**Report**	20.5	33.5	7.5	9.0	146	87	50.5	< 5.0	8.0	< 5.0	< 5.0
Total Aluminum (mg/L) Daily Maximum	**Report**			2.72			0.82			0.62		
Total Cadmium (mg/L) Daily Maximum	**Report**			< 0.005			< 0.005			< 0.005		
Total Copper (mg/L) Daily Maximum	**Report**			0.23			0.47			0.17		
Fluoride (mg/L) Daily Maximum	**Report**			107			2.08			0.32		
Total Iron (mg/L) Daily Maximum	**Report**			8.67			4.44			2.18		
Total Lead (mg/L) Daily Maximum	**Report**			0.04			0.02			0.14		
Total Manganese (mg/L) Daily Maximum	**Report**			1.21			0.16			0.16		
Total Molybdenum (mg/L) Daily Maximum	**Report**	5.78	2.46	5.38	7.83	11.9	14.5	13.9	0.77	11.1	17.1	12.3
Total Zinc (mg/L) Daily Maximum	**Report**			0.82			0.60			0.62		

DMR Data for Outfall 002 (from January 1, 2022 to November 31, 2022)

Parameter	Benchmark	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22
pH (S.U.) Daily Maximum	**Report**						7.8				
TSS (mg/L) Daily Maximum	**100.0**						6.5				
Total Aluminum (mg/L) Daily Maximum	**Report**						0.41				
Total Arsenic (mg/L) Daily Maximum	**Report**						< 0.0005				
Total Cadmium (mg/L) Daily Maximum	**Report**						0.0002				
Total Copper (mg/L) Daily Maximum	**Report**						0.005				
Fluoride (mg/L) Daily Maximum	**Report**						0.13				
Total Iron (mg/L) Daily Maximum	**Report**						0.19				
Total Lead (mg/L) Daily Maximum	**Report**						0.001				
Total Manganese (mg/L) Daily Maximum	**Report**						0.006				
Total Molybdenum (mg/L) Daily Maximum	**30.0**						0.140				
Total Zinc (mg/L) Daily Maximum	**Report**						0.03				

DMR Data for Outfall 003 (from January 1, 2022 to November 31, 2022)

Parameter	Benchmark	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
pH (S.U.) Daily Maximum	**Report**						8.0					
TSS (mg/L) Daily Maximum	**100.0**			12.0			46.5			13.5		
Total Aluminum (mg/L) Daily Maximum	**Report**						0.34					
Total Arsenic (mg/L) Daily Maximum	**Report**						< 0.005					
Total Cadmium (mg/L) Daily Maximum	**Report**						0.0002					
Total Copper (mg/L) Daily Maximum	**Report**						0.005					
Fluoride (mg/L) Daily Maximum	**Report**						0.15					
Total Iron (mg/L) Daily Maximum	**Report**						0.21					
Total Lead (mg/L) Daily Maximum	**Report**						0.008					
Total Manganese (mg/L) Daily Maximum	**Report**						0.006					
Total Molybdenum (mg/L) Daily Maximum	**30.0**						0.16					
Total Zinc (mg/L) Daily Maximum	**Report**						0.03					

DMR Data for Outfall 004 (from January 1, 2022 to November 31, 2022)

Parameter	Benchmark	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
pH (S.U.) Daily Maximum	**Report**						7.5					
TSS (mg/L) Daily Maximum	**100.0**						12.5					
Total Aluminum (mg/L) Daily Maximum	**Report**						0.39					
Total Arsenic (mg/L) Daily Maximum	**Report**						< 0.005					
Total Cadmium (mg/L) Daily Maximum	**Report**						0.0008					
Total Cobalt (mg/L) Daily Maximum	**Report**						0.16					
Total Copper (mg/L) Daily Maximum	**Report**						0.009					
Fluoride (mg/L) Daily Maximum	**Report**						0.32					
Total Iron (mg/L) Daily Maximum	**Report**						0.76					
Total Lead (mg/L) Daily Maximum	**Report**						0.004					
Total Manganese (mg/L) Daily Maximum	**Report**						0.02					
Total Molybdenum (mg/L) Daily Maximum	**30.0**						3.13					
Total Nickel (mg/L) Daily Maximum	**Report**						0.10					
Total Selenium (mg/L) Daily Maximum	**Report**						0.02					
Total Zinc (mg/L) Daily Maximum	**Report**						0.08					

DMR Data for Outfall 006 (from January 1, 2022 to November 31, 2022)

Parameter	Benchmark	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
pH (S.U.) Daily Maximum	**Report**						6.8					
TSS (mg/L) Daily Maximum	**100.0**						25.5					
Total Aluminum (mg/L) Daily Maximum	**Report**						1.08					
Total Arsenic (mg/L) Daily Maximum	**Report**						0.001					
Total Cadmium (mg/L) Daily Maximum	**Report**			< 0.005			< 0.005			0.008		
Total Copper (mg/L) Daily Maximum	**Report**						0.02					
Fluoride (mg/L) Daily Maximum	**Report**						0.20					
Total Iron (mg/L) Daily Maximum	**Report**						2.12					
Total Lead (mg/L) Daily Maximum	**Report**						0.03					
Total Manganese (mg/L) Daily Maximum	**Report**						0.04					
Total Molybdenum (mg/L) Daily Maximum	**30.0**						0.39					
Total Zinc (mg/L) Daily Maximum	**Report**						2.7					

DMR Data for Outfall 101 (from January 1, 2022 to November 31, 2022)

Parameter	Benchmark	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
Flow (MGD) Average Monthly	**Report**	0.0005	0.0008	0.018	0.012	0.002	0.008	0.018	0.004	0.0004	0.007	0.008
Flow (MGD) Daily Maximum	**Report**	0.0005	0.0008	0.018	0.012	0.002	0.008	0.018	0.004	0.0004	0.007	0.008
TSS (mg/L) Daily Maximum	**100.0**			17			< 5.0			5.0		
Total Arsenic (mg/L) Daily Maximum	**Report**			0.003			0.004			< 0.002		
Total Cadmium (mg/L) Daily Maximum	**Report**			0.03			< 0.005			< 0.005		
Total Copper (mg/L) Daily Maximum	**Report**			0.03			0.01			0.007		
Fluoride (mg/L) Daily Maximum	**Report**			< 1			< 0.5			< 0.10		
Total Lead (mg/L) Daily Maximum	**Report**			0.001			0.001			0.001		
Total Molybdenum (mg/L) Daily Maximum	**30.0**			18.4			11.1			0.37		
Total Zinc (mg/L) Daily Maximum	**Report**			0.04			0.09			0.06		

DMR Data for Outfall 201 (from January 1, 2022 to November 31, 2022)

Parameter	Limit	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
Flow (MGD) Average Monthly	**Report**	0.013	0.016	0.013	0.029	0.027	0.022	0.08	0.014	0.014	0.0	0.018
Flow (MGD) Daily Maximum	**Report**	0.019	0.021	0.014	0.031	0.028	0.024	0.014	0.017	0.014	0.0	0.020
pH (S.U.) Instantaneous Minimum	**6.0**	8.5	8.5	8.6	8.7	8.4	8.5	8.6	8.6	8.0	8.1	8.5
pH (S.U.) Instantaneous Maximum	**9.0**	8.6	8.6	8.7	8.7	8.5	8.5	8.6	8.7	8.6	8.4	8.6
Temperature (ºF) Average Monthly	**Report**	73.6	72	74	76.6	74.1	71.3	68.3	70	68.5	76.0	70.9
Temperature (ºF) Daily Maximum	**Report**	74.9	72.2	74.7	77	75.3	72.9	68.6	70.5	70	79.5	71

DMR Data for Outfall 301 (from January 1, 2022 to November 31, 2022)

Parameter	Limit	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
Flow (MGD) Average Monthly	**Report**	0.021	0.010	0.015	0.016	0.017	0.013	0.015	0.011	0.015	0.010	0.009
Flow (MGD) Daily Maximum	**Report**	0.026	0.021	0.020	0.025	0.034	0.019	0.18	0.018	0.025	0.022	0.012
pH (S.U.) Daily Minimum	**6.0**	7.7	7.6	7.6	7.7	7.5	7.7	7.4	7.8	7.5	7.5	7.5
pH (S.U.) Daily Maximum	**9.0**	8.2	7.9	7.9	8	7.7	7.5	7.8	7.7	7.8	7.5	7.5
TSS (lbs/day) Average Monthly	**73.0**	18.7	4.0	7.8	4.41	15.7	15.7	5.2	3.1	9.1	0.57	1.5
TSS (lbs/day) Daily Maximum	**146.0**	43.5	9.1	15.2	7.9	43.14	26.4	13.8	6.9	25.9	1.8	2.7
TSS (mg/L) Average Monthly	**Report**	105.7	48.2	62.2	32.4	106	136	50.5	32.5	71.5	5.7	14.2
TSS (mg/L) Daily Maximum	**Report**	196	51.5	70	39.5	148	156	74.5	45	86.0	7.5	17
Total Dissolved Solids (mg/L) Average Monthly	**Report**	32600	35300	32500	32150	30450	63500	43500	41650	20850	890	12600
Total Dissolved Solids (mg/L) Daily Maximum	**Report**	32800	38100	32700	38400	37500	63700	58400	44200	21100	3120	12700
Oil and Grease (mg/L) Average Monthly	**15.0**	2.1	6.0	1.2	2.0	2.3	2.8	0.21	5.3	1.1	1.8	1.0
Oil and Grease (mg/L) Daily Maximum	**30.0**	4.2	6.3	2.5	2.4	3.0	5.7	0.76	10.6	2.3	3.6	2.1
Total Aluminum (lbs/day) Average Monthly	**Report**	0.07	0.27	0.25	0.07	0.19	0.31	0.15	0.13	0.04	0.02	0.03
Total Aluminum (lbs/day) Daily Maximum	**Report**	0.12	0.98	0.69	0.15	0.43	0.74	0.32	0.30	0.18	0.07	0.05
Total Aluminum (mg/L) Average Monthly	**Report**	0.41	3.3	2.0	0.55	1.3	2.6	1.44	1.3	0.38	0.25	0.28
Total Aluminum (mg/L) Daily Maximum	**Report**	0.57	5.5	3.1	0.76	1.4	4.3	1.76	2.0	0.61	0.30	0.36
Total Arsenic (lbs/day) Average Monthly	**0.76/ 0.033**	0.003	0.002	0.015	0.008	0.03	0.01	0.01	0.002	0.002	0.003	0.001

DMR Data for Outfall 301 (from January 1, 2022 to November 31, 2022) (cont.)

Parameter	Limit	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
Total Arsenic (lbs/day) Daily Maximum	**1.5/ 0.051**	0.005	0.005	0.032	0.01	0.11	0.02	0.02	0.007	0.009	0.01	0.003
Total Arsenic (mg/L) Average Monthly	**Report/ 0.163**	0.022	0.029	0.121	0.06	0.21	0.12	0.11	0.03	0.02	0.03	0.01
Total Arsenic (mg/L) Daily Maximum	**Report/ 0.254**	0.026	0.029	0.151	0.07	0.37	0.17	0.11	0.05	0.03	0.05	0.02
Total Boron (lbs/day) Average Monthly	**Report**	0.44	0.24	0.38	0.49	0.32	0.54	0.32	0.32	0.22	0.07	0.09
Total Boron (lbs/day) Daily Maximum	**Report**	0.64	0.52	0.69	0.76	0.74	0.81	0.76	0.52	0.56	0.27	0.14
Total Boron (mg/L) Average Monthly	**Report**	2.5	2.9	3.0	3.6	2.2	4.6	3.1	3.2	1.7	0.75	0.88
Total Boron (mg/L) Daily Maximum	**Report**	2.9	2.9	3.1	3.8	2.5	4.8	4.1	3.4	1.8	1.09	0.92
Total Cadmium (lbs/day) Average Monthly	**0.10**	0.0001	0.00001	0.0001	0.0001	0.0003	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001
Total Cadmium (lbs/day) Daily Maximum	**0.25**	0.0002	0.0002	0.0002	0.0001	0.0006	0.0003	0.0006	0.0005	0.0006	0.0005	0.0003
Total Cadmium (mg/L) Average Monthly	**Report**	< 0.0002	0.001	0.001	0.0001	0.002	0.001	0.002	0.003	0.001	0.002	0.001
Total Cadmium (mg/L) Daily Maximum	**Report**	0.0009	0.001	0.001	0.0001	0.002	0.002	0.003	0.003	0.002	0.002	0.002
Hexavalent Chromium (lbs/day) Average Monthly	**Report**	0.008	0.004	0.01	< 0.02	0.002	0.001	< 0.02	0.002	< 0.02	0.0002	0.002
Hexavalent Chromium (lbs/day) Daily Maximum	**Report**	0.01	0.01	0.02	< 0.02	0.008	0.003	< 0.04	0.006	< 0.02	0.001	0.007
Hexavalent Chromium (mg/L) Average Monthly	**Report**	0.04	0.05	0.09	< 0.02	0.01	0.01	< 0.02	0.02	< 0.02	0.002	0.02
Hexavalent Chromium (mg/L) Daily Maximum	**Report**	0.05	0.08	0.12	< 0.02	0.03	0.02	< 0.04	0.04	< 0.02	0.004	0.05
Total Cobalt (lbs/day) Average Monthly	**0.062**	0.004	0.003	0.002	0.004	0.002	0.002	0.002	0.004	0.010	0.002	0.001
Total Cobalt (lbs/day) Daily Maximum	**0.096**	0.007	0.011	0.002	0.009	0.005	0.003	0.005	0.009	0.030	0.007	0.001

DMR Data for Outfall 301 (from January 1, 2022 to November 31, 2022) (cont.)

