pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**New**	Application No.	**PA0255602**
Facility Type	**Industrial**	APS ID	**1001632**
Major / Minor	**Minor**	Authorization ID	**1288290**

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

Applicant and Facility Information

Applicant Name	**North Fayette County Municipal Authority**	Facility Name	**Porter Hill Water Treatment Plant**
Applicant Address	1634 University Drive, PO Box 368	Facility Address	Access Road
	Dunbar, PA 15431-0368		Dunbar, PA 15431
Applicant Contact	Robert Softcheck, General Manager	Facility Contact	Rusty Covington, Operations Manager
Applicant Phone	(724) 626-1211	Facility Phone	(724) 628-5710
Applicant Email	nfcmabs@zoominternet.net	Facility Email	nfcmarc@zoominternet.net
Client ID	8027	Site ID	257148
SIC Code	4941	Municipality	Dunbar Township
SIC Description	Trans. & Utilities - Water Supply	County	Fayette
Date Application Received	September 12, 2019	EPA Waived?	Yes
Date Application Accepted		If No, Reason	
Purpose of Application	New NPDES permit for discharges of treated filter backwash and miscellaneous process tank washdown and process water sample taps from a water treatment plant.		

Summary of Review

On September 12, 2019, on behalf of the North Fayette County Municipal Authority (NFCMA), Senate Engineering Company (Senate) submitted an application for a new NPDES permit for discharges from a proposed new 12 MGD water treatment plant. The new plant—identified as the Porter Hill Water Treatment Plant—will be located just south of the city of Connellsville in Dunbar, PA. Discharges from the proposed plant will be to Dunbar Creek through Outfall 001. Dunbar Creek has a designated aquatic life use of Trout Stocking. Dunbar Creek discharges into a high-quality segment of the Youghiogheny River designated for High-Quality Cold-Water Fishes.

The application was submitted following months of pre-application communications between DEP, Senate, and NFCMA beginning in July 2017 and continuing through mid-December 2017 and later resuming in January 2019. The communications were conducted as part of DEP's antidegradation implementation process whereby DEP notifies proposed new dischargers to high-quality waters what limits they can expect in their NPDES permits. The communications promote the development of information to support the issuance of an NPDES permit for discharges to high-quality waters after considering non-discharge alternatives (with feasible alternatives avoiding the need for an NPDES permit) and non-degrading discharge alternatives (with feasible alternatives avoiding degradation of the high-quality waters through more stringent limits in an NPDES permit).

Below is a summary of the communications and events leading up to the preparation of a draft permit by DEP:

- June 20, 2017: DEP's Safe Drinking Water Program refers Senate to DEP's Clean Water Program for preliminary effluent limits (PELs) for a proposed discharge of decant water from backwash tanks at a proposed water treatment plant. DEP requests additional information to develop PELs.

- July 19, 2017: Senate provides DEP with a discharge flow rate and a proposed discharge location.

Approve	Deny	Signatures	Date
X		Ryan C. Decker, P.E. / Environmental Engineer	December 14, 2021
X		Michael E. Fifth, P.E. / Environmental Engineer Manager	December 21, 2021

Summary of Review

- July 20, 2017: DEP provides PELs to Senate.
- July 21, 2017: DEP notifies Senate that additional limits may be imposed depending on discharge concentrations reported on a permit application.
- October 23, 2017: Senate provides DEP with analytical data for additional pollutants. DEP provides Senate with revised PELs and advises Senate that some PELs were based on results reported using insufficiently sensitive reporting limits.
- December 14, 2017: Senate provides DEP with additional analytical data using sufficiently sensitive reporting limits.
- December 15, 2017: DEP provides revised PELs to Senate based on additional analytical data.
- January 4, 2019: Senate requests that DEP reconfirm applicable PELs.
- January 9, 2019: DEP confirms applicable PELs.
- February 1, 2019: After internal review, DEP advises Senate that more stringent non-degrading limits may be necessary to protect the Youghiogheny River's high-quality use.
- February 13, 2019: DEP provides Senate with non-degrading PELs to protect the Youghiogheny River.
- February 21, 2019: Pre-application meeting held with NFCMA, Senate, and DEP. DEP requests NFCMA to follow DEP's antidegradation procedures when preparing the permit application for the Porter Hill Plant.
- May 20, 2019: Senate proposes to discharge to an unnamed tributary to Dunbar Creek.
- May 22, 2019: DEP advises Senate that discharges to the unnamed tributary to Dunbar Creek are not recommended and will result in more stringent limits.
- August 7, 2019: Senate notifies DEP of a revised discharge flow rate and provides DEP with additional analytical data.
- August 14, 2019: DEP provides revised PELs to Senate.
- August 21, 2019: At Senate's request, DEP provides Senate with the Social-Economic Justification (SEJ) for the Municipal Authority of Westmoreland County's (MAWC's) Indian Creek Water Treatment Plant, which discharges to the Youghiogheny River and is subject to less stringent limits than the non-degrading PELs for the Porter Hill Plant.
- August 30, 2019: Senate notifies DEP of a revised discharge flow rate.
- September 9, 2019: DEP provides revised PELs to Senate.
- September 12, 2019: DEP receives an NPDES permit application, which includes an evaluation of non-discharge and non-degrading discharge alternatives and an SEJ to degrade the Youghiogheny River.
- April 2, 2020: DEP notifies Senate in response to a request for a status update that data collected on the Youghiogheny River indicate the river's aquatic life use is impaired, which, if confirmed, would prohibit DEP from approving an SEJ to degrade the river pursuant to 25 Pa. Code § 93.4c(b)(1)(iii).
- July 16, 2020: DEP sends NFCMA and Senate a technical deficiency letter identifying deficiencies in NFCMA's evaluation of non-discharge and non-degrading discharge alternatives.
- August 13, 2020: DEP extends the time to respond to DEP's technical deficiency letter to September 29, 2020.
- September 28, 2020: DEP extends the time to respond to DEP's technical deficiency letter to October 13, 2020.

