pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0216950**
Facility Type	**Industrial**	APS ID	**1100438**
Major / Minor	**Minor**	Authorization ID	**1460933**

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

Applicant and Facility Information

Applicant Name	**Creswell Heights Joint Authority**	Facility Name	**Creswell Heights Joint Authority - Water Treatment Plant**
Applicant Address	3961 Jordan Street PO Box 301	Facility Address	3961 Jordan Street PO Box 301
	South Heights, PA 15081-1026		South Heights, PA 15081-1026
Applicant Contact	Daniel Losco	Facility Contact	Same as Applicant
Applicant Phone	(724) 375-1303	Facility Phone	Same as Applicant
Applicant email	dlosco@crewellwater.net	Facility email	Same as Applicant
Client ID	28371	Site ID	263735
SIC Code	4941	Municipality	South Heights Borough
SIC Description	Trans. & Utilities - Water Supply	County	Beaver
Date Application Received	November 3, 2023	EPA Waived?	Yes
Date Application Accepted		If No, Reason	

Purpose of Application: Renewal NPDES Permit Coverage

Summary of Review

The Department received a timely renewal NPDES permit application from Creswell Heights Joint Authority for their Water Treatment Plant located in South Heights Borough, Beaver County on November 3, 2023. The Facility has a SIC Code of 4941 (Water Supply) and a NAICS code of 221310 (Water supply and irrigation systems).

The Creswell Heights Joint Authority owns and operates a water filtration plant which serves Crescent Township, Hopewell Township, Moon Township, and South Heights Borough. The water supply is obtained from an alluvium deposit of sand and gravel in the flood plain of and beneath the Ohio River from four vertical wells. Raw water is provided from the four wells to six green sand pressure filters. The raw water receives pre-chlorination injection of sodium hypochlorite to maintain a residual of 0.21 mg/l free chlorine prior to filtration. After corrosion control injection, final disinfection of finished water is provided via post chlorination using sodium hypochlorite to maintain a first tap residual of 0.65 mg/l.

Industrial wastewater is generated daily from the pressure filter backwash process. The pressure filters are backwashed daily, on a two filter per day rotation. The filters are backwashed in a reverse flow cycle. Backwash water is conveyed to a backwash trough system for clarification of any solids. Clarified backwash from the backwash trough system is then discharged to the Ohio River, designated in 25 PA Code Chapter 93 as a Warm Water Fishery, via Outfall 101. Settled solids are removed from the backwash trough system manually on a routine basis. Solids are dewatered via gravity dewatering process and disposed of in a sanitary landfill. No stormwater is conveyed through Outfall 101, only clarified filter backwash is discharge through Outfall 101.

Approve	Deny	Signatures	Date
X		Angela Rohrer / Environmental Engineering Specialist	March 29, 2024
X		Michael E. Fifth, P.E. / Environmental Engineer Manager	April 5, 2024

Summary of Review

The permittee has no open violations.

The site was last inspected on October 27, 2022. No violations were noted.

Public Participation

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

Discharge, Receiving Waters and Water Supply Information

Outfall No.	101	Design Flow (MGD)	0.0303
Latitude	40º 34' 34"	Longitude	-80º 14' 06.9"
Quad Name	Ambridge	Quad Code	1404
Wastewater Description:	IW Process Effluent without ELG		

Receiving Waters	Ohio River (WWF)	Stream Code	32317
NHD Com ID	99682404	RMI	964.9
Drainage Area	19,600	Yield (cfs/mi^2)	0.241
Q_{7-10} Flow (cfs)	4,730	Q_{7-10} Basis	US Army Corp of Engineers
Elevation (ft)	685	Slope (ft/ft)	0.0001
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxin, Pathogens, Polychlorinated Biphenyls (PCBS)		
Source(s) of Impairment	Source unknown		
TMDL Status	Final	Name	Ohio River

Nearest Downstream Public Water Supply Intake	Center Township Water Authority (2.49MGD)		
PWS Waters	Ohio River	Flow at Intake (cfs)	5,880
PWS RMI	953.78	Distance from Outfall (mi)	11.6

Development of Effluent Limitations

Outfall No. 101 **Design Flow (MGD)** 0.0303
Latitude 40º 34' 34" **Longitude** -80º 14' 06.9"
Wastewater Description: IW Process Effluent without ELG

Technology-Based Effluent limitations:

Regulatory Effluent Standards and Monitoring Requirements

Flow monitoring is required pursuant to 25 Pa. Code § 92a.61(d)(1) which is displayed in Table 1 below.