Parameter	Limit	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
Total Cobalt (mg/L) Average Monthly	**0.309**	0.027	0.046	0.020	0.036	0.015	0.020	0.025	0.050	0.085	0.020	0.010
Total Cobalt (mg/L) Daily Maximum	**0.482**	0.033	0.066	0.020	0.048	0.020	0.020	0.030	0.060	0.100	0.030	0.010
Total Copper (lbs/day) Average Monthly	**0.75**	0.0002	0.0004	0.0006	0.0008	0.0001	< 0.15	< 0.10	< 0.002	0.05	0.001	0.0005
Total Copper (lbs/day) Daily Maximum	**1.5**	0.0004	0.001	0.001	0.001	0.0006	< 0.20	< 0.10	< 0.10	< 0.05	0.005	0.001
Total Copper (mg/L) Average Monthly	**Report**	0.001	0.005	0.005	0.006	0.001	< 0.15	< 0.10	< 0.002	< 0.05	0.01	0.005
Total Copper (mg/L) Daily Maximum	**Report**	0.002	0.007	0.006	0.007	0.002	< 0.20	< 0.10	< 0.10	< 0.05	0.02	0.01
Fluoride (lbs/day) Average Monthly	**24.0**	14.4	10.3	8.9	12.1	6.05	8.11	7.2	13.5	8.3	4.6	1.3
Fluoride (lbs/day) Daily Maximum	**43.0**	24.1	29.7	17.5	20.8	14.5	11.9	18.0	22.6	19.9	18.7	2.2
Fluoride (mg/L) Average Monthly	**Report**	70.5	122	71	88.8	40.5	70.1	69.6	138	65.2	46.1	12.5
Fluoride (mg/L) Daily Maximum	**Report**	109	167	80.5	104	50.0	70.6	96.6	146	66.3	75.0	13.9
Dissolved Iron (lbs/day) Average Monthly	**Report**	0.001	0.003	< 0.02	0.008	0.01	0.005	0.01	0.01	0.01	0.002	0.001
Dissolved Iron (lbs/day) Daily Maximum	**Report**	0.004	0.007	< 0.02	0.02	0.05	0.01	0.02	0.01	0.03	0.005	0.004
Dissolved Iron (mg/L) Average Monthly	**Report**	0.010	0.04	< 0.02	0.06	0.10	0.04	0.11	0.11	0.11	0.02	0.01
Dissolved Iron (mg/L) Daily Maximum	**Report**	0.020	0.04	< 0.02	0.12	0.18	0.07	0.11	0.12	0.13	0.02	0.03
Total Iron (lbs/day) Average Monthly	**Report**	0.56	0.59	1.3	0.30	0.61	0.80	0.40	0.38	0.20	0.04	0.04
Total Iron (lbs/day) Daily Maximum	**Report**	0.84	1.7	3.0	0.49	1.49	1.91	0.93	0.82	0.73	0.15	0.07
Total Iron (mg/L) Average Monthly	**Report**	3.1	7.0	9.0	2.2	4.1	6.93	3.8	3.8	1.6	0.47	0.40
Total Iron (mg/L) Daily Maximum	**Report**	3.8	9.8	14.2	2.4	5.1	11.3	5.0	5.3	2.4	0.63	0.48
Total Lead (lbs/day) Average Monthly	**0.16**	0.006	0.0005	0.003	0.004	0.001	0.0008	0.0006	0.0003	0.001	0.0001	0.0001

DMR Data for Outfall 301 (from January 1, 2022 to November 31, 2022) (cont.)

Parameter	Limit	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
Total Lead (lbs/day) Daily Maximum	**0.34**	0.01	0.001	0.01	0.01	0.002	0.001	0.001	0.0006	0.003	0.0002	0.0003
Total Lead (mg/L) Average Monthly	**Report**	0.03	0.006	0.03	0.03	0.009	0.007	0.006	0.003	0.01	0.001	0.001
Total Lead (mg/L) Daily Maximum	**Report**	0.06	0.008	0.05	0.07	0.009	0.009	0.006	0.004	0.01	0.001	0.002
Total Manganese (lbs/day) Average Monthly	**Report**	0.22	0.12	0.16	0.19	0.19	0.29	0.18	0.16	0.12	0.04	0.05
Total Manganese (lbs/day) Daily Maximum	**Report**	0.30	0.29	0.29	0.33	0.44	0.43	0.44	0.27	0.29	0.11	0.09
Total Manganese (mg/L) Average Monthly	**Report**	1.2	1.5	1.2	1.4	1.3	2.5	1.7	1.7	0.95	0.42	0.54
Total Manganese (mg/L) Daily Maximum	**Report**	1.3	1.6	1.3	1.6	1.5	2.5	2.3	1.8	0.99	0.48	0.57
Total Molybdenum (lbs/day) Average Monthly	**9.98**	1.81	0.30	1.08	1.97	1.29	0.71	1.15	1.14	1.73	0.54	0.31
Total Molybdenum (lbs/day) Daily Maximum	**19.28**	3.18	0.71	2.85	3.89	3.46	1.08	2.42	2.02	5.57	9.95	0.52
Total Molybdenum (mg/L) Average Monthly	**30.0**	10.2	3.6	8.6	14.4	8.7	6.13	11.0	11.6	13.6	5.42	2.9
Total Molybdenum (mg/L) Daily Maximum	**60.0**	14.4	4.0	13.1	19.4	11.9	6.38	13.0	13.1	18.5	9.95	3.6
Total Nickel (lbs/day) Average Monthly	**Report**	0.13	0.02	0.02	0.03	0.02	0.05	0.02	0.02	0.03	0.04	0.009
Total Nickel (lbs/day) Daily Maximum	**Report**	0.25	0.05	0.04	0.07	0.06	0.10	0.05	0.04	0.08	0.22	0.01
Total Nickel (mg/L) Average Monthly	**Report**	0.75	0.24	0.21	0.28	0.20	0.47	0.23	0.27	0.27	0.49	0.08
Total Nickel (mg/L) Daily Maximum	**Report**	1.15	0.29	0.22	0.36	0.23	0.62	0.28	0.27	0.27	0.89	0.09
Total Selenium (lbs/day) Average Monthly	**Report**	0.05	0.03	0.04	0.07	0.03	0.02	0.05	0.05	0.10	0.007	0.02

DMR Data for Outfall 301 (from January 1, 2022 to November 31, 2022) (cont.)

Parameter	Limit	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
Total Selenium (lbs/day) Daily Maximum	**Report**	0.07	0.07	0.08	0.14	0.08	0.05	0.11	0.09	0.28	0.03	0.03
Total Selenium (mg/L) Average Monthly	**Report**	0.30	0.36	0.36	0.52	0.21	0.25	0.49	0.60	0.85	0.07	0.21
Total Selenium (mg/L) Daily Maximum	**Report**	0.36	0.42	0.41	0.71	0.28	0.30	0.60	0.63	0.95	0.14	0.24
Sulfate (mg/L) Average Monthly	**Report**	22250	25250	23150	21300	19800	40700	27650	27850	13200	5325	8610
Sulfate (mg/L) Daily Maximum	**Report**	22500	26600	23400	25400	24100	41500	37700	28800	13700	7980	8840
Total Thallium (mg/L) Average Monthly	**<1.0**	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 1.0	< 0.005	< 0.08
Total Thallium (mg/L) Daily Maximum	**<1.0**	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 1.0	< 0.08	< 0.08
Total Zinc (lbs/day) Average Monthly	**0.52**	0.01	0.04	0.03	0.02	0.02	0.02	0.02	0.04	0.01	0.004	0.006
Total Zinc (lbs/day) Daily Maximum	**1.25**	0.01	0.13	0.07	0.04	0.05	0.06	0.06	0.08	0.03	0.02	0.01
Total Zinc (mg/L) Average Monthly	**Report**	0.05	0.53	0.30	0.20	0.17	0.25	0.26	0.47	0.09	0.04	0.05
Total Zinc (mg/L) Daily Maximum	**Report**	0.08	0.74	0.34	0.23	0.19	0.38	0.33	0.58	0.10	0.09	0.11
Chloride (mg/L) Average Monthly	**Report**	390	163	233	757	601	1575	750	979	1035	459	306
Chloride (mg/L) Daily Maximum	**Report**	601	182	248	767	626	2070	880	1010	1070	618	336
Bromide (mg/L) Average Monthly	**Report**	4.7	1.5	1.1	1.8	0.95	0.33	2.2	3.6	1.3	1.29	1.3
Bromide (mg/L) Daily Maximum	**Report**	8.3	3.0	1.5	2.5	0.97	0.67	2.4	3.9	1.5	1.60	2.6

*** Total Arsenic effluent limitation is Report from permit effective date till August 31, 2022 then during September 2022 the final effluent limitation becomes effective Average Monthly of 0.163 mg/L and Daily Maximum of 0.254 mg/L.**

****Total Thallium Quantitation Limit was determined to be 1.0 mg/L, due to process wastewater's parameters and matrix effects caused by those parameters. To demonstrate effluent limitation compliance, the reported concentration must be <1.0 mg/L.**

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.084 (0.024+0.06+0.0)
Latitude 40° 21' 53.8" **Longitude** -80° 23' 52.4
Wastewater Description: Industrial Process Wastewater, Non-Contact Cooling Water, and Stormwater

Outfall 001 discharges consist of a combination of the IMPs 101-301 which collectively consist of process wastewater with an ELG-regulated source, Non-Contact Cooling Water (source water is from municipal water supply), and Stormwater runoff.

During the previous permit cycle, parameters identified in the ELG (Total Suspended Solids, Arsenic, Cadmium, Copper, Lead, Molybdenum, Zinc and Fluoride) to which IMP 301 is subjected along with the parameters identified in the Racoon Creek TMDL (Iron, Manganese, Aluminum and pH) were monitored at this outfall. During the previous permit cycle, the concentrations have been non-detect or slightly above the detection limit. With a permit cycle of monitoring data, the monitoring parameters identified in the ELG (Total Suspended Solids, Arsenic, Cadmium, Copper, Lead, Molybdenum, Zinc and Fluoride) are evaluated at IMP 301 and will be removed from monitoring requirements of Outfall 001. The parameters identified in the Racoon Creek TMDL (Iron, Manganese, Aluminum, and pH) will be maintained at Outfall 001.

Effluent Limitations and Monitoring Requirements for Outfall 001

Effluent limits applicable at Outfall 001 are the more stringent of TBELs, regulatory effluent standards, previously permitted effluent limits and the monitoring requirements are summarized in Table 1.

Table 1: Final Effluent limits and monitoring requirements for Outfall 001

Parameter	Mass (pounds)		Concentration (mg/L)				Basis
	Average Monthly	Daily Maximum	Daily Minimum	Average Monthly	Daily Maximum	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	—	25 Pa. Code § 92a.61(d)(1)
Total Aluminum	—	—	—	—	Report	—	40 CFR § 130
Total Manganese	—	—	—	—	Report	—	40 CFR § 130
Total Iron	—	—	—	—	Report	—	40 CFR § 130
pH (S.U.)	—	—	6.0	—	—	9.0	25 Pa. Code § 95.2

Monitoring requirements for the interim and final effluent limits are based on the previous permit's monitoring requirements for the facility and displayed in Table 2 below.

Table 2: Monitoring Requirements for Outfall 001

Parameter	Sample Type	Minimum Sample Frequency
Flow (MGD)	Measured	1/quarter
Total Aluminum	Grab	1/quarter
Total Manganese	Grab	1/quarter
Total Iron	Grab	1/quarter
pH (S.U.)	Grab	1/quarter

Development of Effluent Limitations

Outfall No. 101 **Design Flow (MGD)** 0.0
Latitude 40° 21' 48.3" **Longitude** -80° 24' 07.7"
Wastewater Description: Stormwater

Outfall 101 contains stormwater from the stormwater retention pond. Water is pumped to Outfall 001 by a pump house located in the surge tank containment dike. The current permit does not require sampling nor was sampling completed as part of the application. The stormwater is mixed with LET effluent and non-contact cooling water before discharge via Outfall 001. Before mixing, stormwater will be sampled for parameters contained in the ELG and the TMDL parameters.

During the previous permit cycle, parameters identified in the ELG (Total Suspended Solids, Arsenic, Cadmium, Copper, Lead, Molybdenum, Zinc and Fluoride) to which IMP 301 is subjected have been imposed at Outfall 101. During the permit cycle, the concentrations have been non-detect or slightly above the detection limit. The monitoring frequency will be changed from quarterly to semi-annually to be consisted with the Department's General Permit for Discharges of Stormwater Associated with Industrial Activity.

Effluent Limitations and Monitoring Requirements for Outfall 101

Effluent limits applicable at Outfall 101 are the more stringent of TBELs, regulatory effluent standards, previously permitted effluent limits and the monitoring requirements are summarized in Table 3.

Table 3: Final Effluent limits and monitoring requirements for Outfall 101

Parameter	Mass (pounds)		Concentration (mg/L)				Basis
	Average Monthly	Daily Maximum	Daily Minimum	Average Monthly	Daily Maximum	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	—	25 Pa. Code § 92a.61(d)(1)
Total Suspended Solids	—	—	—	—	Report	—	40 CFR § 130
Arsenic, Total	—	—	—	—	Report	—	40 CFR § 130
Cadmium, Total	—	—	—	—	Report	—	40 CFR § 130
Copper, Total	—	—	—	—	Report	—	40 CFR § 130
Fluoride, Total	—	—	—	—	Report	—	40 CFR § 130
Lead, Total	—	—	—	—	Report	—	40 CFR § 130
Molybdenum, Total	—	—	—	—	Report	—	40 CFR § 130
Zinc, Total	—	—	—	—	Report	—	40 CFR § 130

Monitoring requirements for the interim and final effluent limits are based on the previous permit's monitoring requirements for the facility and displayed in Table 4 below.

Table 4: Monitoring Requirements for Outfall 101

Parameter	Sample Type	Minimum Sample Frequency
Flow (MGD)	Measured	1/semi annual
Total Suspended Solids	Grab	1/semi annual
Arsenic, Total	Grab	1/semi annual
Cadmium, Total	Grab	1/semi annual
Copper, Total	Grab	1/semi annual
Fluoride, Total	Grab	1/semi annual
Lead, Total	Grab	1/semi annual
Molybdenum, Total	Grab	1/semi annual
Zinc, Total	Grab	1/semi annual

Development of Effluent Limitations

Outfall No.	201	**Design Flow (MGD)**	0.06
Latitude	40° 21' 48.2"	**Longitude**	-80° 24' 02.8"

Wastewater Description: Non-contact cooling water

Technology-Based Limitations

Outfall 201 discharge consist of NCCW which are not subject to Federal Effluent Limitation Guidelines (ELGs) as the SIC code is not listed under 40 CFR parts 405 through 471.

Regulatory Effluent Standards and Monitoring Requirements

In accordance with the recommendations given in Chapter 6, Table 6-4 of the Department's Permit Writer's Manual for NCCW discharges, self-monitoring requirements at Outfall 001 will include, at a minimum, the following parameters: flow, pH, and temperature. Monitoring frequency is determined by the flowrate of the NCCW discharge.

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

Effluent standards for pH (6.0 to 9.0 S.U.) are also imposed on industrial wastes by 25 Pa. Code § 95.2(1).

Total Residual Chlorine (TRC)

The facility utilizes public water supply as a source from the NCCW activities, but the facility does not conduct chlorination activities. 25 Pa. Code § 92a.48 applies to facilities or activities that use chlorination. Since Langeloth does not use chlorine, the TRC technology-based limits 25 Pa. Code § 92a.48 do not apply to Outfall 201.

Total Dissolved Solids (TDS)

Integral to the implementation of 25 Pa. Code § 95.10 is the principle that existing, authorized mass loadings of TDS are exempt from any treatment requirements under these provisions. Existing mass loadings of TDS up to and including the maximum daily discharge loading for any existing discharge, provided that the loading was authorized prior to August 21, 2010 are exempt. Discharge loadings of TDS authorized by the Department are typically exempt from the treatment requirements of Chapter 95.10 until the net TDS loading is increased, an existing discharge proposes a hydraulic expansion or a change in the waste stream. If there are existing mass or production-based TDS effluent limits, then these are used as the basis for the existing mass loading. The facility is not new or expanding waste loading of TDS, therefore, the facility is exempt from 25 Pa. Code § 95.10 treatment requirements.