Summary of Review

- October 13, 2020: Senate responds to DEP's July 16, 2020 technical deficiency letter on behalf of NFCMA.
- January 6, 2021: NFCMA requests a status update on the application review.
- January 7, 2021: DEP notifies NFCMA that an evaluation of the need for additional data for DEP to assess the conditions of Dunbar Creek and the Youghiogheny River is underway, which could affect the effluent limits for the Porter Hill Plant. DEP provides NFCMA with clarification regarding the inapplicability of grandfathering to new discharges (MAWC's Indiana Creek Plant is grandfathered into the Youghiogheny River's HQ-CWF designation and can discharge at its existing levels; new dischargers are ineligible for grandfathering). NFCMA responds that it disagrees with DEP's position on grandfathering. DEP delays further response to NFCMA until data collection for Dunbar Creek and the Youghiogheny River is complete.
- April 12, 2021: DEP sends NFCMA and Senate a second technical deficiency letter. The letter identifies deficiencies in NFCMA's October 13, 2020 response to DEP's first technical deficiency letter; most deficiencies are the same as those in DEP's July 16, 2020 letter. The letter also revises the PELs for aluminum based on updated stream data and notifies NFCMA that Dunbar Creek and the Youghiogheny River are not attaining their respective designated uses and that the Youghiogheny River is not attaining its "Tier 1" CWF protected use. The non-attainment status of the Youghiogheny River precludes the approval of an SEJ per 25 Pa. Code § 93.4c(b)(1)(iii), which confirms the situation described to Senate on April 2, 2020.
- April 16, 2021: DEP and NFCMA participate in a conference call to discuss outstanding issues and a path forward.
- April 29, 2021: Senate inquires about the discharge flow rate used to prepare the PELs. DEP replies with the flow rate used to calculate PELs based on the flow rate previously reported to DEP by Senate (370 gpm).
- May 5, 2021: Senate responds to DEP's April 12, 2021 technical deficiency letter on behalf of NFCMA.
- July 13, 2021: Following its review of Senate's May 5, 2021 response letter, DEP requests that Senate/NFCMA clarify the proposed discharge flow rate. DEP also inquires whether the concentrations of metals were reported on the NPDES permit application in units of mg/L rather than the µg/L units prompted by the Pollutant Group 2 form.
- July 22, 2021: Senate/NFCMA propose to extend the batch discharge duration from 18 hours to 24 hours (12 hours per settling tank), thus confirming a discharge flow rate of 0.4002 MGD.
- August 4, 2021: Senate confirms reporting errors for Pollutant Group 2 results.
- August 5, 2021: DEP requests that Senate update the Pollutant Group 2 results and offers an opportunity to resample pollutants that were not reported using sufficiently sensitive analytical methods with the potential to eliminate water quality-based effluent limits for parameters reported as not detectable at reporting limits higher than DEP's target quantitation limits.
- August 10, 2021: Senate confirms that NFCMA will resample using lower analytical reporting limits. NFCMA's estimates for the Porter Hill Plant are based on samples of filter backwash discharges from NFCMA's existing Wheeler Bottom Plant, so the resampling effort is for that other plant's discharges.
- September 30, 2021: NFCMA submits updated Pollutant Group 2 results.
- October 4, 2021: NFCMA notifies DEP via phone that its design contract with Senate was terminated (confirmed by NFCMA in writing on October 8, 2021 and confirmed by Senate via letter dated October 11, 2021). NFCMA also notifies DEP that progress on the Porter Hill Plant is on hold due to a two-fold increase in construction costs.
- October 12, 2021: NFCMA notifies DEP that NFCMA is working to obtain grant funding to construct the Porter Hill Plant. NFCMA requests that DEP issue a permit based on information previously provided so that NFCMA has an effluent design target.

Summary of Review

Application Review Summary

Effluent limits for Outfall 001's discharges are the more stringent of technology-based effluent limits, water quality-based effluent limits, and non-degrading limits. Based on DEP's evaluation using the most up-to-date stream data for Dunbar Creek and the Youghiogheny River, as documented in this Fact Sheet, a combination of technology-based limits and water quality-based limits apply to Outfall 001's discharges including technology-based limits for total suspended solids, total iron, total manganese, and pH; water quality-based limits for total aluminum, total copper, total silver, total thallium, and total residual chlorine; and a water quality-based reporting requirement for total zinc. Non-degrading limits to protect the Youghiogheny River's high-quality use are not the most stringent limits. However, the water quality-based effluent limits needed to protect Dunbar Creek's uses may require NFCMA to use more sophisticated treatment technologies than would otherwise be required.