Effluent standards for pH are also imposed on industrial wastes by 25 Pa. Code §§ 95.2(1) which is displayed in Table 1 below.

Pennsylvania regulations at 25 Pa. Code § 92a.48(b) require the imposition of technology-based TRC limits for facilities that use chlorination and that are not already subject to TRC limits based on applicable federal ELGs or a facility-specific BPJ evaluation which is displayed in Table 1 below.

Table 1. Regulatory Effluent Standards

Parameter	Monthly Avg	Daily Max	IMAX
Flow	Monitor	Monitor	----
pH	6-9 at all times		----
TRC	0.5 mg/l	----	1.6 mg/l

Per- and Polyfluoroalkyl Substances (PFAS)

In accordance with Section II.I of DEP's "Standard Operating Procedure (SOP) for Clean Water Program – Establishing Effluent Limitations for Individual Industrial Permits" [SOP No. BCW-PMT-032] and under the authority of 25 Pa. Code § 92a.61(b), DEP has determined that monitoring for a subset of common/well-studied PFAS including Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS), Perfluorobutanesulfonic acid (PFBS), and Hexafluoropropylene oxide dimer acid (HFPO-DA) is necessary to help understand the extent of environmental contamination by PFAS in the Commonwealth and the extent to which point source dischargers are contributors. SOP BCW-PMT-032 directs permit writers to consider special monitoring requirements for PFOA, PFOS, PFBS, and HFPO-DA in the following instances:

a. If sampling that is completed as part of the permit renewal application reveals a detection of PFOA, PFOS, HFPO-DA or PFBS (any of these compounds), the application manager will establish a quarterly monitoring requirement for PFOA, PFOS, HFPO-DA and PFBS (all of these compounds) in the permit.

b. If sampling that is completed as part of the permit renewal application demonstrates non-detect values at or below the Target QLs for PFOA, PFOS, HFPO-DA and PFBS (all of these compounds in a minimum of 3 samples), the application manager will establish an annual monitoring requirement for PFOA, PFOS, HFPO-DA and PFBS in the permit.

c. In all cases the application manager will include a condition in the permit that the permittee may cease monitoring for PFOA, PFOS, HFPO-DA and PFBS when the permittee reports non-detect values at or below the Target QL for four consecutive monitoring periods for each PFAS parameter that is analyzed. Use the following language: The permittee may discontinue monitoring for PFOA, PFOS, HFPO-DA, and PFBS if the results in 4 consecutive monitoring periods indicate non-detects at or below Quantitation Limits of 4.0 ng/L for PFOA, 3.7 ng/L for PFOS, 3.5 ng/L for PFBS and 6.4 ng/L for HFPO-DA. When monitoring is discontinued, permittees should enter a No Discharge Indicator (NODI) Code of "GG" on DMRs.

Creswell Heights Joint Authority submitted the application before the NPDES permit application forms were updated to require sampling for PFOA, PFOS, PFBS, and HFPO-DA. According to EPA's guidance, Creswell Heights Joint Authority

does not operate in one of the industries EPA expects to be a source for PFAS. Therefore, annual reporting of PFOA, PFOS, PFBS, and HFPO-DA will be required consistent with Section II.I.b of SOP BCW-PMT-032.

Best Practicable Control Technology Currently Achievable (BPT)

BPT for wastewater from treatment of WTP sludges and filter backwash is found in DEPs Technology-Based Control Requirements for Water Treatment Plant Wastes Document which falls under Best Professional Judgement under 40 CFR § 125.3 and the limits imposed are displayed in Table 2 below.