Water Quality-Based Limitations

Total Maximum Daily Load (TMDL)

The Racoon Creek Watershed TMDL published February 3, 2005 covers the watershed of the discharges. The TMDL is for segments affected by Acid Mine Drainage (AMD), including Burgett's Fork. The TMDL addresses the three primary metals associated with AMD (iron, manganese, aluminum) and pH. LMC is not included in the TMDL and is not expected to contribute to the impairment.

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 201 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 5 below.

Table 5: TMS Inputs

Parameter	Value
Discharge Inputs	
Facility	Langeloth Metallurgical Plant
Evaluation Type	Industrial
NPDES Permit No.	PA0004219
Wastewater Description	Industrial Wastewater and Stormwater
Outfall ID	201
Design Flow (MGD)	0.06
Hardness ($^{mg}/_{L}$)	490
pH (S.U.)	7.4
Partial Mix Factors	Unknown – Calculated by TMS
Complete Mix Times	
$Q_{7\text{-}10}$ (min)	
Q_h (min)	
Stream Inputs	
Receiving Surface Water	Burgett's Fork
Number of Reaches to Model	1
Stream Code	33846
RMI	2.48
Elevation (ft)	1180
Drainage Area (mi^2)	11.1
Slope (ft/ft)	
PWS Withdrawal (MGD)	
Apply Fish Criteria	Yes
Low Flow Yield (cfs/mi^2)	
Flows	
Stream (cfs)	0.567/0.567*
Tributary (cfs)	N/A
Width (ft)	
Stream Hardness ($^{mg}/_{L}$)	100
Stream pH (S.U.)	7

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

Based on the recommendations of the TMS, no WQBEL are recommended at Outfall 201. Analysis Report from the TMS run is included in Attachment A.

WQM 7.0 Model

In general, WQM 7.0 Model is run if the maximum $BOD_5/CBOD_5$ concentrations exceeds 30/25 mg/L in the permit application or the DMRs. The permit application reports BOD_5 concentrations of <2.5 mg/L, therefore, WQM 7.0 Model is not required to be run.

Thermal WQBELs for Heated Discharges (Non-Contact Cooling Water)

Thermal WQBELs are evaluated using the Department's "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 aquatic life-use. The Department 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 (as discussed in Technology-Based Limitations) for the safety of sampling personnel and anyone who may encounter 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.

The Department's *Implementation Guidance for Temperature Criteria* directs permit writers to assume instantaneous complete mixing of the discharge with the receiving stream when calculating thermal effluent limits unless adverse factors exist. One such factor listed in the guidance is that the "discharge is to a receiving water that is very wide, resulting in restricted dispersion of the plume, and horizontal stratification of the plume." Since wastewaters from Outfall 201 will be discharged to the Burgetts Fork, the dispersion of the discharge plume is assumed to be instantaneous.

Discharges from Outfall 201 are classified under Case 2 because the facility's water is obtained from the local municipal supply. The facility's heated discharge flows were used for modeling for a total flowrate of 0.06 MGD which is the monthly average flow of all the facility's heated effluent sources (NCCW) and 0.567 cfs, which is the calculated Q_{7-10} from USGS Gage 03108000. The results of the thermal analysis, included in Attachment C, indicate that WQBELs for temperature are not required at Outfall 201. The summary of WQBELs for temperature are provided below in Table 6.

Table 6: Outfall 201 WQBELs for Temperature

Date	WWF Daily WLA (°F)
Jan 1-31	110.0
Feb 1-29	110.0
Mar 1-31	110.0
Apr 1-15	110.0
Apr 16-30	110.0
May 1-15	110.0
May 16-30	110.0
Jun 1-15	110.0
Jun 16-30	110.0
Jul 1-31	110.0
Aug 1-15	110.0
Aug 16-31	110.0
Sep 1-15	110.0
Sep 16-30	110.0
Oct 1-15	110.0
Oct 16-31	110.0
Nov 1-15	110.0
Nov 16-30	110.0
Dec 1-31	110.0

Emerging Pollutants of Concern

Where the concentration of TDS in the discharge exceeds 1,000 $^{mg}/_{L}$, or the net TDS load from a discharge exceeds 20,000 lbs/day, and the discharge flow exceeds 0.1 MGD, establish a monitoring requirement for TDS, sulfate, chloride, and bromide. For discharges of 0.1 MGD or less establish a monitoring requirement for TDS, sulfate, chloride, and bromide if the concentration of TDS in the discharge exceeds 5,000 mg/L. Langeloth's discharge flowrate is 0.06 MGD and reported

maximum TDS concentration of 1,420 $^{mg}/_{L}$. Therefore, the emerging pollutants of concern monitoring requirements are not imposed.

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 201

Effluent limits applicable at Outfall 201 are the more stringent of TBELs, regulatory effluent standards, WQBELs, previously permitted effluent limits and the monitoring requirements are summarized in Table 7.

Table 7: Final Effluent limits and monitoring requirements for Outfall 201

Parameter	Mass (pounds)		Concentration (mg/L)			Basis
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(d)(1)
Temperature (°F)	—	—	—	—	110.0	25 Pa. Code § 93.7
pH (S.U.)	Within the range of 6.0 to 9.0					25 Pa. Code § 95.2

Monitoring requirements for the interim and final effluent limits are based on the previous permit's monitoring requirements for the facility and displayed in Table 8 below.

Table 8: Monitoring Requirements for Outfall 201

Parameter	Sample Type	Minimum Sample Frequency
Flow (MGD)	Measured	2/month
Temperature	Grab	2/month
pH (S.U.)	Grab	2/month

Development of Effluent Limitations

Outfall No. 301 **Design Flow (MGD)** 0.024
Latitude 40° 21' 47.1" **Longitude** -80° 24' 08.8"
Wastewater Description: Process Wastewater from the Liquid Effluent Treatment (LET) Plant

Technology-Based Limitations

The discharge at IMP 301 is subject to Effluent Guideline Limitations in the Nonferrous Metals Manufacturing Category at 40 CFR Part 421, Subpart I. The following mass effluent limitations are laid out in 40 CFR 421.93 as the best available technology economically achievable (BAT):

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
	mg/kg (pounds per/million pounds) of 100% sulfuric acid capacity	
Arsenic	3.550	1.584
Cadmium	0.511	0.204
Copper	3.269	1.558
Lead	0.715	0.332
Zinc	2.605	1.073
Fluoride	89.390	50.820

Total Suspended Solids is not included in 40 CFR 421.93 as BAT and the limitations for Molybdenum have been reserved. Therefore, the following mass effluent limitations which are laid out in 40 CFR 421.92 as the best practicable technology (BPT) will apply:

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
	mg/kg (pounds per/million pounds) of 100% sulfuric acid capacity	
Total Suspended Solids	304.0	152.0
Molybdenum	40.18	20.79

The ELG limitations are based on acid plant capacity as opposed to acid production rate. LMC's acid plant capacity is 240 tons per day of 100% sulfuric acid according to a letter dated March 13, 2007. Considering 240 tons per day (design capacity in application) of 100% sulfuric acid a multiplier of 0.48 is used to calculate TBELs (i.e., 240 tons/day / 500 tons/day (1,000,000 lbs/day) = 0.48). Therefore, the following TBELs apply (Arsenic 3.55 pounds per/million pounds * 0.48 = 1.704 lbs/day):

Pollutant or pollutant property	Maximum for any 1 day (lbs/day)	Maximum for monthly average (lbs/day)
Arsenic	1.704	0.760
Cadmium	0.245	0.098
Copper	1.569	0.748
Lead	0.343	0.159
Zinc	1.250	0.515
Fluoride	42.907	24.39
Total Suspended Solids	145.920	72.960
Molybdenum	19.286	9.979

Water Quality-Based Limitations

Determination of low flow $Q_{7\text{-}10}$

Burgetts Fork feeds into Raccoon Creek, which has a stream gauge station (05030101). The gauge is located at Lat 40º37'40", Long 80º20'16" on the left bank at downstream side of highway bridge at Moffatts Mill. During the previous permit cycle, the $Q_{7\text{-}10}$ from this station has been used in the Water-Quality Base Effluent Limit (WQBEL) evaluation.

The previously cycle used the $Q_{7\text{-}10}$ flow of 9.1 cfs. Review of the current station flow data has $Q_{7\text{-}10}$ of 11 cfs and since the station started (1920) through current (2019) the $Q_{7\text{-}10}$ is 5.6 cfs. During this permit development cycle, the stream gauge station $Q_{7\text{-}10}$ that will be used to develop effluent limits is 9.1 cfs to ensure proper protection of the environment is maintained.

A $Q_{7\text{-}10}$ flow of 0.567 cfs was calculated using flow data from USGS Gage 03108000 during the previous permit cycle. The station $Q_{7\text{-}10}$ and station drainage area are ratioed to the facility $Q_{7\text{-}10}$ and facility drainage area. The calculation is below:

$$\frac{Flow_{gage}}{Drainage\ Area_{gage}} = \frac{Flow_{Burgetts\ Fork}}{Drainage\ Area_{\ Burgetts\ Fork}}$$

$$\frac{9.1\ cfs}{178\ mi^2} = \frac{Q_{7-10}}{11.1\ mi^2}$$

$$Q_{7-10} = 0.567\ cfs$$

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:

3. 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.

4. 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 301 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 9 below.

Table 9: TMS Inputs

Parameter	Value
Discharge Inputs	
Facility	Langeloth Metallurgical Plant
Evaluation Type	Industrial
NPDES Permit No.	PA0004219
Wastewater Description	Industrial Wastewater
Outfall ID	301
Design Flow (MGD)	0.024
Hardness ($^{mg}/_{L}$)	11,300
pH (S.U.)	8.2
Partial Mix Factors	Unknown – Calculated by TMS
Complete Mix Times	
Q_{7-10} (min)	
Q_h (min)	
Stream Inputs	
Receiving Surface Water	Burgett's Fork
Number of Reaches to Model	1
Stream Code	33846
RMI	2.48
Elevation (ft)	1180
Drainage Area (mi^2)	11.1
Slope (ft/ft)	
PWS Withdrawal (MGD)	
Apply Fish Criteria	Yes
Low Flow Yield (cfs/mi^2)	
Flows	
Stream (cfs)	0.567/0.613*****
Tributary (cfs)	N/A
Width (ft)	
Stream Hardness ($^{mg}/_{L}$)	100
Stream pH (S.U.)	7

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

Below is a summary of the recommendations of the TMS at Outfall 301. Analysis Report from the TMS run is included in Attachment A.

Table 10: TMS Model WQBELs

Parameter	Mass Load (lbs/day)		Concentration Limit (ug/L)	
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Total Aluminum	Report	Report	Report	Report
Total Antimony	Report	Report	Report	Report
Total Arsenic	0.033	0.051	163	254
Total Boron	Report	Report	Report	Report
Total Cadmium	Report	Report	Report	Report
Hexavalent Chromium[1]	**0.034**	**0.053**	**169**	**264**
Total Cobalt	Report	Report	Report	Report
Total Copper	0.27	0.42	1,338	2,088
Total Iron	Report	Report	Report	Report
Total Selenium	0.016	0.025	81.2	127
Total Thallium[2]	0.0008	0.001	3.91	6.09
Total Zinc	Report	Report	Report	Report
Acrylamide[3]	**0.002**	**0.003**	**8.6**	**13.4**
4,6-Dinitro-o-Cresol[1]	**Report**	**Report**	**Report**	**Report**
Bis(2-Ethylhexyl)Phthalate[1]	**0.008**	**0.012**	**39.3**	**61.3**
3,3-Dichlorobenzidine[1]	**0.001**	**0.002**	**6.14**	**9.59**
Hexachlorobutadiene[1]	**0.0002**	**0.0004**	**1.23**	**1.92**
1,2,4-Trichlorobenzene[1]	**0.0002**	**0.0004**	**1.14**	**1.78**

1) The six (6) parameters (Hexavalent Chromium, 4,6-Dinitro-o-Cresol, Bis(2-Ethylhexyl)Phthalate, 3,3-Dichlorobenzidine, Hexachlorobutadiene, and 1,2,4-Trichlorobenzene) all had non-detect concentrations above the

Department's Target QLs. The Department will allow Langeloth the opportunity to resample these parameters during the 30-day Draft permit comment period. If the new analytical results verify that the parameters are not present in its wastewater discharge at the Department's minimum quantitation limits, effluent limitations / monitoring requirements for these pollutants may be eliminated prior to Final permit issuance.

2) During the previous permit, Langeloth evaluated their raw materials and additives for Total Thallium. Langeloth then completed a mass balance evaluation and the results were considerably lower than the laboratory results. Microbac evaluated testing results and determined that when accounting for matrix interference of the process wastewater, the MDL for thallium is 1.0 mg/L. This MDL concentration is above the imposed average monthly effluent limitation of 0.0039 mg/L. The higher MDL accounts for the other parameters in the facility process water that are caused by matrix interference of the analyzed thallium concentration.
3) Langeloth evaluated their raw materials and additives for Acrylamide and determined that Acrylamide is not contained in their materials. Since Acrylamide is not in the facility's materials, the reasonable potential for Acrylamide is removed. No Acrylamide effluent limitations are imposed.

An analysis of Average Monthly WQBELs vs. Average Monthly TBELs is outlined in the table below. The more stringent of the two is presented as bold and shaded values and will be implemented in the permit. "M&R" indicates that monitoring and reporting requirements (no limits) will be established in the permit.

Table 11: WQBEL vs. TBEL Recommendations

Pollutant	WQBEL (mg/L) [1]	WQBEL (lbs/day) [1]	TBEL (mg/L) [2]	TBEL (lbs/day)
Total Aluminum	Report	Report	N/A	N/A
Total Antimony	Report	Report	N/A	N/A
Total Arsenic	0.163	0.033	1.704	0.760
Total Boron	Report	Report	N/A	N/A
Total Cadmium	Report	Report	0.245	0.098
Hexavalent Chromium[4]	**0.169**	**0.034**	N/A	N/A
Total Cobalt[7]	Report	Report	N/A	N/A
Total Copper	1.3	0.27	1.569	0.748
Total Iron	Report	Report	N/A	N/A
Total Selenium	0.812	0.016	N/A	N/A
Total Thallium[5]	**0.004**	**0.0008**	N/A	N/A
Total Zinc	**Report**	**Report**	1.250	0.515
Acrylamide[6]	**0.009**	**0.002**	N/A	N/A
4,6-Dinitro-o-Cresol[4]	**Report**	**Report**	N/A	N/A
Bis(2-Ethylhexyl)Phthalate[4]	**0.04**	**0.008**	N/A	N/A
3,3-Dichlorobenzidine[4]	**0.006**	**0.001**	N/A	N/A
Hexachlorobutadiene[4]	**0.001**	**0.0002**	N/A	N/A
1,2,4-Trichlorobenzene[4]	**0.001**	**0.0002**	N/A	N/A
Lead	N/A [3]	N/A [3]	0.343	0.159
Total Suspended Solids	N/A [3]	N/A [3]	145.92	72.96
Molybdenum	N/A [3]	N/A [3]	19.286	9.979
Fluoride	N/A [3]	N/A [3]	42.907	24.39

1 – Average Monthly WQBEL concentration limits were determined using TMS. WQBEL mass limits determined by multiplying the Average Monthly WQBEL concentration by the design flow (0.024 MGD) and the conversion factor (8.34).