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.	001	Design Flow (MGD)	0.4002
Latitude	39° 59' 35.00"	Longitude	-79° 36' 20.00"
Quad Name	South Connellsville	Quad Code	1909
Wastewater Description:	Settled and decanted water from dual media filter backwash and filter-to-waste operations; miscellaneous process tank washdown and process water sample taps		
Receiving Waters	Dunbar Creek (TSF)	Stream Code	38164
NHD Com ID	69918819	RMI	1.13
Drainage Area	36.2 sq. mi.	Yield (cfs/mi^2)	0.0235
Q_{7-10} Flow (cfs)	0.851	Q_{7-10} Basis	USGS StreamStats (see following pages)
Elevation (ft)	910.35	Slope (ft/ft)	0.01
Watershed No.	19-D	Chapter 93 Class.	TSF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s) **[under reassessment]**		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

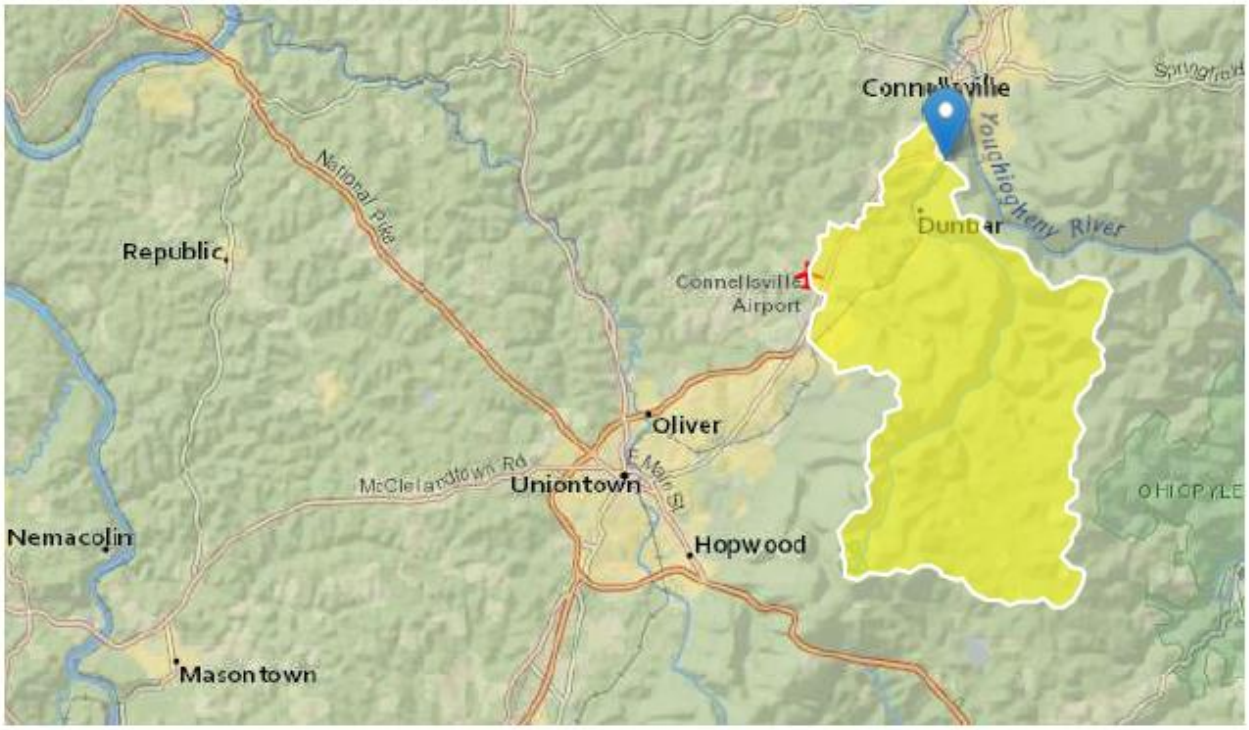
Background/Ambient Data		Data Source
pH (SU)	7.83	Field samples collected by DEP (June 2018 – Nov 2021)
Temperature (°F)		
Hardness (mg/L)		
Other:		See Attachment A to this Fact Sheet

Nearest Downstream Public Water Supply Intake		Westmoreland County Municipal Authority – McKeesport (PWS ID 5020025)	
PWS Waters	Youghiogheny River	Flow at Intake (cfs)	510
PWS RMI	1.30	Distance from Outfall (mi)	45.49

Changes Since Last Permit Issuance: New permit; new outfall**.**

StreamStats Report

Region ID: PA
Workspace ID: PA20211202194016414000
Clicked Point (Latitude, Longitude): 39.99308, -79.60565
Time: 2021-12-02 14:40:37 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	36.2	square miles
ELEV	Mean Basin Elevation	1757	feet
PRECIP	Mean Annual Precipitation	46	inches
FOREST	Percentage of area covered by forest	87.312	percent
URBAN	Percentage of basin with urban development	5.022	percent
CARBON	Percentage of area of carbonate rock	0	percent

Parameter Code	Parameter Description	Value	Unit
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.03	percent

Low-Flow Statistics Parameters [Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	36.2	square miles	2.26	1400
ELEV	Mean Basin Elevation	1757	feet	1050	2580

Low-Flow Statistics Flow Report [Low Flow Region 4]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	2.3	ft^3/s	43	43
30 Day 2 Year Low Flow	3.84	ft^3/s	38	38
7 Day 10 Year Low Flow	0.851	ft^3/s	66	66
30 Day 10 Year Low Flow	1.44	ft^3/s	54	54
90 Day 10 Year Low Flow	2.7	ft^3/s	41	41

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

General Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	36.2	square miles	2.26	1720
PRECIP	Mean Annual Precipitation	46	inches	33.1	50.4
CARBON	Percent Carbonate	0	percent	0	99
FOREST	Percent Forest	87.312	percent	5.1	100
URBAN	Percent Urban	5.022	percent	0	89