Table 2. BPT Limits for WTP sludge and filter backwash wastewater

Parameter	Monthly Avg (mg/l)	Daily Max (mg/l)
Suspended solids	30.0	60.0
Iron (total)	2.0	4.0
Aluminum (total)	4.0	8.0
Manganese (total)	1.0	2.0
Flow	Monitor	----
pH	6-9 at all times	
Total Residual Chlorine	0.5	1.0

Water Quality-Based Effluent limitations:

Toxics Management Spread Sheet

The Department of Environmental Protection (DEP) has developed the DEP Toxics Management Spreadsheet ("TMS") to facilitate calculations necessary for completing a reasonable potential (RP) analysis and determining water quality-based effluent limitations for discharges of toxic pollutants. The Toxics Management Spreadsheet is a macro-enabled Excel binary file that combines the functions of the PENTOXSD model and the Toxics Screening Analysis spreadsheet to evaluate the reasonable potential for discharges to cause excursions above water quality standards and to determine WQBELs. The Toxics Management Spread Sheet is a single discharge, mass-balance water quality calculation spread sheet that includes consideration for mixing, first-order decay and other factors to determine recommended WQBELs for toxic substances and several non-toxic substances. Required input data including stream code, river mile index, elevation, drainage area, discharge name, NPDES permit number, discharge flow rate and the discharge concentrations for parameters in the permit application or in DMRs, which are entered into the spread sheet to establish site-specific discharge conditions. Other data such as low flow yield, reach dimensions and partial mix factors may also be entered to further characterize the conditions of the discharge and receiving water. Discharge concentrations for the parameters are chosen to represent the "worst case" quality of the discharge (i.e., maximum reported discharge concentrations). The spread sheet then evaluates each parameter by computing a Waste Load Allocation for each applicable criterion, determining a recommended maximum WQBEL and comparing that recommended WQBEL with the input discharge concentration to determine which is more stringent. Based on this evaluation, the Toxics Management Spread sheet recommends average monthly and maximum daily WQBELs.

Reasonable Potential Analysis and WQBEL Development for Outfall 001

Discharges from Outfall 101 are evaluated based on concentrations reported on the application and on DMRs; data from those sources are entered into the Toxics Management Spread Sheet. The maximum reported value of the parameters from the application form or from previous DMRs is used as the input concentration in the Toxics Management Spread Sheet. All toxic pollutants whose maximum concentrations, as reported in the permit application or on DMRs, are greater than the most stringent applicable water quality criterion are considered to be pollutants 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]. The Toxics Management Spread Sheet is run with the discharge and receiving stream characteristics shown in Table 3. For IW discharges, the design flow used in modeling is the average flow during production or operation taken from the permit application. Pollutants for which water quality standards have not been promulgated (e.g., TSS, oil and grease) are excluded from the analysis. All the parameters are evaluated using the model to determine the water quality-based effluent limits applicable to the discharge and the receiving stream. The spreadsheet then compares the reported discharge concentrations to the calculated water quality-based effluent limitations to determine if a reasonable potential exists to exceed the calculated WQBELs. Effluent limitations are established in the

draft permit where a pollutant's maximum reported discharge concentration equals or exceeds 50% of the WQBEL. For non-conservative pollutants, monitoring requirements are established where the maximum reported concentration is between 25% - 50% of the WQBEL. For conservative pollutants, monitoring requirements are established where the maximum reported concentration is between 10% - 50% of the WQBEL. The information described above including the maximum reported discharge concentrations, the most stringent water quality criteria, the pollutant-of-concern (reasonable potential) determinations, the calculated WQBELs, and the WQBEL/monitoring recommendations are displayed in the Toxics Management Spread Sheet in Attachment C of this Fact Sheet. The Toxics Management Spread Sheet did not recommend any WQBELs for Outfall 101.