2 – Average Monthly TBEL concentrations were determined by dividing the Average Monthly TBEL mass limits derived above by the design flow (0.024 MGD) and the conversion factor (8.34).

3 – No reasonable potential exists, based on data submitted by LMC, for excursions of water quality criteria due to the presence of these pollutants in LMC's discharge. However, TBELs still apply.

4 – The six (6) parameters (Hexavalent Chromium, 4,6-Dinitro-o-Cresol, Bis(2-Ethylhexyl)Phthalate, 3,3-Dichlorobenzidine, Hexachlorobutadiene, and 1,2,4-Trichlorobenzene) all had non-detect concentrations above the Department's Target QLs. The Department will allow Langeloth the opportunity to resample this parameter during the 30-day Draft permit comment period. If the new analytical results verify that the parameters are not present in its wastewater discharge at the Department's minimum quantitation limits, effluent limitations / monitoring requirements for these pollutants may be eliminated prior to Final permit issuance.

5 – During the previous permit, Langeloth evaluated their raw materials and additives for Total Thallium. Langeloth then completed a mass balance evaluation and the results were considerably lower than the laboratory results. Microbac evaluated testing results and determined that when accounting for matrix interference of the process wastewater, the MDL for thallium is 1.0 mg/L. This MDL concentration is above the imposed average monthly effluent limitation of 0.0039

$^{mg}/_{L}$. The higher MDL accounts for the other parameters in the facility process water that are caused by matrix interference of the analyzed thallium concentration.

6 – Langeloth evaluated their raw materials and additives for Acrylamide and determined that Acrylamide is not contained in their materials. Since Acrylamide is not in the facility's materials, the reasonable potential for Acrylamide is removed. No Acrylamide effluent limitations are imposed.

7 - During the previous permitting cycle, Total Cobalt was monitored and no longer exhibits a reasonable potential to exceed water quality criteria. The previously imposed effluent limits will not be imposed. Also, the TMS recommendation of monitor and report will not be imposed, the historic Total Cobalt concentrations have been approximately 20% of the WQBEL previously imposed with no reasonable potential to exceed WQ criteria.

For Zinc and Total Cadmium, WQBELs are not necessary, although TBELs will be established in the permit. Three (3) parameters (Dissolved Iron, Total Manganese, and Total Nickel) had monitor and report imposed and review of the concentrations contained in the eDMRs and the renewal application have shown that reasonable potential has been removed for these three parameters. The previously imposed monitor and report requirement is not imposed for Dissolved Iron, Total Manganese, and Total Nickel.

Limits for Oil and Grease based on Pa. Code Chapter § 95.2(2)ii are included in the existing permit and will be retained in the renewed permit.

Monitoring requirements for the TMDL parameters, Aluminum, Iron and Manganese, are included.

Emerging Pollutants of Concern

Where the concentration of TDS in the discharge exceeds 1,000 $^{mg}/_{L}$, or the net TDS load from a discharge exceeds 20,000 lbs/day, and the discharge flow exceeds 0.1 MGD, establish a monitoring requirement for TDS, sulfate, chloride, and bromide. For discharges of 0.1 MGD or less establish a monitoring requirement for TDS, sulfate, chloride, and bromide if the concentration of TDS in the discharge exceeds 5,000 mg/L. Outfall 301's discharge flowrate is 0.024 MGD (<0.1 MGD) and reported maximum TDS concentration of 59,600 $^{mg}/_{L}$ (>1,000 $^{mg}/_{L}$), which equals a TDS load of 12,000 lbs/day (<20,000 lbs/day). Therefore, the emerging pollutants of concern monitoring requirements are imposed as previously permitted.

Effluent Limitations and Monitoring Requirements for Outfall 301

Effluent limits applicable at Outfall 301 are the more stringent of TBELs, regulatory effluent standards, WQBELs, previously permitted effluent limits and the monitoring requirements are summarized in Table 12.

Table 12: Final Effluent limits and monitoring requirements for Outfall 301

Parameter	Mass (pounds)		Concentration (mg/L)			Basis
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(d)(1)
TDS	—	—	Report	Report	—	25 Pa. Code § 95.10
Chloride	—	—	Report	Report	—	25 Pa. Code § 96.3
Bromide	—	—	Report	Report	—	25 Pa. Code § 96.3
Sulfate	—	—	Report	Report	—	25 Pa. Code § 96.3
Total Suspended Solids	73.0	146.0	Report	Report	—	40 CFR § 421.93
Oil and Grease	—	—	15.0	30.0	30.0	25 Pa. Code § 95.2(2)(ii)
Total Aluminum	Report	Report	Report	Report	—	WQBELs
Total Antimony	Report	Report	Report	Report	—	WQBELs
Total Arsenic	0.033	0.051	0.163	0.254	0.41	WQBELs
Total Boron	Report	Report	Report	Report	—	WQBELs
Total Cadmium	0.10	0.25	Report	Report	—	40 CFR § 421.93
Hexavalent Chromium	—	—	0.169	0.264	—	WQBELs
Total Copper	0.27	0.42	1.3	2.1	—	WQBELs
Total Iron	—	—	Report	Report	—	WQBELs
Total Selenium	Report	Report	0.081	0.127	—	WQBELs
Total Thallium	0.00078	0.0012	0.0039	0.0061	—	WQBELs
Total Zinc	0.52	1.25	Report	Report	—	40 CFR § 421.93
4,6-Dinitro-o-Cresol	—	—	Report	Report	—	WQBELs
Bis(2-Ethylhexyl)Phthalate	—	—	0.04	0.06	—	WQBELs
3,3-Dichlorobenzidine	—	—	0.006	0.01	—	WQBELs
Hexachlorobutadiene	—	—	0.001	0.002	—	WQBELs
1,2,4-Trichlorobenzene	—	—	0.001	0.002	—	WQBELs
Lead	0.16	0.34	Report	Report	—	40 CFR § 421.93
Molybdenum	9.98	19.28	30.0	60.0	75.0	40 CFR § 421.93
Fluoride	24.0	43.0	Report	Report	—	40 CFR § 421.93
pH (S.U.)	Within the range of 6.0 to 9.0					25 Pa. Code § 95.2

Monitoring requirements for the interim and final effluent limits are based on the previous permit's monitoring requirements for the facility and displayed in Table 13 below.

Table 13: Monitoring Requirements for Outfall 301

Parameter	Sample Type	Minimum Sample Frequency
Flow (MGD)	Measured	1/day
TDS	24-hr Composite	2/month
Chloride	24-hr Composite	2/month
Bromide	24-hr Composite	2/month
Sulfate	24-hr Composite	2/month
Total Suspended Solids	24-hr Composite	2/month
Oil and Grease	Grab	2/month
Total Aluminum	24-hr Composite	2/month
Total Antimony	24-hr Composite	2/month
Total Arsenic	24-hr Composite	2/month
Total Boron	24-hr Composite	2/month
Total Cadmium	24-hr Composite	2/month
Hexavalent Chromium	24-hr Composite	2/month
Total Copper	24-hr Composite	2/month
Total Iron	24-hr Composite	2/month
Total Selenium	24-hr Composite	2/month
Total Thallium	24-hr Composite	2/month
Total Zinc	24-hr Composite	2/month
4,6-Dinitro-o-Cresol4	24-hr Composite	2/month
Bis(2-Ethylhexyl)Phthalate4	24-hr Composite	2/month
3,3-Dichlorobenzidine4	24-hr Composite	2/month
Hexachlorobutadiene4	24-hr Composite	2/month
1,2,4-Trichlorobenzene4	24-hr Composite	2/month
Lead	24-hr Composite	2/month
Molybdenum	24-hr Composite	2/month
Fluoride	24-hr Composite	2/month
pH (S.U.)	Grab	2/month

Development of Effluent Limitations

Outfall No.	002	**Design Flow (MGD)**	0
Latitude	40° 21' 52.6	**Longitude**	-80° 24' 10.0

Wastewater Description: Stormwater

Outfall 002 consists of stormwater from the Northeast side of the property. This outfall was not identified in the permit application. The outfall was identified during an inspection on September 23, 2014. The outfall contains plant area stormwater and will contain monitor and report requirements for each parameter identified in the ELG and TMDL.

During the previous permit cycle, parameters identified in the ELG (Total Suspended Solids, Arsenic, Cadmium, Copper, Lead, Molybdenum, Zinc and Fluoride) to which IMP 301 is subjected along with the parameters identified in the Racoon Creek TMDL (Iron, Manganese, Aluminum and pH) were monitored at this outfall. Below, Table 14 Outfall 002 Evaluation.

Table 14: Outfall 002 Evaluation

Parameter	Criteria / Benchmark	Concentration ($^{mg}/_{L}$)	Percent of Criteria (%)	Recommendation
pH	6-9	8.1	N/A	Maintain Monitoring
TSS	100	6.5	6.5	Maintain Monitoring
Total Aluminum	0.75	0.41	55	TMDL, Maintain Monitoring
Total Arsenic	0.01	<0.0005	<5	Remove from Monitoring
Total Cadmium	0.00143	0.0002	14	Remove from Monitoring
Total Copper	0.079	0.005	6.3	Remove from Monitoring
Total Fluoride	2.0	0.13	6.5	Remove from Monitoring
Total Iron	1.5	0.19	12.7	TMDL, Maintain Monitoring
Total Lead	0.0342	0.0014	4	Remove from Monitoring
Total Manganese	1.0	0.006	0.6	TMDL, Maintain Monitoring
Total Molybdenum	30	0.14	0.5	Remove from Monitoring
Total Zinc	1.014	0.035	3.5	Remove from Monitoring

Effluent Limitations and Monitoring Requirements for Outfall 002

Effluent limits applicable at Outfall 002 are previously permitted effluent limits, parameters with reasonable potential and the monitoring requirements are summarized in Table 15.

Table 15: Final Effluent limits and monitoring requirements for Outfall 002

Parameter	Mass (pounds)		Concentration (mg/L)			Basis
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Instant Maximum	
TSS	—	—	—	Report	—	25 Pa. Code § 93.7
Total Aluminum	—	—	—	Report	—	25 Pa. Code § 96.4
Total Iron	—	—	—	Report	—	25 Pa. Code § 96.4
Total Manganese	—	—	—	Report	—	25 Pa. Code § 96.4
pH (S.U.)	Within the range of 6.0 to 9.0					25 Pa. Code § 95.2

Monitoring requirements for the interim and final effluent limits are based on the previous permit's monitoring requirements for the facility and displayed in Table 16 below.

Table 16: Monitoring Requirements for Outfall 002

Parameter	Sample Type	Minimum Sample Frequency
TSS	Grab	1/6 month
Total Aluminum	Grab	1/6 month
Total Iron	Grab	1/6 month
Total Manganese	Grab	1/6 month
pH (S.U.)	Grab	1/6 month

Development of Effluent Limitations

Outfall No. 003 **Design Flow (MGD)** 0
Latitude 40° 21' 49.8" **Longitude** -80° 24' 10.6"
Wastewater Description: Stormwater

During the previous permit cycle, parameters identified in the ELG (Total Suspended Solids, Arsenic, Cadmium, Copper, Lead, Molybdenum, Zinc and Fluoride) to which IMP 301 is subjected along with the parameters identified in the Racoon Creek TMDL (Iron, Manganese, Aluminum and pH) were monitored at this outfall. Below, Table 17 Outfall 003 Evaluation.

Table 17: Outfall 003 Evaluation

Parameter	Criteria / Benchmark	Concentration ($^{mg}/_{L}$)	Percent of Criteria (%)	Recommendation
pH	6-9	8.0	N/A	Maintain Monitoring
TSS	100	13.5	13.5	Maintain Monitoring
Total Aluminum	0.75	0.34	45.3	TMDL, Maintain Monitoring
Total Arsenic	0.01	<0.0005	<5	Remove from Monitoring
Total Cadmium	0.00143	0.0002	14	Remove from Monitoring
Total Copper	0.079	0.005	6.3	Remove from Monitoring
Total Fluoride	2.0	0.15	7.5	Remove from Monitoring
Total Iron	1.5	0.21	14	TMDL, Maintain Monitoring
Total Lead	0.0342	0.0009	2.6	Remove from Monitoring
Total Manganese	1.0	0.006	0.6	TMDL, Maintain Monitoring
Total Molybdenum	30	0.168	0.6	Remove from Monitoring
Total Zinc	1.014	0.038	3.7	Remove from Monitoring

Effluent Limitations and Monitoring Requirements for Outfall 003

Effluent limits applicable at Outfall 003 are previously permitted effluent limits, parameters with reasonable potential and the monitoring requirements are summarized in Table 18.

Table 18: Final Effluent limits and monitoring requirements for Outfall 003

Parameter	Mass (pounds)		Concentration (mg/L)			Basis
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Instant Maximum	
TSS	—	—	—	Report	—	25 Pa. Code § 93.7
Total Aluminum	—	—	—	Report	—	25 Pa. Code § 96.4
Total Iron	—	—	—	Report	—	25 Pa. Code § 96.4
Total Manganese	—	—	—	Report	—	25 Pa. Code § 96.4
pH (S.U.)	Within the range of 6.0 to 9.0					25 Pa. Code § 95.2

Monitoring requirements for the interim and final effluent limits are based on the previous permit's monitoring requirements for the facility and displayed in Table 19 below.

Table 19: Monitoring Requirements for Outfall 003

Parameter	Sample Type	Minimum Sample Frequency
TSS	Grab	1/6 month
Total Aluminum	Grab	1/6 month
Total Iron	Grab	1/6 month
Total Manganese	Grab	1/6 month
pH (S.U.)	Grab	1/6 month

Development of Effluent Limitations

Outfall No.	004	**Design Flow (MGD)**	0
Latitude	40° 21' 44.3	**Longitude**	-80° 24' 10.1

Wastewater Description: Stormwater

During the previous permit cycle, parameters identified in the ELG (Total Suspended Solids, Arsenic, Cadmium, Copper, Lead, Molybdenum, Zinc and Fluoride) to which IMP 301 is subjected along with the parameters identified in the Racoon Creek TMDL (Iron, Manganese, Aluminum and pH) were monitored at this outfall. Nickel and Cobalt have been included in monitoring requirements along with Selenium. Selenium is introduced in the molybdenum roasting operations. Table 20 below summarizes the Outfall 004 Evaluation.

Table 20: Outfall 004 Evaluation

Parameter	Criteria / Benchmark	Concentration ($^{mg}/_{L}$)	Percent of Criteria (%)	Recommendation
pH	6-9	7.4	N/A	Maintain Monitoring
TSS	100	12.5	12.5	Maintain Monitoring
Total Aluminum	0.75	0.39	52	TMDL, Maintain Monitoring
Total Arsenic	0.01	<0.0005	<5	Remove from Monitoring
Total Cadmium	0.00143	0.0008	56	Remove from Monitoring
Total Copper	0.079	0.009	11.4	Remove from Monitoring
Total Fluoride	2.0	0.32	6.5	Remove from Monitoring
Total Iron	1.5	0.76	16	TMDL, Maintain Monitoring
Total Lead	0.0342	0.005	14.6	Remove from Monitoring
Total Manganese	1.0	0.029	2.9	TMDL, Maintain Monitoring
Total Molybdenum	30	3.13	10.4	Remove from Monitoring
Total Zinc	1.014	0.088	8.7	Remove from Monitoring
Total Cobalt	0.019	0.16	842	Maintain Monitoring
Total Nickel	0.449	0.10	22.2	Maintain Monitoring
Total Selenium	0.0046	0.02	435	Maintain Monitoring

Effluent Limitations and Monitoring Requirements for Outfall 004

Effluent limits applicable at Outfall 004 are previously permitted effluent limits, parameters with reasonable potential and the monitoring requirements are summarized in Table 21.