General Flow Statistics Flow Report [Statewide Mean and Base Flow]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
Harmonic Mean Streamflow	20.1	ft^3/s	38	38

General Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

Application Version: 4.6.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

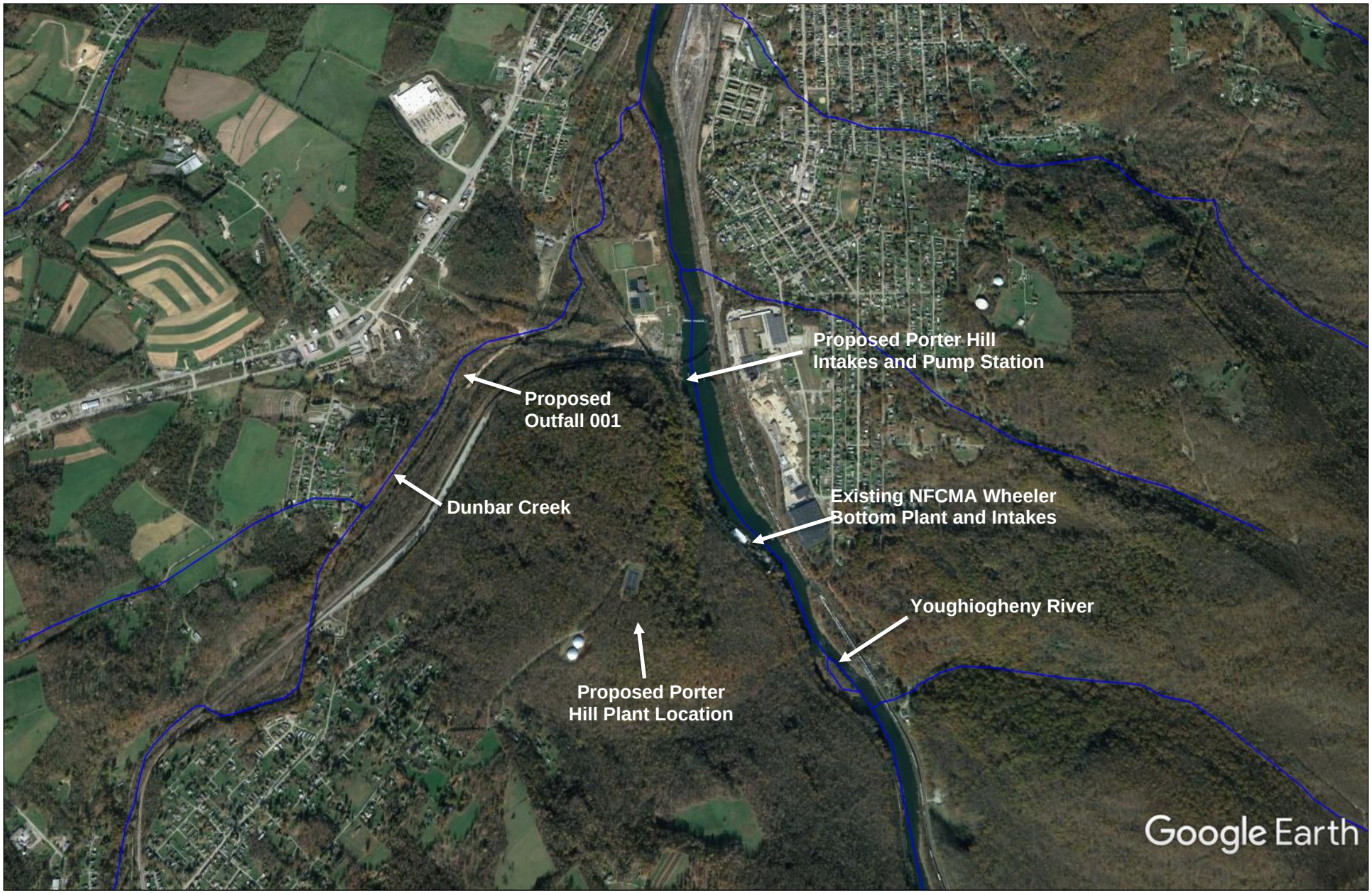
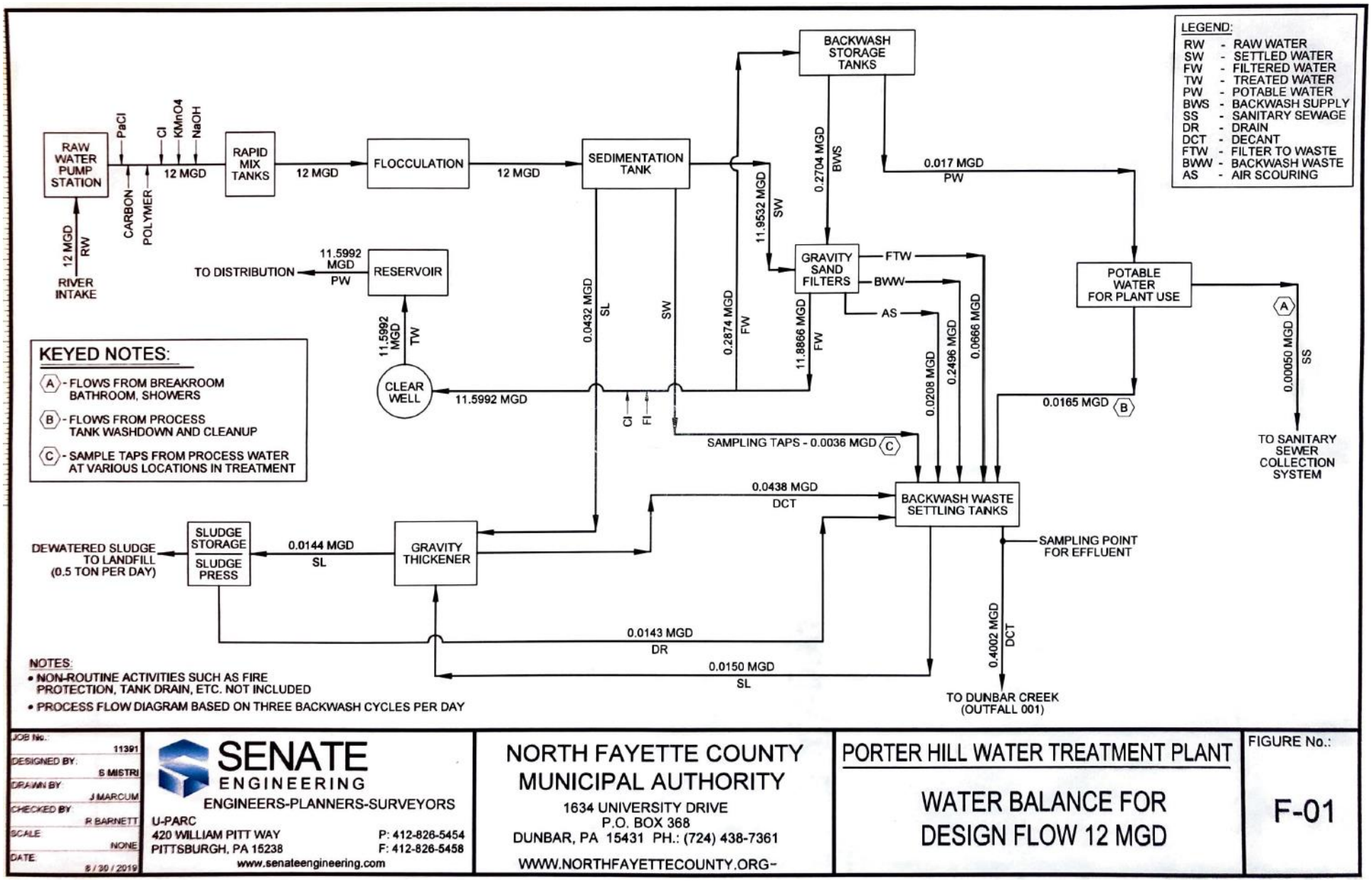