Table 3: TMS Inputs for Outfall 101

Parameter	**Value**
River Mile Index	964.9
Discharge Flow (MGD)	0.0264
Basin/Stream Characteristics	
Parameter	**Value**
Area in Square Miles	19,600
Q_{7-10} (cfs)	4,730
Low-flow yield (cfs/mi^2)	0.241
Elevation (ft)	685
Slope	0.0001

Total Residual Chlorine

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

Anti-Backsliding

Previous limits can be used pursuant to EPA's anti-backsliding regulation, 40 CFR 122.44(l). The previous limitations for Outfall 001 are displayed below in Table 4.

Table 4: Current Effluent Limitation at Outfall 101

Parameters	Mass (lb/day)		Concentration (mg/L)				Monitoring Requirements	
	Average Monthly	Daily Maximum	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum	Frequency	Sample Type
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	2/Month	Measured
Total Suspended Solids	XXX	XXX	XXX	30.0	60.0	XXX	2/Month	Grab
Total Residual Chlorine	XXX	XXX	XXX	0.5	1.0	XXX	2/Month	Grab
Total Aluminum	XXX	XXX	XXX	4.0	8.0	XXX	2/Month	Grab
Total Iron	XXX	XXX	XXX	2.0	4.0	XXX	2/Month	Grab
Total Manganese	XXX	XXX	XXX	1.0	2.0	XXX	2/Month	Grab
pH (S.U.)	XXX	XXX	6.0	XXX	9.0	XXX	2/Month	Grab

Final Effluent Limitations

The proposed effluent limitations and monitoring requirements for Outfall 101 are shown below in Table 5. The limits are the most stringent values from the above limitation analysis.

Table 5: Proposed Effluent Limitation at Outfall 101

Parameters	Mass (lb/day)		Concentration (mg/L)				Monitoring Requirements	
	Average Monthly	Daily Maximum	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum	Frequency	Sample Type
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	2/Month	Measured
Total Suspended Solids	XXX	XXX	XXX	30.0	60.0	XXX	2/Month	Grab
Total Residual Chlorine	XXX	XXX	XXX	0.5	1.0	XXX	2/Month	Grab
Total Aluminum	XXX	XXX	XXX	4.0	8.0	XXX	2/Month	Grab
Total Iron	XXX	XXX	XXX	2.0	4.0	XXX	2/Month	Grab
Total Manganese	XXX	XXX	XXX	1.0	2.0	XXX	2/Month	Grab
pH (S.U.)	XXX	XXX	6.0	XXX	9.0	XXX	2/Month	Grab
Perfluorooctanoic acid (PFOA) (ng/L)	XXX	XXX	XXX	XXX	Report	XXX	1/Year	Grab
Perfluorooctanesulfonic acid (PFOS) (ng/L)	XXX	XXX	XXX	XXX	Report	XXX	1/Year	Grab
HFPO-DA (ng/L)	XXX	XXX	XXX	XXX	Report	XXX	1/Year	Grab
Perfluorobutanesulfonic acid (PFBS) (ng/L)	XXX	XXX	XXX	XXX	Report	XXX	1/Year	Grab

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachment C)
☒	TRC Model Spreadsheet (see Attachment D)
☐	Temperature Model Spreadsheet (see Attachment)
☐	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☐	Technical Guidance for the Development and Specification of Effluent Limitations, 386-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
☐	Pennsylvania CSO Policy, 386-2000-002, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97.
☐	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
☐	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
☐	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 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, 386-2000-020, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 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, 386-2000-010, 3/1999.
☐	Design Stream Flows, 386-2000-003, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 386-2000-006, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☐	SOP:
☐	Other:

Attachments

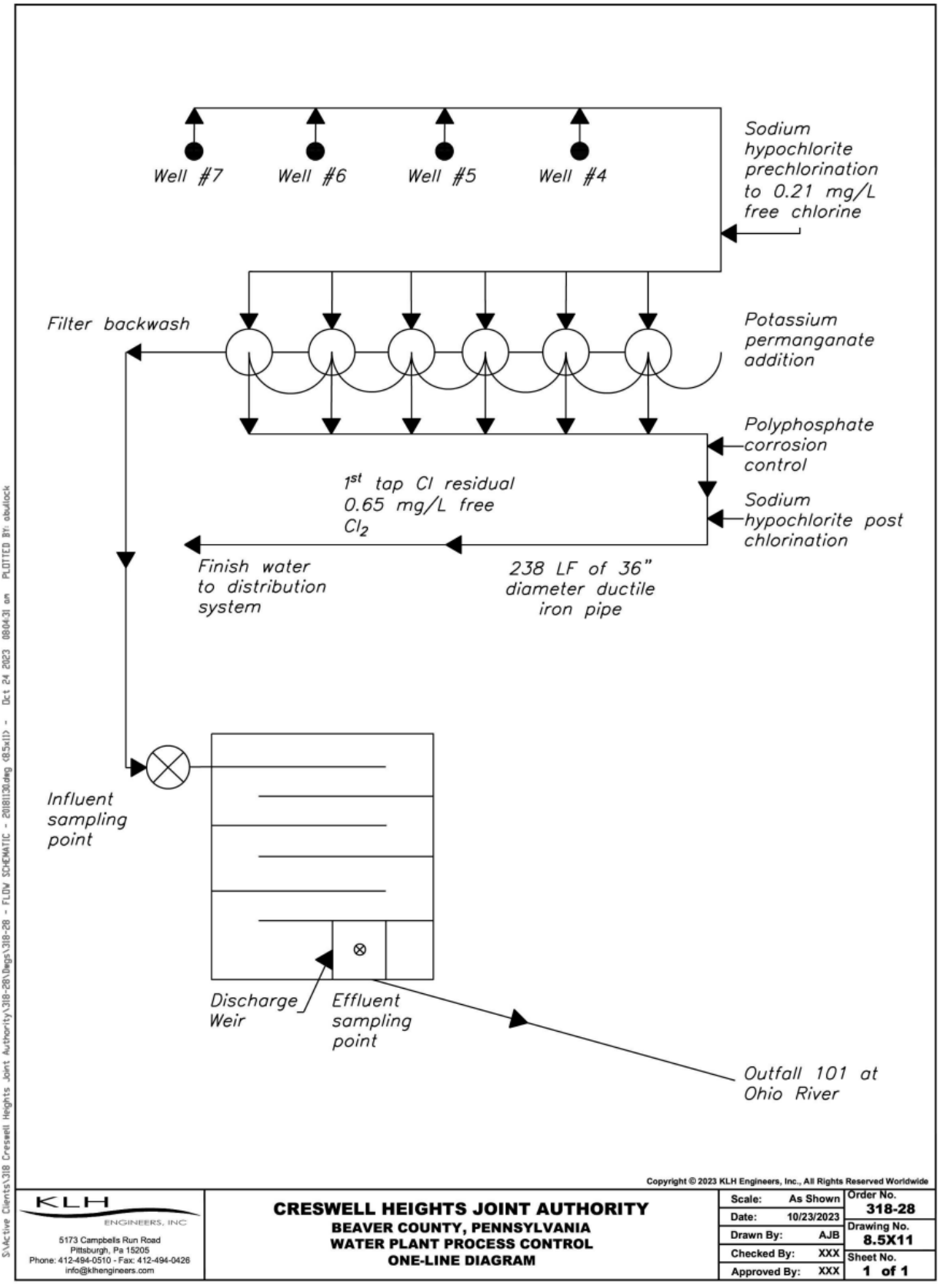
Attachment A: Site Line Diagram

Attachment B: StreamStats Report

Attachment C: Toxic Management Spreadsheet for Outfall 101

Attachment D: TRC Modeling Results for Outfall 101

Attachment A: Site Line Diagram


Well #7
Well #6
Well #5
Well #4
Sodium hypochlorite prechlorination to 0.21 mg/L free chlorine
Filter backwash
Potassium permanganate addition
Polyphosphate corrosion control
1st tap Cl residual 0.65 mg/L free Cl2
Sodium hypochlorite post chlorination
Finish water to distribution system
238 LF of 36" diameter ductile iron pipe
Influent sampling point
Discharge Weir
Effluent sampling point
Outfall 101 at Ohio River
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KLH ENGINEERS, INC
5173 Campbells Run Road
Pittsburgh, Pa 15205
Phone: 412-494-0510 - Fax: 412-494-0426
info@klhengineers.com
CRESWELL HEIGHTS JOINT AUTHORITY
BEAVER COUNTY, PENNSYLVANIA
WATER PLANT PROCESS CONTROL
ONE-LINE DIAGRAM
Scale: As Shown
Date: 10/23/2023
Drawn By: AJB
Checked By: XXX
Approved By: XXX
Order No. 318-28
Drawing No. 8.5X11
Sheet No. 1 of 1
S:\Active Clients\318 Creswell Heights Joint Authority\318-28\Dwgs\318-28 - FLOW SCHEMATIC - 20181130.dwg (8.5x11) - Oct 24 2023 08:04:31 am PLOTTED BY: abullock

Attachment B: StreamStats Report

PA0216950 - Creswell Heights Joint Authority - StreamStats Report

Region ID: PA
Workspace ID: PA20240328104733826000
Clicked Point (Latitude, Longitude): 40.57719, -80.23202
Time: 2024-03-28 06:48:08 -0400

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	0	percent
DRNAREA	Area that drains to a point on a stream	19600	square miles
FOREST	Percentage of area covered by forest	72.3481	percent
PRECIP	Mean Annual Precipitation	45	inches
URBAN	Percentage of basin with urban development	4.3606	percent

Base Flow Statistics

Base Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	19600	square miles	2.26	1720
PRECIP	Mean Annual Precipitation	45	inches	33.1	50.4
CARBON	Percent Carbonate	0	percent	0	99
FOREST	Percent Forest	72.3481	percent	5.1	100
URBAN	Percent Urban	4.3606	percent	0	89

Base Flow Statistics Disclaimers [Statewide Mean and Base Flow]

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