Table 21: Final Effluent limits and monitoring requirements for Outfall 004

Parameter	Mass (pounds)		Concentration (mg/L)			Basis
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Instant Maximum	
TSS	—	—	—	Report	—	25 Pa. Code § 93.7
Total Aluminum	—	—	—	Report	—	25 Pa. Code § 96.4
Total Iron	—	—	—	Report	—	25 Pa. Code § 96.4
Total Manganese	—	—	—	Report	—	25 Pa. Code § 96.4
Total Cobalt	—	—	—	Report	—	25 Pa. Code § 93.7
Total Nickel	—	—	—	Report	—	25 Pa. Code § 93.7
Total Selenium	—	—	—	Report	—	25 Pa. Code § 93.7
pH (S.U.)	Within the range of 6.0 to 9.0					25 Pa. Code § 95.2

Monitoring requirements for the interim and final effluent limits are based on the previous permit's monitoring requirements for the facility and displayed in Table 22 below.

Table 22: Monitoring Requirements for Outfall 004

Parameter	Sample Type	Minimum Sample Frequency
TSS	Grab	1/6 month
Total Aluminum	Grab	1/6 month
Total Iron	Grab	1/6 month
Total Manganese	Grab	1/6 month
Total Cobalt	Grab	1/6 month
Total Nickel	Grab	1/6 month
Total Selenium	Grab	1/6 month
pH (S.U.)	Grab	1/6 month

Development of Effluent Limitations

Outfall No. 006 **Design Flow (MGD)** 0
Latitude 40° 21' 33.1" **Longitude** -80° 23' 57.3
Wastewater Description: Stormwater

Outfall 006 discharges stormwater from the southwest side of the property. The stormwater from this outfall is expected to contain high levels of Zinc due to residual Zinc in the soil from a pre-existing zinc smelter nearby.

During the previous permit cycle, parameters identified in the ELG (Total Suspended Solids, Arsenic, Cadmium, Copper, Lead, Molybdenum, Zinc and Fluoride) to which IMP 301 is subjected along with the parameters identified in the Racoon Creek TMDL (Iron, Manganese, Aluminum and pH) were monitored at this outfall. Below, Table 23 Outfall 006 Evaluation.

Table 23: Outfall 006 Evaluation

Parameter	Criteria / Benchmark	Concentration ($^{mg}/_{L}$)	Percent of Criteria (%)	Recommendation
pH	6-9	8.2	N/A	Maintain Monitoring
TSS	100	25.5	25.5	Maintain Monitoring
Total Aluminum	0.75	1.08	1.44	TMDL, Maintain Monitoring
Total Arsenic	0.01	0.001	10	Remove from Monitoring
Total Cadmium	0.00143	0.008	559	Maintain Monitoring
Total Copper	0.079	0.026	32.9	Maintain Monitoring
Total Fluoride	2.0	0.20	10	Remove from Monitoring
Total Iron	1.5	2.12	141	TMDL, Maintain Monitoring
Total Lead	0.0342	0.035	102	Maintain Monitoring
Total Manganese	1.0	0.048	4.8	TMDL, Maintain Monitoring
Total Molybdenum	30	0.393	1.3	Remove from Monitoring
Total Zinc	1.014	2.70	266	Maintain Monitoring

Effluent Limitations and Monitoring Requirements for Outfall 006

Effluent limits applicable at Outfall 006 are previously permitted effluent limits, parameters with reasonable potential and the monitoring requirements are summarized in Table 24.

Table 24: Final Effluent limits and monitoring requirements for Outfall 006

Parameter	Mass (pounds)		Concentration (mg/L)			Basis
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Instant Maximum	
TSS	—	—	—	Report	—	25 Pa. Code § 93.7
Total Aluminum	—	—	—	Report	—	25 Pa. Code § 96.4
Total Iron	—	—	—	Report	—	25 Pa. Code § 96.4
Total Manganese	—	—	—	Report	—	25 Pa. Code § 96.4
Total Cadmium	—	—	—	Report	—	25 Pa. Code § 93.7
Total Copper	—	—	—	Report	—	25 Pa. Code § 93.7
Total Lead	—	—	—	Report	—	25 Pa. Code § 93.7
Total Molybdenum	—	—	—	Report	—	25 Pa. Code § 93.7
Total Zinc	—	—	—	Report	—	25 Pa. Code § 93.7
pH (S.U.)	Within the range of 6.0 to 9.0					25 Pa. Code § 95.2

Monitoring requirements for the interim and final effluent limits are based on the previous permit's monitoring requirements for the facility and displayed in Table 25 below.

Table 25: Monitoring Requirements for Outfall 006

Parameter	Sample Type	Minimum Sample Frequency
TSS	Grab	1/6 month
Total Aluminum	Grab	1/6 month
Total Iron	Grab	1/6 month
Total Manganese	Grab	1/6 month
Total Cadmium	Grab	1/6 month
Total Copper	Grab	1/6 month
Total Lead	Grab	1/6 month
Total Molybdenum	Grab	1/6 month
Total Zinc	Grab	1/6 month
pH (S.U.)	Grab	1/6 month

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachment **A**)
☐	TRC Model Spreadsheet (see Attachment)
☒	Temperature Model Spreadsheet (see Attachment **B**)
☐	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:

Attachment A – TMS Output Files

Attachment B – Temperature Model Spreadsheet

Attachment A – TMS Output Files

Outfall 201

Outfall 301

TMS Model Output - Outfall 201

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Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Langeloth Metallurgical Plant** NPDES Permit No.: **PA0004219** Outfall No.: **201**

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

Discharge Characteristics									
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{1-10}	Q_h
0.06	490	7.4						

					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		1420									
	Chloride (PWS)	mg/L											
	Bromide	mg/L											
	Sulfate (PWS)	mg/L											
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L											
	Total Antimony	µg/L											
	Total Arsenic	µg/L											
	Total Barium	µg/L											
	Total Beryllium	µg/L	<										
	Total Boron	µg/L											
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L	<										
	Total Cobalt	µg/L											
	Total Copper	µg/L											
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L											
	Total Lead	µg/L											
	Total Manganese	µg/L											
	Total Mercury	µg/L	<										
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L	<										
	Total Selenium	µg/L											
	Total Silver	µg/L	<										
	Total Thallium	µg/L	<										
	Total Zinc	µg/L	<										
	Total Molybdenum	µg/L											
	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 1.3, March 2021

Stream / Surface Water Information

Langeloth Metallurgical Plant, NPDES Permit No. PA0004219, Outfall 201

Instructions | Discharge | Stream

Receiving Surface Water Name: Burgett's Fork

No. Reaches to Model: 1

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

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	033846	2.48	1180	11.1			Yes
End of Reach 1	033846	2.37	1178	12			Yes

Q_{7-10}

Location	RMI	LFY (cfs/mi²)*	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	2.48	0.1	0.567									490	7		
End of Reach 1	2.37	0.1													

Q_h

Location	RMI	LFY (cfs/mi²)	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	2.48														
End of Reach 1	2.37														

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Toxics Management Spreadsheet
Version 1.3, March 2021

Model Results

Langeloth Metallurgical Plant, NPDES Permit No. PA0004219, Outfall 201

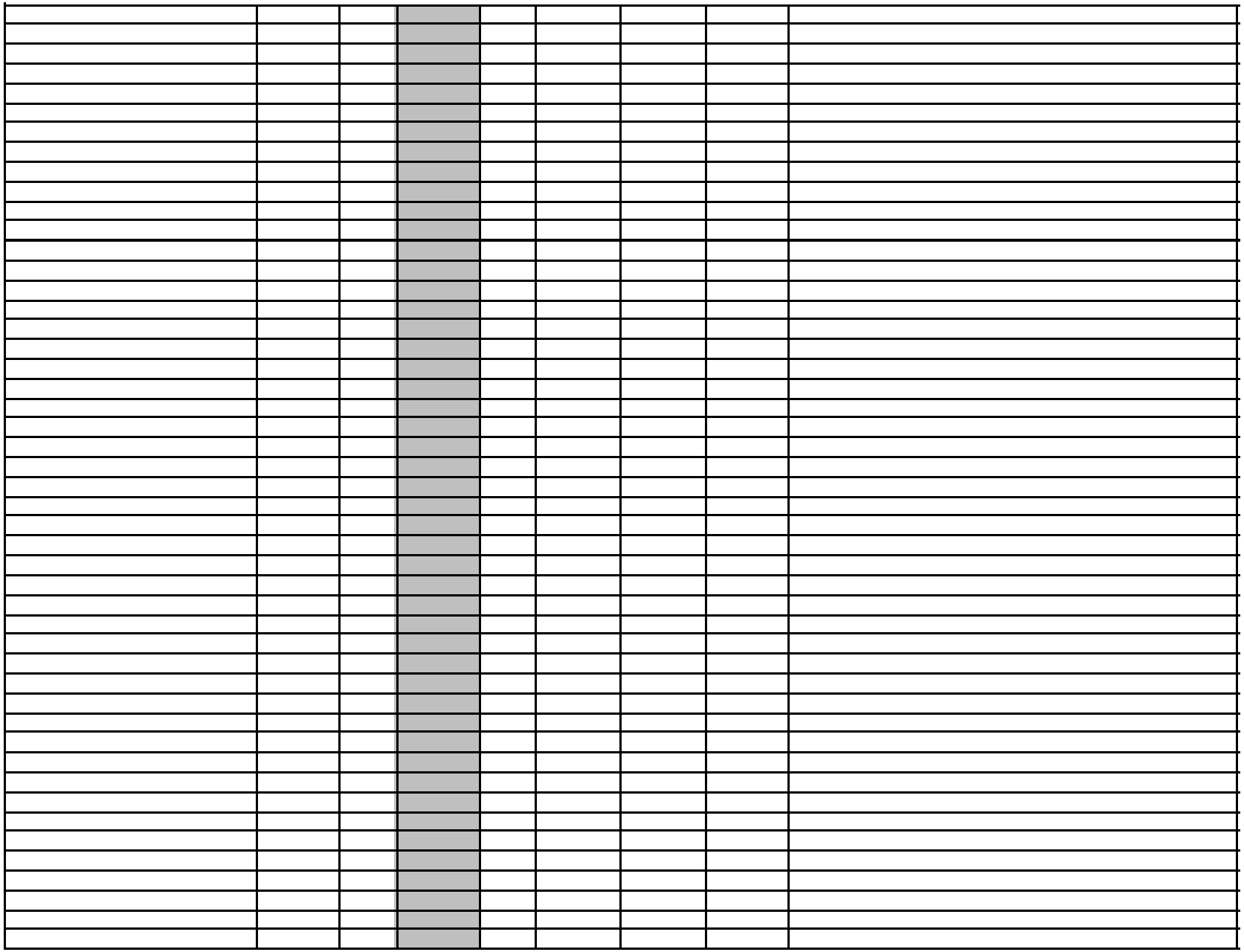
Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All ○ Inputs ○ Results ○ Limits

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

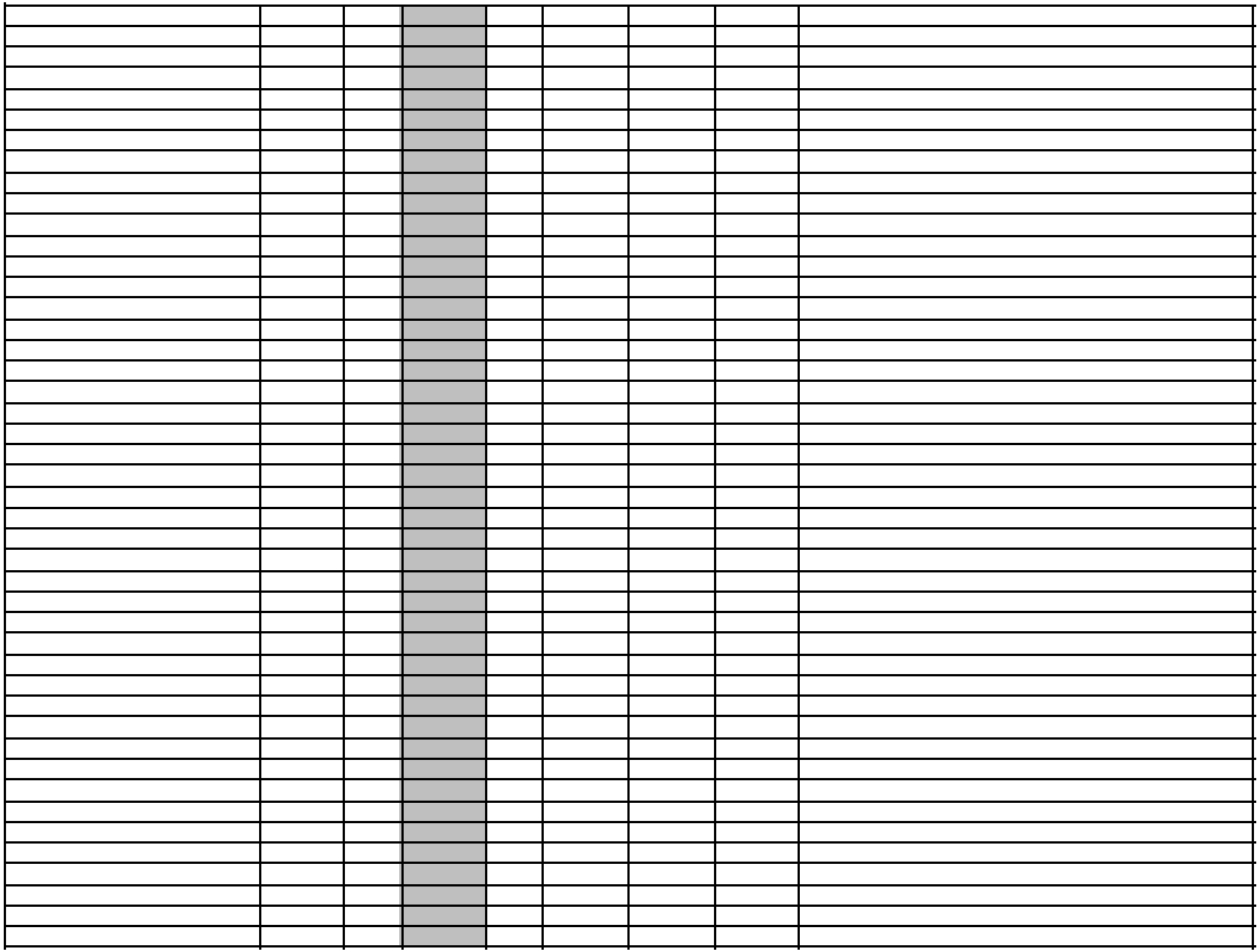
☑ ***AFC*** CCT (min): 9.976 PMF: 1 Analysis Hardness (mg/l): 490 Analysis pH: 7.04