Image Source and Date: Google Earth Pro; November 12, 2016.



Proposed Water Treatment Process. NPDES discharge will be from the Backwash Waste Settling Tanks to Dunbar Creek (Outfall 001).

Development of Effluent Limitations

Outfall No.	001	**Design Flow (MGD)**	0.4002
Latitude	39° 59' 35.00"	**Longitude**	-79° 36' 20.00"

Wastewater Description: Settled and decanted water from dual media filter backwash and filter-to-waste operations; miscellaneous process tank washdown and process water sample taps

Technology-Based Effluent Limitations (TBELs)

Discharges from Outfall 001 are not subject to Federal Effluent Limitations Guidelines (ELGs). Pursuant to 25 Pa. Code § 92a.48(a)(3) and Sections 304(b)(2)(B), 304(b)(4)(B), and 402(a)(1) of the Clean Water Act, in the absence of applicable Federal ELGs, effluent limits are established on a case-by-case basis using Best Professional Judgment (BPJ). Regulations under 40 CFR § 125.3(d) require that certain factors be considered when developing BPJ limits for the levels of technology-based control in the Clean Water Act including: Best Practicable Control Technology Currently Available (BPT), Best Conventional Pollutant Control Technology (BCT), and Best Available Control Technology Economically Achievable (BAT).

On October 1, 1997, DEP published a guidance document titled "Technology-Based Control Requirements for Water Treatment Plant Wastes" [Doc. No. 362-2183-003]. The guidance discusses the regulatory factors for BPT, BCT, and BAT and identifies TBELs to be applied to discharges of water treatment plant wastes. Pursuant to that guidance, 25 Pa. Code § 92a.48, and DEP's BPJ, the following TBELs apply to discharges from Outfall 001.

Table 1. TBELs for Outfall 001

Parameter	Average Monthly (mg/L)	Maximum Daily (mg/L)	Instantaneous Maximum (mg/L)	Basis
Total Suspended Solids	30.0	60.0	75.0	§ 92a.48(a)(3); BPJ of BAT/BCT
Iron, Total	2.0	4.0	5.0	§ 92a.48(a)(3); BPJ of BAT/BCT
Aluminum, Total	4.0	8.0	10.0	§ 92a.48(a)(3); BPJ of BAT/BCT
Manganese, Total	1.0	2.0	2.5	§ 92a.48(a)(3); BPJ of BAT/BCT
Total Residual Chlorine	0.5	—	1.6	25 Pa. Code § 92a.48(b)(2)
pH (s.u.)	not less than 6.0 and not greater than 9.0			25 Pa. Code § 95.2(1)

†† IMAXs are calculated as 2.5 times the monthly average in accordance with Chapter 2 of DEP's "Technical Guidance for the Development and Specification of Effluent Limitations. and Other Permit Conditions in NPDES Permits" [Doc. No. 362-0400-001].