Attachment C: Toxic Management Spreadsheet for Outfall 101

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Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Creswell Heights Joint Authority - WTP** NPDES Permit No.: **PA0216950** Outfall No.: **101**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Pressure filter backwash**

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
0.0264	219	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		396									
	Chloride (PWS)	mg/L		62.7									
	Bromide	mg/L		0.115									
	Sulfate (PWS)	mg/L		81.9									
	Fluoride (PWS)	mg/L		0.21									
Group 2	Total Aluminum	µg/L		40									
	Total Antimony	µg/L	<	2									
	Total Arsenic	µg/L	<	2									
	Total Barium	µg/L		46.9									
	Total Beryllium	µg/L	<	0.8									
	Total Boron	µg/L											
	Total Cadmium	µg/L	<	0.077									
	Total Chromium (III)	µg/L	<	4									
	Hexavalent Chromium	µg/L	<	0.25									
	Total Cobalt	µg/L	<	0.8									
	Total Copper	µg/L		3.07									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L	<	6									
	Dissolved Iron	µg/L	<	200									
	Total Iron	µg/L	<	200									
	Total Lead	µg/L	<	0.8									
	Total Manganese	µg/L		478									
	Total Mercury	µg/L	<	0.2									
	Total Nickel	µg/L		0.807									
	Total Phenols (Phenolics) (PWS)	µg/L	<	5									
	Total Selenium	µg/L		2.41									
	Total Silver	µg/L	<	0.3									
	Total Thallium	µg/L	<	0.8									
	Total Zinc	µg/L	<	4									
	Total Molybdenum	µg/L		2.44									
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

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Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

Creswell Heights Joint Authority - WTP, NPDES Permit No. PA0216950, Outfall 101

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Ohio River**

No. Reaches to Model: **1**

- ○ Statewide Criteria
- ○ Great Lakes Criteria
- ◉ ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	032317	964.9	685	19,600			Yes
End of Reach 1	032317	953.78	684	22,800			Yes

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

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	964.9	0.1	4,730			1,169	18					100	7		
End of Reach 1	953.78	0.1	5,880			1,486	18								