Pollutants	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	



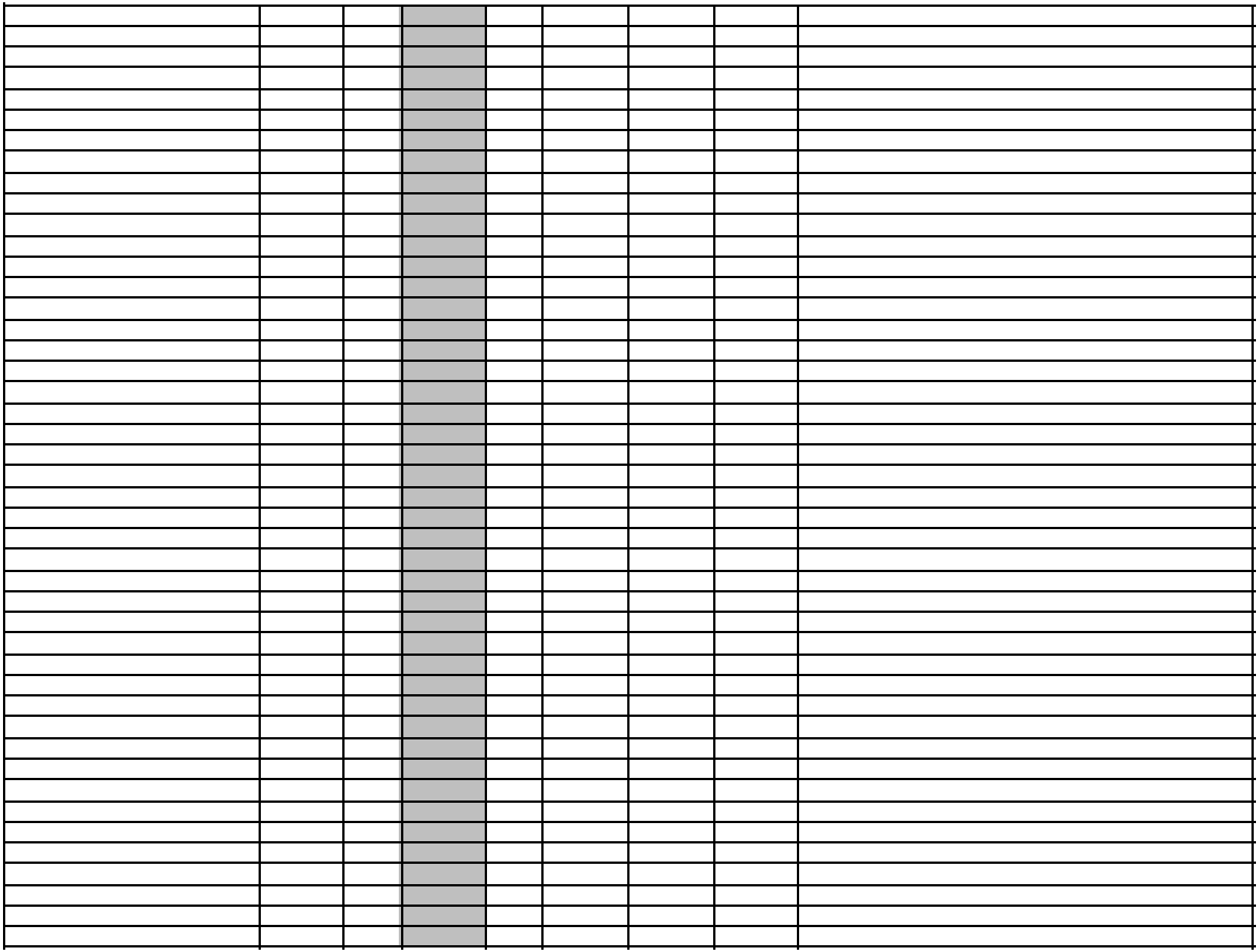
☑ *CFC* CCT (min): 9.976 PMF: 1 Analysis Hardness (mg/l): 490 Analysis pH: 7.04

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	



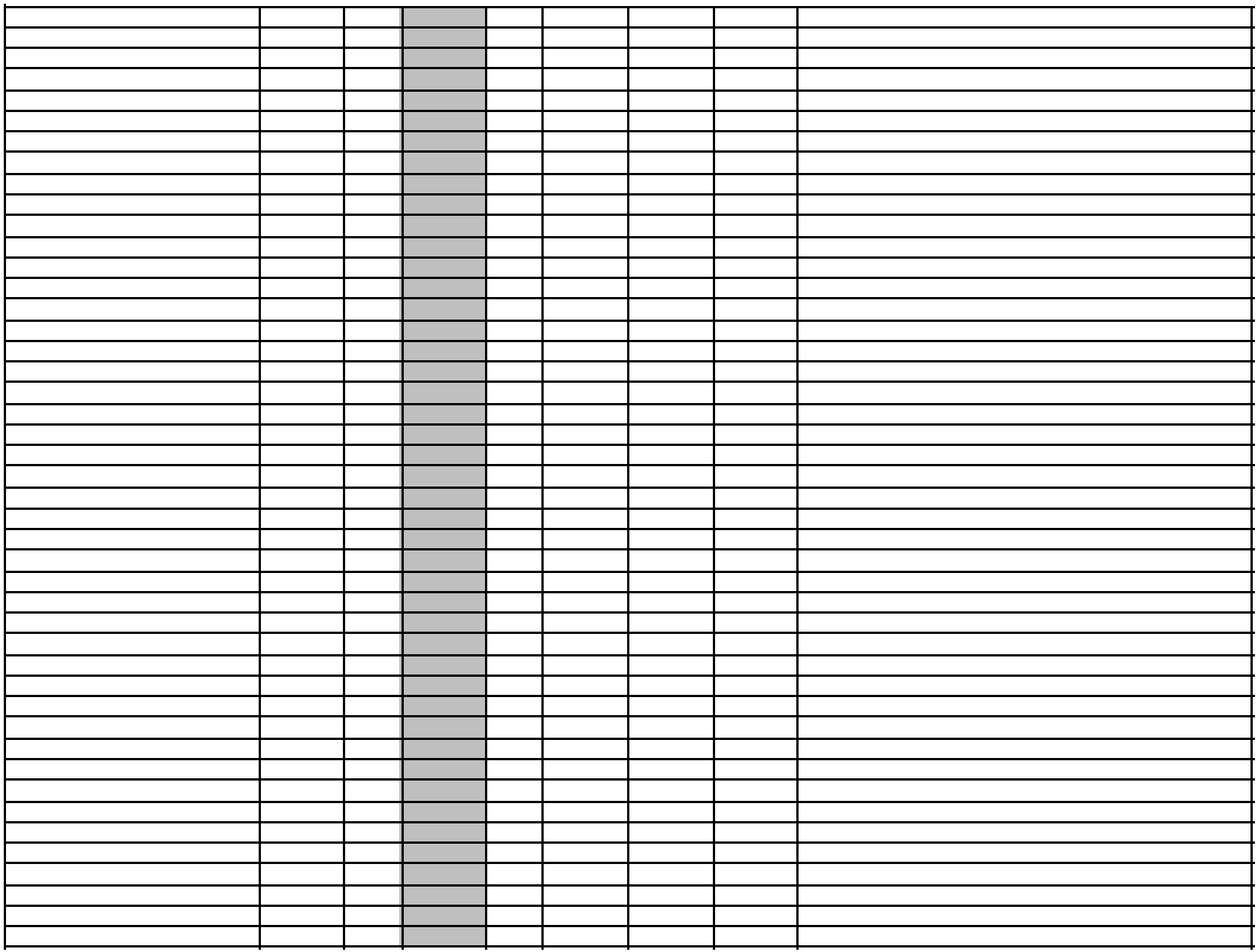
☑ *THH* CCT (min): 9.976 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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	500,000	500,000	N/A	



☑ CRL CCT (min): 3.592 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	



☑ ***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

☑ ***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)	N/A	N/A	PWS Not Applicable

TMS Model Output - Outfall 301

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Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: Langeloth Metallurgical Plant NPDES Permit No.: PA0004219 Outfall No.: 001

Evaluation Type: Major Sewage / Industrial Waste Wastewater Description: NCCW

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
0.024	13300	8.2						

	Discharge Pollutant	Units	Max Discharge Conc		0 if left blank: Trib Conc	Stream Conc	0.5 if left blank: Daily CV	Hourly CV	0 if left blank: Stream CV	Fate Coeff	FOS	1 if left blank: Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		59600									
	Chloride (PWS)	mg/L		2020									
	Bromide	mg/L		8.4									
	Sulfate (PWS)	mg/L		38310									
	Fluoride (PWS)	mg/L		124									
Group 2	Total Aluminum	µg/L		1340									
	Total Antimony	µg/L		24									
	Total Arsenic	µg/L		120									
	Total Barium	µg/L		449									
	Total Beryllium	µg/L	<	4.5									
	Total Boron	µg/L		3300									
	Total Cadmium	µg/L		4									
	Total Chromium (III)	µg/L	<	35									
	Hexavalent Chromium	µg/L	<	150									
	Total Cobalt	µg/L		70									
	Total Copper	µg/L		1200									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L		43									
	Dissolved Iron	µg/L	<	200									
	Total Iron	µg/L		5600									
	Total Lead	µg/L		20									
	Total Manganese	µg/L		1070									
	Total Mercury	µg/L	<	0.2									
	Total Nickel	µg/L		350									
	Total Phenols (Phenolics) (PWS)	µg/L	<	45.5									
	Total Selenium	µg/L		980									
	Total Silver	µg/L	<	0.9									
	Total Thallium	µg/L	<	1000									
	Total Zinc	µg/L	<	1400									
	Total Molybdenum	µg/L		28500									
	Acrolein	µg/L	<	2.5									
	Acrylamide	µg/L	<	110									
	Acrylonitrile	µg/L	<	2.5									
	Benzene	µg/L	<	0.5									
	Bromoform	µg/L		2.5									

Group 3	Carbon Tetrachloride	µg/L	<	0.5										
	Chlorobenzene	µg/L	<	0.5										
	Chlorodibromomethane	µg/L	<	0.5										
	Chloroethane	µg/L	<	0.5										
	2-Chloroethyl Vinyl Ether	µg/L	<	5										
	Chloroform	µg/L		0.7										
	Dichlorobromomethane	µg/L	<	0.5										
	1,1-Dichloroethane	µg/L	<	0.5										
	1,2-Dichloroethane	µg/L	<	0.5										
	1,1-Dichloroethylene	µg/L	<	0.5										
	1,2-Dichloropropane	µg/L	<	0.5										
	1,3-Dichloropropylene	µg/L	<	0.5										
	1,4-Dioxane	µg/L	<	25										
	Ethylbenzene	µg/L	<	0.5										
	Methyl Bromide	µg/L	<	0.5										
	Methyl Chloride	µg/L	<	0.5										
	Methylene Chloride	µg/L	<	0.5										
	1,1,2,2-Tetrachloroethane	µg/L	<	0.5										
	Tetrachloroethylene	µg/L	<	0.5										
	Toluene	µg/L	<	0.5										
	1,2-trans-Dichloroethylene	µg/L	<	0.5										
	1,1,1-Trichloroethane	µg/L	<	0.5										
	1,1,2-Trichloroethane	µg/L	<	0.5										
	Trichloroethylene	µg/L	<	0.5										
	Vinyl Chloride	µg/L		0.5										
Group 4	2-Chlorophenol	µg/L	<	1.3										
	2,4-Dichlorophenol	µg/L	<	0.53										
	2,4-Dimethylphenol	µg/L	<	1.7										
	4,6-Dinitro-o-Cresol	µg/L	<	15										
	2,4-Dinitrophenol	µg/L	<	16										
	2-Nitrophenol	µg/L	<	1.9										
	4-Nitrophenol	µg/L	<	9.8										
	p-Chloro-m-Cresol	µg/L	<	2.8										
	Pentachlorophenol	µg/L	<	8.6										
	Phenol	µg/L	<	4.9										
	2,4,6-Trichlorophenol	µg/L	<	2.3										
Group 5	Acenaphthene	µg/L	<	0.68										
	Acenaphthylene	µg/L	<	0.68										
	Anthracene	µg/L	<	0.51										
	Benzidine	µg/L	<	0.5										
	Benzo(a)Anthracene	µg/L	<	0.78										
	Benzo(a)Pyrene	µg/L	<	0.55										
	3,4-Benzofluoranthene	µg/L	<	1										
	Benzo(ghi)Perylene	µg/L		0.72										
	Benzo(k)Fluoranthene	µg/L	<	1										
	Bis(2-Chloroethoxy)Methane	µg/L	<	1.6										
	Bis(2-Chloroethyl)Ether	µg/L	<	0.42										
	Bis(2-Chloroisopropyl)Ether	µg/L	<	0.59										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<	83										
	4-Bromophenyl Phenyl Ether	µg/L	<	3.3										
	Butyl Benzyl Phthalate	µg/L	<	4.7										
	2-Chloronaphthalene	µg/L	<	0.61										
	4-Chlorophenyl Phenyl Ether	µg/L	<	2.3										
	Chrysene	µg/L		0.84										
	Dibenzo(a,h)Anthrancene	µg/L	<	0.75										
	1,2-Dichlorobenzene	µg/L	<	0.96										
	1,3-Dichlorobenzene	µg/L	<	1										
	1,4-Dichlorobenzene	µg/L	<	0.84										
	3,3-Dichlorobenzidine	µg/L	<	8.1										
	Diethyl Phthalate	µg/L	<	5.8										
	Dimethyl Phthalate	µg/L	<	2.1										
	Di-n-Butyl Phthalate	µg/L	<	7.7										
	2,4-Dinitrotoluene	µg/L	<	3.6										

	2,6-Dinitrotoluene	µg/L	<	1.8									
	Di-n-Octyl Phthalate	µg/L	<	7.7									
	1,2-Diphenylhydrazine	µg/L	<	2									
	Fluoranthene	µg/L	<	0.63									
	Fluorene	µg/L		0.72									
	Hexachlorobenzene	µg/L	<	0.57									
	Hexachlorobutadiene	µg/L	<	0.7									
	Hexachlorocyclopentadiene	µg/L	<	5									
	Hexachloroethane	µg/L	<	1.3									
	Indeno(1,2,3-cd)Pyrene	µg/L	<	0.86									
	Isophorone	µg/L	<	1.9									
	Naphthalene	µg/L	<	0.6									
	Nitrobenzene	µg/L	<	5.1									
	n-Nitrosodimethylamine	µg/L	<	0.68									
	n-Nitrosodi-n-Propylamine	µg/L	<	0.72									
	n-Nitrosodiphenylamine	µg/L	<	1.2									
	Phenanthrene	µg/L	<	0.56									
	Pyrene	µg/L	<	0.55									
	1,2,4-Trichlorobenzene	µg/L	<	1.4									
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 1.3, March 2021