Antidegradation Best Available Combination of Technologies (ABACT) will be driven by technologies necessary to maintain the existing quality of the Youghiogheny River, as achieved by complying with non-degrading limits, if such limits are needed. DEP notes that Outfall 001's discharges will not be direct discharges to a high-quality water even though they will affect a high-quality water, so the development and imposition of ABACT limits is not compulsory in this circumstance.

Water Quality-Based Effluent Limitations (WQBELs)

Outfall 001 will discharge to Dunbar Creek, which is designated for Trout Stocking (TSF) pursuant to 25 Pa. Code § 93.9v. From the proposed Outfall 001 discharge point, Dunbar Creek flows 1.13 river miles to the Youghiogheny River, which is designated for High-Quality Cold-Water Fishes (HQ-CWF) pursuant to 25 Pa. Code § 93.9v.

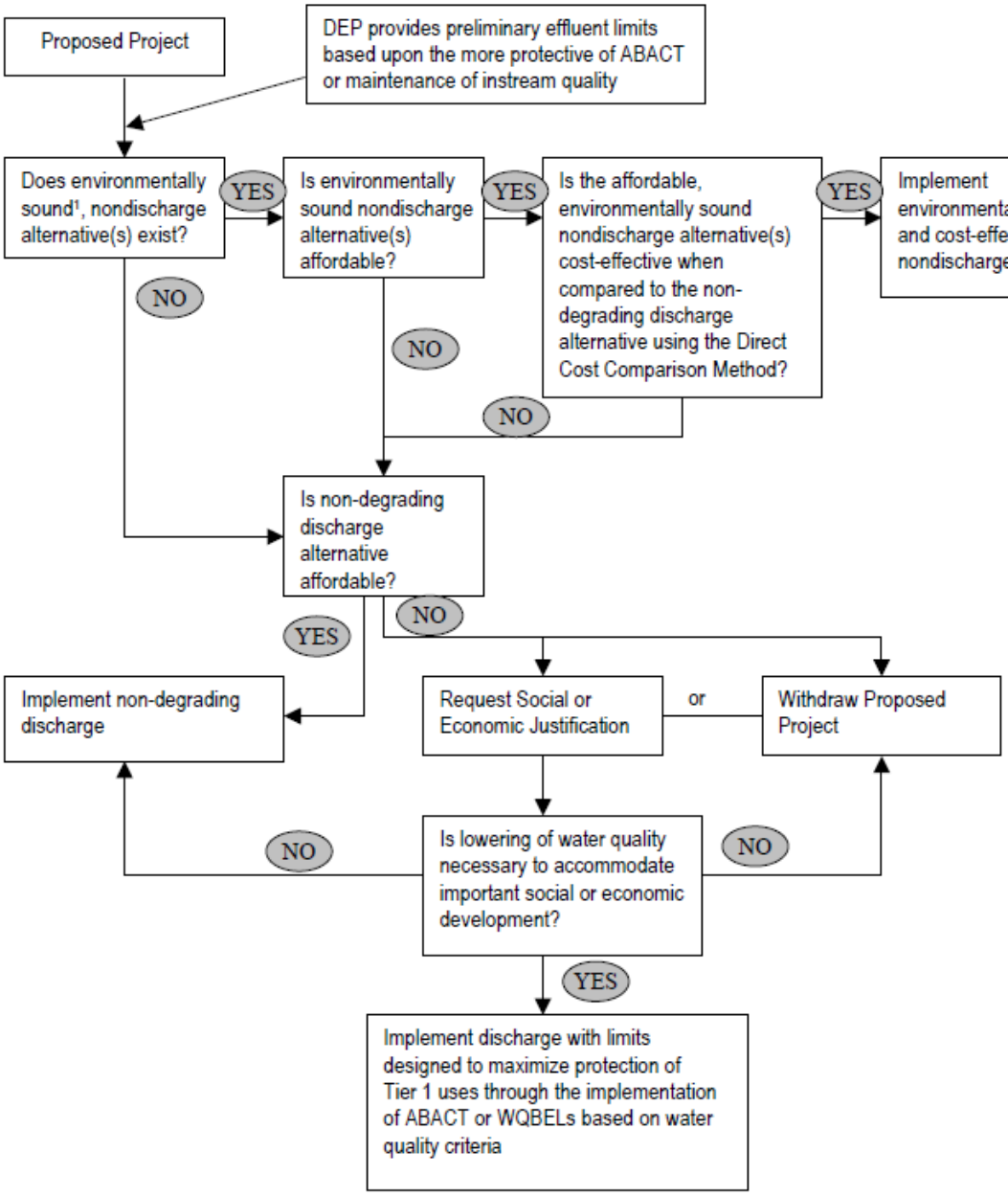
Even though Outfall 001's discharges will not be direct discharges to a high-quality surface water, Outfall 001's discharges will indirectly affect a high-quality surface water. Therefore, antidegradation evaluation procedures are employed to protect the Youghiogheny River's high-quality use in accordance with 25 Pa. Code § 93.4a.

The generalized review process for proposed discharges to high-quality waters is depicted below in Figure 3 from DEP's "Water Quality Antidegradation Implementation Guidance" [Doc. No. 391-0300-002, November 29, 2003] ("Antidegradation Guidance"). In July 2017, in response to an inquiry from NFCMA's consultant, DEP initiated the generalized review process for NFCMA's Porter Hill Plant by providing preliminary effluent limits (PELs) to NFCMA's consultant. The PELs were subsequently revised based on additional information provided by NFCMA's consultant in correspondence with DEP through mid-December 2017. DEP did not receive any further communications about the NFCMA Porter Hill Plant or the PELs until January 2019.