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	964.9														
End of Reach 1	953.78														

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Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Creswell Heights Joint Authority - WTP, NPDES Permit No. PA0216950, Outfall 101

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.050 Analysis Hardness (mg/l): 100.02 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	4,364,591	
Total Antimony	0	0		0	1,100	1,100	6,401,400	
Total Arsenic	0	0		0	340	340	1,978,615	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	##########	
Total Cadmium	0	0		0	2.014	2.13	12,417	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	569.859	1,803	10,494,519	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	94,818	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	552,848	
Total Copper	0	0		0	13.442	14.0	81,483	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	64.596	81.7	475,254	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	9,585	Chem Translator of 0.85 applied
Total Nickel	0	0		0	468.317	469	2,730,810	Chem Translator of 0.998 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	3.218	3.79	22,031	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	378,265	
Total Zinc	0	0		0	117.201	120	697,387	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 720 PMF: 0.348 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

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	8,868,736	
Total Arsenic	0	0		0	150	150	6,046,866	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	##########	
Total Cadmium	0	0		0	0.246	0.27	10,910	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	74.116	86.2	3,474,197	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	419,048	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	765,936	
Total Copper	0	0		0	8.956	9.33	376,080	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	##########	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.517	3.18	128,263	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	36,518	Chem Translator of 0.85 applied
Total Nickel	0	0		0	52.008	52.2	2,102,871	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	201,125	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	524,062	
Total Zinc	0	0		0	118.142	120	4,830,213	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 720 PMF: 0.348 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	1,000	1,000	40,312,438	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	225,750	
Total Arsenic	0	0		0	10	10.0	403,124	
Total Barium	0	0		0	1,000	1,000	40,312,438	
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	1,300	1,300	52,406,169	

Dissolved Iron	0	0		0	300	300	12,093,731	
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	40,312,438	
Total Mercury	0	0		0	0.012	0.012	484	
Total Nickel	0	0		0	610	610	24,590,587	
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	9,675	
Total Zinc	0	0		0	7,400	7,400	#########	

☑ ***CRL*** CCT (min): 720 PMF: 0.475 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Barium	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	50	50.0	7,030,403	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments

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)	40,312	mg/L	Discharge Conc ≤ 10% WQBEL
Total Aluminum	2,797,527	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	N/A	N/A	Discharge Conc < TQL
Total Barium	40,312,438	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Cadmium	7,959	µg/L	Discharge Conc < TQL
Total Chromium (III)	3,474,197	µg/L	Discharge Conc < TQL
Hexavalent Chromium	60,775	µg/L	Discharge Conc < TQL
Total Cobalt	354,353	µg/L	Discharge Conc < TQL
Total Copper	52,227	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	12,093,731	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	##########	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	128,263	µg/L	Discharge Conc < TQL
Total Manganese	40,312,438	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	0.012	µg/L	Discharge Conc < TQL
Total Nickel	1,750,339	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	Discharge Conc < TQL
Total Selenium	201,125	µg/L	Discharge Conc ≤ 10% WQBEL
Total Silver	14,121	µg/L	Discharge Conc < TQL
Total Thallium	9,675	µg/L	Discharge Conc < TQL
Total Zinc	446,997	µg/L	Discharge Conc < TQL
Total Molybdenum	N/A	N/A	No WQS

Attachment D: TRC Modeling Results for Outfall 101

TRC EVALUATION - Outfall 101

4,730	= Q stream (cfs)	0.5	= CV Daily
0.0264	= Q discharge (MGD)	0.5	= CV Hourly
4	= no. samples	0.05	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	0.348	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations		Reference	CFC Calculations	
TRC	1.3.2.iii	WLA afc =	1847.277	1.3.2.iii	WLA cfc =	12534.497
PENTOXSD TRG	5.1a	LTAMULT afc =	0.373	5.1c	LTAMULT cfc =	0.581
PENTOXSD TRG	5.1b	LTA_afc=	688.340	5.1d	LTA_cfc =	7286.969

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

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