Stream / Surface Water Information

Langeloth Metallurgical Plant, NPDES Permit No. PA0004219, Outfall 301

Instructions | Discharge | Stream

Receiving Surface Water Name: Burgett's Fork

No. Reaches to Model: 1

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

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	033846	2.48	1180	11.1			Yes
End of Reach 1	033846	2.37	1178	12			Yes

Q_{7-10}

Location	RMI	LFY (cfs/mi²)*	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	2.48	0.1	0.567									490	7		
End of Reach 1	2.37	0.1													

Q_h

Location	RMI	LFY (cfs/mi²)	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	2.48														
End of Reach 1	2.37														

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Toxics Management Spreadsheet
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Model Results

Langeloth Metallurgical Plant, NPDES Permit No. PA0004219, Outfall 301

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ *AFC* CCT (min): 11.484 PMF: 1 Analysis Hardness (mg/l): 1277.3 Analysis pH: 7.03

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	12,204	
Total Antimony	0	0		0	1,100	1,100	17,899	
Total Arsenic	0	0		0	340	340	5,532	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	341,701	
Total Boron	0	0		0	8,100	8,100	131,799	
Total Cadmium	0	0		0	23.802	28.4	462	Chem Translator of 0.837 applied
Total Chromium (III)	0	0		0	4589.223	14,523	236,309	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	265	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	1,546	
Total Copper	0	0		0	148.153	154	2,511	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	877.603	2,090	34,014	Chem Translator of 0.42 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	26.8	Chem Translator of 0.85 applied
Total Nickel	0	0		0	4039.976	4,048	65,868	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	257.171	303	4,923	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	1,058	
Total Zinc	0	0		0	1014.396	1,037	16,877	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	48.8	

Acrylamide	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	650	650	10,576	
Benzene	0	0		0	640	640	10,414	
Bromoform	0	0		0	1,800	1,800	29,289	
Carbon Tetrachloride	0	0		0	2,800	2,800	45,560	
Chlorobenzene	0	0		0	1,200	1,200	19,526	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	292,887	
Chloroform	0	0		0	1,900	1,900	30,916	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	15,000	15,000	244,072	
1,1-Dichloroethylene	0	0		0	7,500	7,500	122,036	
1,2-Dichloropropane	0	0		0	11,000	11,000	178,986	
1,3-Dichloropropylene	0	0		0	310	310	5,044	
Ethylbenzene	0	0		0	2,900	2,900	47,187	
Methyl Bromide	0	0		0	550	550	8,949	
Methyl Chloride	0	0		0	28,000	28,000	455,602	
Methylene Chloride	0	0		0	12,000	12,000	195,258	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	16,271	
Tetrachloroethylene	0	0		0	700	700	11,390	
Toluene	0	0		0	1,700	1,700	27,662	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	110,646	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	48,814	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	55,323	
Trichloroethylene	0	0		0	2,300	2,300	37,424	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	560	560	9,112	
2,4-Dichlorophenol	0	0		0	1,700	1,700	27,662	
2,4-Dimethylphenol	0	0		0	660	660	10,739	
4,6-Dinitro-o-Cresol	0	0		0	80	80.0	1,302	
2,4-Dinitrophenol	0	0		0	660	660	10,739	
2-Nitrophenol	0	0		0	8,000	8,000	130,172	
4-Nitrophenol	0	0		0	2,300	2,300	37,424	
p-Chloro-m-Cresol	0	0		0	160	160	2,603	
Pentachlorophenol	0	0		0	8.962	8.95	146	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	460	460	7,485	
Acenaphthene	0	0		0	83	83.0	1,351	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	300	300	4,881	
Benzo(a)Anthracene	0	0		0	0.5	0.5	8.14	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	30,000	30,000	488,145	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	73,222	
4-Bromophenyl Phenyl Ether	0	0		0	270	270	4,393	

Butyl Benzyl Phthalate	0	0		0	140	140	2,278	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	820	820	13,343	
1,3-Dichlorobenzene	0	0		0	350	350	5,695	
1,4-Dichlorobenzene	0	0		0	730	730	11,878	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	4,000	4,000	65,086	
Dimethyl Phthalate	0	0		0	2,500	2,500	40,679	
Di-n-Butyl Phthalate	0	0		0	110	110	1,790	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	26,034	
2,6-Dinitrotoluene	0	0		0	990	990	16,109	
1,2-Diphenylhydrazine	0	0		0	15	15.0	244	
Fluoranthene	0	0		0	200	200	3,254	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	10	10.0	163	
Hexachlorocyclopentadiene	0	0		0	5	5.0	81.4	
Hexachloroethane	0	0		0	60	60.0	976	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	162,715	
Naphthalene	0	0		0	140	140	2,278	
Nitrobenzene	0	0		0	4,000	4,000	65,086	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	276,615	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	4,881	
Phenanthrene	0	0		0	5	5.0	81.4	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	2,115	

☑ CFC CCT (min): 11.484 PMF: 1 Analysis Hardness (mg/l): 1277.3 Analysis pH: 7.03

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	3,580	
Total Arsenic	0	0		0	150	150	2,441	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	66,713	
Total Boron	0	0		0	1,600	1,600	26,034	
Total Cadmium	0	0		0	1.434	1.79	29.1	Chem Translator of 0.802 applied
Total Chromium (III)	0	0		0	596.964	694	11,295	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	169	Chem Translator of 0.962 applied

Total Cobalt	0	0		0	19	19.0	309	
Total Copper	0	0		0	78.962	82.3	1,338	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	24,407	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	34.199	81.5	1,325	Chem Translator of 0.42 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	14.7	Chem Translator of 0.85 applied
Total Nickel	0	0		0	448.717	450	7,323	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	81.2	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	212	
Total Zinc	0	0		0	1022.694	1,037	16,877	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	48.8	
Acrylamide	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	130	130	2,115	
Benzene	0	0		0	130	130	2,115	
Bromoform	0	0		0	370	370	6,020	
Carbon Tetrachloride	0	0		0	560	560	9,112	
Chlorobenzene	0	0		0	240	240	3,905	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	56,950	
Chloroform	0	0		0	390	390	6,346	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	50,442	
1,1-Dichloroethylene	0	0		0	1,500	1,500	24,407	
1,2-Dichloropropane	0	0		0	2,200	2,200	35,797	
1,3-Dichloropropylene	0	0		0	61	61.0	993	
Ethylbenzene	0	0		0	580	580	9,437	
Methyl Bromide	0	0		0	110	110	1,790	
Methyl Chloride	0	0		0	5,500	5,500	89,493	
Methylene Chloride	0	0		0	2,400	2,400	39,052	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	3,417	
Tetrachloroethylene	0	0		0	140	140	2,278	
Toluene	0	0		0	330	330	5,370	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	22,780	
1,1,1-Trichloroethane	0	0		0	610	610	9,926	
1,1,2-Trichloroethane	0	0		0	680	680	11,065	
Trichloroethylene	0	0		0	450	450	7,322	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	1,790	
2,4-Dichlorophenol	0	0		0	340	340	5,532	
2,4-Dimethylphenol	0	0		0	130	130	2,115	
4,6-Dinitro-o-Cresol	0	0		0	16	16.0	260	
2,4-Dinitrophenol	0	0		0	130	130	2,115	

2-Nitrophenol	0	0		0	1,600	1,600	26,034	
4-Nitrophenol	0	0		0	470	470	7,648	
p-Chloro-m-Cresol	0	0		0	500	500	8,136	
Pentachlorophenol	0	0		0	6.868	6.87	112	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	1,481	
Acenaphthene	0	0		0	17	17.0	277	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	59	59.0	960	
Benzo(a)Anthracene	0	0		0	0.1	0.1	1.63	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	6,000	6,000	97,629	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	14,807	
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	879	
Butyl Benzyl Phthalate	0	0		0	35	35.0	570	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	160	160	2,603	
1,3-Dichlorobenzene	0	0		0	69	69.0	1,123	
1,4-Dichlorobenzene	0	0		0	150	150	2,441	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	800	800	13,017	
Dimethyl Phthalate	0	0		0	500	500	8,136	
Di-n-Butyl Phthalate	0	0		0	21	21.0	342	
2,4-Dinitrotoluene	0	0		0	320	320	5,207	
2,6-Dinitrotoluene	0	0		0	200	200	3,254	
1,2-Diphenylhydrazine	0	0		0	3	3.0	48.8	
Fluoranthene	0	0		0	40	40.0	651	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	2	2.0	32.5	
Hexachlorocyclopentadiene	0	0		0	1	1.0	16.3	
Hexachloroethane	0	0		0	12	12.0	195	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	2,100	2,100	34,170	
Naphthalene	0	0		0	43	43.0	700	
Nitrobenzene	0	0		0	810	810	13,180	
n-Nitrosodimethylamine	0	0		0	3,400	3,400	55,323	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	59	59.0	960	
Phenanthrene	0	0		0	1	1.0	16.3	

Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	26	26.0	423	

☑ *THH* CCT (min): 11.484 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	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Fluoride (PWS)	0	0		0	2,000	2,000	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	91.1	
Total Arsenic	0	0		0	10	10.0	163	
Total Barium	0	0		0	2,400	2,400	39,052	
Total Boron	0	0		0	3,100	3,100	50,442	
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	4,881	
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	16,271	
Total Mercury	0	0		0	0.050	0.05	0.81	
Total Nickel	0	0		0	610	610	9,926	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	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	0.24	0.24	3.91	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	3	3.0	48.8	
Acrylamide	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	N/A	N/A	N/A	
Benzene	0	0		0	N/A	N/A	N/A	
Bromoform	0	0		0	N/A	N/A	N/A	
Carbon Tetrachloride	0	0		0	N/A	N/A	N/A	
Chlorobenzene	0	0		0	100	100.0	1,627	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	5.7	5.7	92.7	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	N/A	N/A	N/A	
1,1-Dichloroethylene	0	0		0	33	33.0	537	

1,2-Dichloropropane	0	0		0	N/A	N/A	N/A	
1,3-Dichloropropylene	0	0		0	N/A	N/A	N/A	
Ethylbenzene	0	0		0	68	68.0	1,106	
Methyl Bromide	0	0		0	100	100.0	1,627	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	N/A	N/A	N/A	
1,1,2,2-Tetrachloroethane	0	0		0	N/A	N/A	N/A	
Tetrachloroethylene	0	0		0	N/A	N/A	N/A	
Toluene	0	0		0	57	57.0	927	
1,2-trans-Dichloroethylene	0	0		0	100	100.0	1,627	
1,1,1-Trichloroethane	0	0		0	10,000	10,000	162,715	
1,1,2-Trichloroethane	0	0		0	N/A	N/A	N/A	
Trichloroethylene	0	0		0	N/A	N/A	N/A	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	30	30.0	488	
2,4-Dichlorophenol	0	0		0	10	10.0	163	
2,4-Dimethylphenol	0	0		0	100	100.0	1,627	
4,6-Dinitro-o-Cresol	0	0		0	2	2.0	32.5	
2,4-Dinitrophenol	0	0		0	10	10.0	163	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	4,000	4,000	65,086	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Acenaphthene	0	0		0	70	70.0	1,139	
Anthracene	0	0		0	300	300	4,881	
Benzidine	0	0		0	N/A	N/A	N/A	
Benzo(a)Anthracene	0	0		0	N/A	N/A	N/A	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroisopropyl)Ether	0	0		0	200	200	3,254	
Bis(2-Ethylhexyl)Phthalate	0	0		0	N/A	N/A	N/A	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	0.1	0.1	1.63	
2-Chloronaphthalene	0	0		0	800	800	13,017	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	1,000	1,000	16,271	
1,3-Dichlorobenzene	0	0		0	7	7.0	114	
1,4-Dichlorobenzene	0	0		0	300	300	4,881	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	600	600	9,763	

Dimethyl Phthalate	0	0		0	2,000	2,000	32,543	
Di-n-Butyl Phthalate	0	0		0	20	20.0	325	
2,4-Dinitrotoluene	0	0		0	N/A	N/A	N/A	
2,6-Dinitrotoluene	0	0		0	N/A	N/A	N/A	
1,2-Diphenylhydrazine	0	0		0	N/A	N/A	N/A	
Fluoranthene	0	0		0	20	20.0	325	
Fluorene	0	0		0	50	50.0	814	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	N/A	N/A	N/A	
Hexachlorocyclopentadiene	0	0		0	4	4.0	65.1	
Hexachloroethane	0	0		0	N/A	N/A	N/A	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	34	34.0	553	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	10	10.0	163	
n-Nitrosodimethylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	N/A	N/A	N/A	
Phenanthrene	0	0		0	N/A	N/A	N/A	
Pyrene	0	0		0	20	20.0	325	
1,2,4-Trichlorobenzene	0	0		0	0.07	0.07	1.14	

☑ CRL CCT (min): 3.378 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Upstream 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 Arsenic	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	
Acrolein	0	0		0	N/A	N/A	N/A	
Acrylamide	0	0		0	0.07	0.07	8.6	
Acrylonitrile	0	0		0	0.06	0.06	7.37	
Benzene	0	0		0	0.58	0.58	71.3	
Bromoform	0	0		0	7	7.0	860	
Carbon Tetrachloride	0	0		0	0.4	0.4	49.2	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.8	0.8	98.3	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	N/A	N/A	N/A	
Dichlorobromomethane	0	0		0	0.95	0.95	117	
1,2-Dichloroethane	0	0		0	9.9	9.9	1,216	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.9	0.9	111	
1,3-Dichloropropylene	0	0		0	0.27	0.27	33.2	
Ethylbenzene	0	0		0	N/A	N/A	N/A	
Methyl Bromide	0	0		0	N/A	N/A	N/A	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	20	20.0	2,458	
1,1,2,2-Tetrachloroethane	0	0		0	0.2	0.2	24.6	
Tetrachloroethylene	0	0		0	10	10.0	1,229	
Toluene	0	0		0	N/A	N/A	N/A	
1,2-trans-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,1,1-Trichloroethane	0	0		0	N/A	N/A	N/A	
1,1,2-Trichloroethane	0	0		0	0.55	0.55	67.6	
Trichloroethylene	0	0		0	0.6	0.6	73.7	
Vinyl Chloride	0	0		0	0.02	0.02	2.46	
2-Chlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dichlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dimethylphenol	0	0		0	N/A	N/A	N/A	
4,6-Dinitro-o-Cresol	0	0		0	N/A	N/A	N/A	
2,4-Dinitrophenol	0	0		0	N/A	N/A	N/A	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	0.030	0.03	3.69	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.5	1.5	184	
Acenaphthene	0	0		0	N/A	N/A	N/A	

Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	0.0001	0.0001	0.012	
Benzo(a)Anthracene	0	0		0	0.001	0.001	0.12	
Benzo(a)Pyrene	0	0		0	0.0001	0.0001	0.012	
3,4-Benzofluoranthene	0	0		0	0.001	0.001	0.12	
Benzo(k)Fluoranthene	0	0		0	0.01	0.01	1.23	
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	3.69	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	39.3	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	N/A	N/A	N/A	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	0.12	0.12	14.7	
Dibenzo(a,h)Anthrancene	0	0		0	0.0001	0.0001	0.012	
1,2-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,3-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,4-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
3,3-Dichlorobenzidine	0	0		0	0.05	0.05	6.14	
Diethyl Phthalate	0	0		0	N/A	N/A	N/A	
Dimethyl Phthalate	0	0		0	N/A	N/A	N/A	
Di-n-Butyl Phthalate	0	0		0	N/A	N/A	N/A	
2,4-Dinitrotoluene	0	0		0	0.05	0.05	6.14	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	6.14	
1,2-Diphenylhydrazine	0	0		0	0.03	0.03	3.69	
Fluoranthene	0	0		0	N/A	N/A	N/A	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	0.00008	0.00008	0.01	
Hexachlorobutadiene	0	0		0	0.01	0.01	1.23	
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A	
Hexachloroethane	0	0		0	0.1	0.1	12.3	
Indeno(1,2,3-cd)Pyrene	0	0		0	0.001	0.001	0.12	
Isophorone	0	0		0	N/A	N/A	N/A	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	N/A	N/A	N/A	
n-Nitrosodimethylamine	0	0		0	0.0007	0.0007	0.086	
n-Nitrosodi-n-Propylamine	0	0		0	0.005	0.005	0.61	
n-Nitrosodiphenylamine	0	0		0	3.3	3.3	405	
Phenanthrene	0	0		0	N/A	N/A	N/A	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	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
Total Aluminum	Report	Report	Report	Report	Report	µg/L	7,822	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Antimony	Report	Report	Report	Report	Report	µg/L	91.1	THH	Discharge Conc > 10% WQBEL (no RP)
Total Arsenic	0.033	0.051	163	254	407	µg/L	163	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Boron	Report	Report	Report	Report	Report	µg/L	26,034	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Cadmium	Report	Report	Report	Report	Report	µg/L	29.1	CFC	Discharge Conc > 10% WQBEL (no RP)
Hexavalent Chromium	0.034	0.053	169	264	423	µg/L	169	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Cobalt	Report	Report	Report	Report	Report	µg/L	309	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Copper	0.27	0.42	1,338	2,088	3,346	µg/L	1,338	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Iron	Report	Report	Report	Report	Report	µg/L	24,407	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Selenium	0.016	0.025	81.2	127	203	µg/L	81.2	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Thallium	0.0008	0.001	3.91	6.09	9.76	µg/L	3.91	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	10,817	AFC	Discharge Conc > 10% WQBEL (no RP)
Acrylamide	0.002	0.003	8.6	13.4	21.5	µg/L	8.6	CRL	Discharge Conc ≥ 50% WQBEL (RP)
4,6-Dinitro-o-Cresol	Report	Report	Report	Report	Report	µg/L	32.5	THH	Discharge Conc > 25% WQBEL (no RP)
Bis(2-Ethylhexyl)Phthalate	0.008	0.012	39.3	61.3	98.3	µg/L	39.3	CRL	Discharge Conc ≥ 50% WQBEL (RP)
3,3-Dichlorobenzidine	0.001	0.002	6.14	9.59	15.4	µg/L	6.14	CRL	Discharge Conc ≥ 50% WQBEL (RP)
Hexachlorobutadiene	0.0002	0.0004	1.23	1.92	3.07	µg/L	1.23	CRL	Discharge Conc ≥ 50% WQBEL (RP)
1,2,4-Trichlorobenzene	0.0002	0.0004	1.14	1.78	2.85	µg/L	1.14	THH	Discharge Conc ≥ 50% WQBEL (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)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Fluoride (PWS)	N/A	N/A	PWS Not Applicable
Total Barium	39,052	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Chromium (III)	11,295	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	4,881	µg/L	Discharge Conc ≤ 10% WQBEL

Total Lead	1,325	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	16,271	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	0.81	µg/L	Discharge Conc < TQL
Total Nickel	7,323	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	PWS Not Applicable
Total Silver	3,155	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS
Acrolein	31.3	µg/L	Discharge Conc ≤ 25% WQBEL
Acrylonitrile	7.37	µg/L	Discharge Conc < TQL
Benzene	71.3	µg/L	Discharge Conc < TQL
Bromoform	860	µg/L	Discharge Conc ≤ 25% WQBEL
Carbon Tetrachloride	49.2	µg/L	Discharge Conc < TQL
Chlorobenzene	1,627	µg/L	Discharge Conc < TQL
Chlorodibromomethane	98.3	µg/L	Discharge Conc < TQL
Chloroethane	N/A	N/A	No WQS
2-Chloroethyl Vinyl Ether	56,960	µg/L	Discharge Conc < TQL
Chloroform	92.7	µg/L	Discharge Conc ≤ 25% WQBEL
Dichlorobromomethane	117	µg/L	Discharge Conc < TQL
1,1-Dichloroethane	N/A	N/A	No WQS
1,2-Dichloroethane	1,216	µg/L	Discharge Conc < TQL
1,1-Dichloroethylene	537	µg/L	Discharge Conc < TQL
1,2-Dichloropropane	111	µg/L	Discharge Conc < TQL
1,3-Dichloropropylene	33.2	µg/L	Discharge Conc < TQL
1,4-Dioxane	N/A	N/A	No WQS
Ethylbenzene	1,106	µg/L	Discharge Conc < TQL
Methyl Bromide	1,627	µg/L	Discharge Conc < TQL
Methyl Chloride	89,493	µg/L	Discharge Conc < TQL
Methylene Chloride	2,458	µg/L	Discharge Conc < TQL
1,1,2,2-Tetrachloroethane	24.6	µg/L	Discharge Conc < TQL
Tetrachloroethylene	1,229	µg/L	Discharge Conc < TQL
Toluene	927	µg/L	Discharge Conc < TQL
1,2-trans-Dichloroethylene	1,627	µg/L	Discharge Conc < TQL
1,1,1-Trichloroethane	9,926	µg/L	Discharge Conc < TQL
1,1,2-Trichloroethane	67.6	µg/L	Discharge Conc < TQL
Trichloroethylene	73.7	µg/L	Discharge Conc < TQL
Vinyl Chloride	2.46	µg/L	Discharge Conc ≤ 25% WQBEL
2-Chlorophenol	488	µg/L	Discharge Conc < TQL
2,4-Dichlorophenol	163	µg/L	Discharge Conc < TQL
2,4-Dimethylphenol	1,627	µg/L	Discharge Conc < TQL
2,4-Dinitrophenol	163	µg/L	Discharge Conc ≤ 25% WQBEL
2-Nitrophenol	26,034	µg/L	Discharge Conc < TQL
4-Nitrophenol	7,648	µg/L	Discharge Conc < TQL
p-Chloro-m-Cresol	1,669	µg/L	Discharge Conc < TQL
Pentachlorophenol	3.69	µg/L	Discharge Conc < TQL
Phenol	65,086	µg/L	Discharge Conc < TQL

2,4,6-Trichlorophenol	184	µg/L	Discharge Conc < TQL
Acenaphthene	277	µg/L	Discharge Conc < TQL
Acenaphthylene	N/A	N/A	No WQS
Anthracene	4,881	µg/L	Discharge Conc < TQL
Benzidine	0.012	µg/L	Discharge Conc < TQL
Benzo(a)Anthracene	0.12	µg/L	Discharge Conc < TQL
Benzo(a)Pyrene	0.012	µg/L	Discharge Conc < TQL
3,4-Benzofluoranthene	0.12	µg/L	Discharge Conc < TQL
Benzo(ghi)Perylene	N/A	N/A	No WQS
Benzo(k)Fluoranthene	1.23	µg/L	Discharge Conc < TQL
Bis(2-Chloroethoxy)Methane	N/A	N/A	No WQS
Bis(2-Chloroethyl)Ether	3.69	µg/L	Discharge Conc < TQL
Bis(2-Chloroisopropyl)Ether	3,254	µg/L	Discharge Conc < TQL
4-Bromophenyl Phenyl Ether	879	µg/L	Discharge Conc < TQL
Butyl Benzyl Phthalate	1.63	µg/L	Discharge Conc < TQL
2-Chloronaphthalene	13,017	µg/L	Discharge Conc < TQL
4-Chlorophenyl Phenyl Ether	N/A	N/A	No WQS
Chrysene	14.7	µg/L	Discharge Conc ≤ 25% WQBEL
Dibenzo(a,h)Anthrancene	0.012	µg/L	Discharge Conc < TQL
1,2-Dichlorobenzene	2,603	µg/L	Discharge Conc ≤ 25% WQBEL
1,3-Dichlorobenzene	114	µg/L	Discharge Conc ≤ 25% WQBEL
1,4-Dichlorobenzene	2,441	µg/L	Discharge Conc ≤ 25% WQBEL
Diethyl Phthalate	9,763	µg/L	Discharge Conc ≤ 25% WQBEL
Dimethyl Phthalate	8,136	µg/L	Discharge Conc < TQL
Di-n-Butyl Phthalate	325	µg/L	Discharge Conc ≤ 25% WQBEL
2,4-Dinitrotoluene	6.14	µg/L	Discharge Conc < TQL
2,6-Dinitrotoluene	6.14	µg/L	Discharge Conc < TQL
Di-n-Octyl Phthalate	N/A	N/A	No WQS
1,2-Diphenylhydrazine	3.69	µg/L	Discharge Conc < TQL
Fluoranthene	325	µg/L	Discharge Conc < TQL
Fluorene	814	µg/L	Discharge Conc ≤ 25% WQBEL
Hexachlorobenzene	0.01	µg/L	Discharge Conc < TQL
Hexachlorocyclopentadiene	16.3	µg/L	Discharge Conc < TQL
Hexachloroethane	12.3	µg/L	Discharge Conc < TQL
Indeno(1,2,3-cd)Pyrene	0.12	µg/L	Discharge Conc < TQL
Isophorone	553	µg/L	Discharge Conc < TQL
Naphthalene	700	µg/L	Discharge Conc ≤ 25% WQBEL
Nitrobenzene	163	µg/L	Discharge Conc ≤ 25% WQBEL
n-Nitrosodimethylamine	0.086	µg/L	Discharge Conc < TQL
n-Nitrosodi-n-Propylamine	0.61	µg/L	Discharge Conc < TQL
n-Nitrosodiphenylamine	405	µg/L	Discharge Conc < TQL
Phenanthrene	16.3	µg/L	Discharge Conc < TQL
Pyrene	325	µg/L	Discharge Conc < TQL

Attachment B – Temperature Model Spreadsheet

Flow Data for Thermal Discharge Analysis

Facility: Langeloth Metallurgical Plant
Permit Number: PA0004219
Stream Name: Burgetts Fork
Analyst/Engineer: Curt Holes
Stream Q7-10 (cfs): 0.567

	Facility Flows				Stream Flows			
	Intake (Stream) (MGD)	Intake (External) (MGD)	Consumptive Loss (MGD)	Discharge Flow (MGD)	PMF	Upstream Stream Flow (cfs)	Adjusted Stream Flow (cfs)	Downstream Stream Flow (cfs)
Jan 1-31	0	0.06	0	0.06	1.00	1.75	1.75	1.84
Feb 1-29	0	0.06	0	0.06	1.00	1.98	1.98	2.08
Mar 1-31	0	0.06	0	0.06	1.00	3.69	3.69	3.78
Apr 1-15	0	0.06	0	0.06	1.00	5.08	5.08	5.17
Apr 16-30	0	0.06	0	0.06	1.00	5.08	5.08	5.17
May 1-15	0	0.06	0	0.06	1.00	2.88	2.88	2.97
May 16-31	0	0.06	0	0.06	1.00	2.88	2.88	2.97
Jun 1-15	0	0.06	0	0.06	1.00	1.68	1.68	1.77
Jun 16-30	0	0.06	0	0.06	1.00	1.68	1.68	1.77
Jul 1-31	0	0.06	0	0.06	1.00	0.77	0.77	0.86
Aug 1-15	0	0.06	0	0.06	1.00	0.79	0.79	0.88
Aug 16-31	0	0.06	0	0.06	1.00	0.79	0.79	0.88
Sep 1-15	0	0.06	0	0.06	1.00	0.61	0.61	0.71
Sep 16-30	0	0.06	0	0.06	1.00	0.61	0.61	0.71
Oct 1-15	0	0.06	0	0.06	1.00	0.73	0.73	0.82
Oct 16-31	0	0.06	0	0.06	1.00	0.73	0.73	0.82
Nov 1-15	0	0.06	0	0.06	1.00	1.03	1.03	1.12
Nov 16-30	0	0.06	0	0.06	1.00	1.03	1.03	1.12
Dec 1-31	0	0.06	0	0.06	1.00	1.70	1.70	1.79

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.

Outfall 201 Thermal Discharge Model v2.0 2/8/2023

Thermal Discharge Recommended Permit Limits

Warm Water Fishes (WWF) Stream

Facility: **Langeloth Metallurgical Plant**
Permit Number: PA0004219
Stream: Burgetts Fork

	WWF Ambient Stream Temperature (ºF) (Default)	Ambient Stream Temperature (ºF) (Site-specific data)	Target Maximum Stream Temp.[1] (ºF)	**WWF** Daily WLA[2] (Million BTUs/day)	**WWF** Daily WLA[3] (ºF)	at Discharge Flow (MGD)	**PMF**
Jan 1-31	35	0	40	N/A -- Case 2	110.0	0.06	1.00
Feb 1-29	35	0	40	N/A -- Case 2	110.0	0.06	1.00
Mar 1-31	40	0	46	N/A -- Case 2	110.0	0.06	1.00
Apr 1-15	47	0	52	N/A -- Case 2	110.0	0.06	1.00
Apr 16-30	53	0	58	N/A -- Case 2	110.0	0.06	1.00
May 1-15	58	0	64	N/A -- Case 2	110.0	0.06	1.00
May 16-31	62	0	72	N/A -- Case 2	110.0	0.06	1.00
Jun 1-15	67	0	80	N/A -- Case 2	110.0	0.06	1.00
Jun 16-30	71	0	84	N/A -- Case 2	110.0	0.06	1.00
Jul 1-31	75	0	87	N/A -- Case 2	110.0	0.06	1.00
Aug 1-15	74	0	87	N/A -- Case 2	110.0	0.06	1.00
Aug 16-31	74	0	87	N/A -- Case 2	110.0	0.06	1.00
Sep 1-15	71	0	84	N/A -- Case 2	110.0	0.06	1.00
Sep 16-30	65	0	78	N/A -- Case 2	110.0	0.06	1.00
Oct 1-15	60	0	72	N/A -- Case 2	110.0	0.06	1.00
Oct 16-31	54	0	66	N/A -- Case 2	110.0	0.06	1.00
Nov 1-15	48	0	58	N/A -- Case 2	110.0	0.06	1.00
Nov 16-30	42	0	50	N/A -- Case 2	110.0	0.06	1.00
Dec 1-31	37	0	42	N/A -- Case 2	110.0	0.06	1.00

[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 1ºF 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 ºF 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 110ºF are displayed as 110ºF.

Outfall 201 Thermal Discharge Model v2.0

2/8/2023