In January 2019, NFCMA's consultant resumed its communications with DEP on NFCMA's behalf, which led to further revisions to the PELs. The PELs are 'non-degrading' limits that prevent discharges from reducing the water quality of high-

quality waters. Consistent with the generalized permit review process, DEP requested NFCMA to perform a non-discharge alternatives analysis to identify environmentally sound, affordable, and cost-effective alternatives (e.g., offsite disposal, moving the discharge to a different, non-HQ stream, etc.) to avoid a new, direct or indirect discharge to a high-quality water. DEP also requested NFCMA to perform a non-degrading discharge alternatives analysis to identify alternatives (e.g., wastewater reuse, treatment, etc.) to comply with the PELs and not degrade the Youghiogheny River's HQ-CWF use.

FIGURE 3
GENERALIZED PERMIT REVIEW PROCESS
FOR
PROPOSED DISCHARGES TO HQ WATERS



NFCMA's consultant submitted an evaluation of alternatives in an "Antidegradation Analysis and Social Economic Justification" report. DEP identified deficiencies in NFCMA's evaluation and sent a technical deficiency letter to NFCMA on July 16, 2020. NFCMA responded to DEP's July 16, 2020 letter on October 13, 2020 and DEP again identified deficiencies in NFCMA's evaluation. DEP sent a second deficiency letter to NFCMA on April 12, 2021. NFCMA responded to DEP's April 12, 2021 letter on May 5, 2021.

NFCMA's May 5, 2021 response letter claimed that the primary non-discharge alternative—moving Outfall 001 to a location on the Youghiogheny River not designated as high-quality—is not feasible based on the added cost to implement that alternative ($2.7 million). However, NFCMA contacted DEP in October 2021 and indicated that further development of the Porter Hill Plant was going to be put on hold with progress on the plant depending on NFCMA's ability to secure the additional funding need to construct the plant. According to NFCMA, the initial cost estimate to construct the Porter Hill Plant was about $30 million when that estimate was prepared a few years ago, but NFCMA indicated in October 2021 that costs would double to $60 million if the plant was constructed in 2021 (excluding upgrades that consider antidegradation). NFCMA indicated that it plans to pursue the additional funding necessary to build the plant. DEP observes that if NFCMA secures an additional $30 million to the build the plant, then it is plausible for NFCMA to pursue funding for the $2.7 million needed to implement a non-discharge alternative. Therefore, non-discharge alternatives are not presumptively infeasible.

Additionally, NFCMA never completed its analysis of treatment technologies that could result in compliance with the PELs. Senate Engineering identified a ballasted flocculation treatment system manufactured by Actiflo as a plausible treatment technology to meet the PELs (possibly representing ABACT), but a more detailed evaluation of that technology was not conducted. NFCMA's submissions generally sought relaxed effluent limits that would not require enhanced treatment measures, but which could degrade the Youghiogheny River's HQ-CWF use. Pursuant to 25 Pa. Code § 93.4c(b)(1), degradation of a high-quality water is allowable in limited circumstances through the approval of a Social-Economic Justification (SEJ), which is evaluated after all non-discharge and non-degrading discharge alternatives are vetted. SEJs for high quality waters are evaluated pursuant to 25 Pa. Code § 93.4c(b)(1)(iii), which states:

> "Social or economic justification (SEJ) in High Quality Waters. The Department may allow a reduction of water quality in a High Quality Water if it finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the Commonwealth's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. A reduction in water quality will not be allowed under this subparagraph unless the discharger demonstrates that the High Quality Water will support applicable existing and designated water uses (other than the high quality and exceptional value uses) in § 93.3, Table 1 (relating to protected water uses)."

Monitoring and assessment efforts by DEP indicate that both Dunbar Creek and the Youghiogheny River are not attaining their respective designated uses. Additionally, the Youghiogheny River is not attaining the "Tier 1", Cold Water Fishes (CWF) protected use. Since the Youghiogheny River is not attaining the Tier 1 CWF designated use in 25 Pa. Code § 93.3, Table 1, NFCMA is not eligible for an SEJ. Even if the waters were attaining their uses, NFCMA did not complete the preceding steps in the permit review process for proposed discharges to high-quality waters to DEP's satisfaction.

Notwithstanding NFCMA's incomplete assessment of non-discharge and non-degrading discharge alternatives, DEP later identified errors in some of its PEL calculations. Correcting the errors results in less stringent PELs that NFCMA may be able to achieve without additional treatment technologies. Also, as explained previously, since Outfall 001's discharges are not direct discharges to a high-quality water, DEP has some flexibility when applying the antidegradation regulations. For reference, 25 Pa. 93.4c regarding the implementation of antidegradation requirements states:

> (b) *Protection of High Quality and Exceptional Value Waters.*
>
> (1) *Point source discharges.* The following applies to point source discharges to High Quality or Exceptional Value Waters.
>
> (i) *Nondischarge alternatives/use of best technologies.*
>
> (A) A person proposing a new, additional or increased discharge to High Quality or Exceptional Value Waters shall evaluate nondischarge alternatives to the proposed discharge and use an alternative that is environmentally sound and cost-effective when compared with the cost of the proposed discharge. If a nondischarge alternative is not environmentally sound and cost-effective, a new, additional or increased discharge shall use the best available combination of cost-effective treatment, land disposal, pollution prevention and wastewater reuse technologies.
>
> (B) A person proposing a new, additional or increased discharge to High Quality or Exceptional Value Waters, who has demonstrated that no environmentally sound and cost-effective nondischarge alternative exists under clause (A), shall demonstrate that the discharge will maintain and protect the existing quality of receiving surface waters, except as provided in subparagraph (iii).

As the regulation states, the non-discharge alternatives requirements and non-degrading discharge requirements apply to point source discharges to high-quality waters. Outfall 001 will discharge to non-HQ Dunbar Creek. The combined flow of Dunbar Creek and Outfall 001's discharges will then flow to the Youghiogheny River, which is designated for HQ-CWF. It is not typical for a stream without a special protection designation to discharge to a stream that has a special protection

designation because the quality of the non-special protection stream could inherently degrade the special protection stream. Given this situation and the fact that Outfall 001 will be an indirect discharger to a high-quality water, DEP has determined that NFCMA's evaluation of non-discharge alternatives is adequate. DEP will not require NFCMA to relocate Outfall 001 to the non-high-quality portion of the Youghiogheny River despite the potential for that to be an environmentally sound and affordable non-discharge alternative.

DEP still must ensure that the Youghiogheny River's existing and designated uses are protected pursuant to 25 Pa. Code §§ 93.4(a) and 93.9(a), which may require NFCMA to use enhanced treatment techniques. Since NFCMA is not eligible for an SEJ because both Dunbar Creek's and the Youghiogheny River's aquatic life uses are impaired, non-degrading effluent limits are developed. To the extent that non-degrading limits are not necessary to protect the Youghiogheny River's uses, WQBELs are developed to protect Dunbar Creek's uses. The more stringent of non-degrading limits for the Youghiogheny River, WQBELs for Dunbar Creek, and TBELs will control in the permit.

Non-Degrading Limits for Outfall 001

Non-degrading limits are calculated using the following mass balance equation in accordance with the procedures outlined on p.63 of DEP's Antidegradation Guidance.

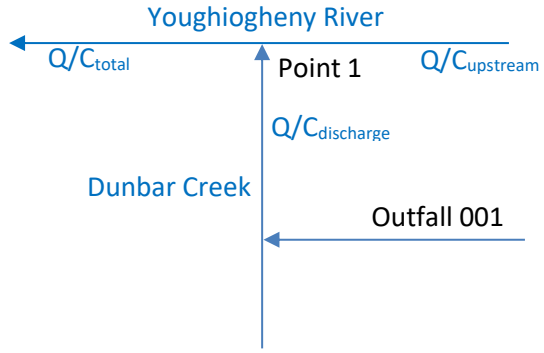
$$(Q_{discharge} \times C_{discharge}) + (Q_{upstream} \times C_{upstream}) = (Q_{total} \times C_{total})$$

$$\text{Solving for } C_{discharge} = \frac{(Q_{total} \times C_{total}) - (Q_{upstream} \times C_{upstream})}{Q_{discharge}}$$

Variable	Definition
$Q_{upstream}$	Instream flow above the point of discharge (appropriate design stream flow condition, i.e. Q_{HM})
$C_{upstream}$	Instream Concentration above the point of discharge (median concentration value of the data set)
$Q_{discharge}$	Discharge Flow (permitted discharge flow or the maximum hydraulic design capacity of the treatment system)
$C_{discharge}$	Discharge Concentration (this is the factor solved for in the equation)
Q_{total}	Combined flow of the discharge and the stream below the point of discharge (sum of the discharge flow and upstream flow)
C_{total}	Concentration in the stream below the point of discharge (the water quality objective, which is the concentration represented by the upper bound of the 95 percent confidence of the data set)

Outfall 001 is an indirect discharge to the Youghiogheny River, so the first modeled "discharge" is the combined flow of Dunbar Creek and Outfall 001 to the Youghiogheny River (see Point 1 Analysis below). After the long-term average non-degrading concentrations for that "discharge" are determined, a separate mass balance calculation is performed using flow and concentration data for Dunbar Creek and Outfall 001 to calculate the allowable long-term average discharge concentrations for Outfall 001's discharges (see Point 2 Analysis below). The long-term average discharge concentrations for Outfall 001 at Point 2 are converted to average monthly and maximum daily limits so they can be compared to the WQBELs calculated at Outfall 001 to protect Dunbar Creek (discussed later) to determine which limits are more stringent.

Point 1 Analysis



Point 2 Analysis

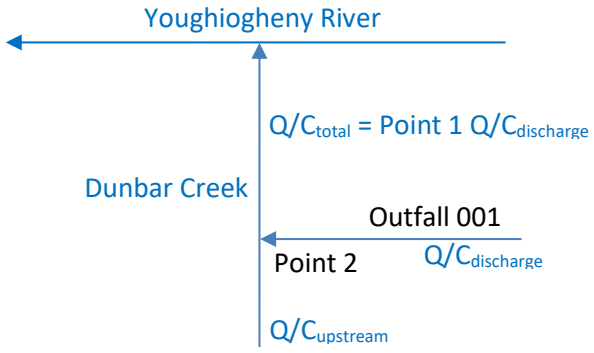


Table 2. Summary of Values for Point 1 and Point 2 Analyses

Variable	Point 1 Analysis	Point 2 Analysis
$Q_{discharge}$	$Q_{discharge} = Q_{harmonic\ (Dunbar)} + Q_{001}$ = 12.99 MGD + 0.4002 MGD = 13.3902 MGD ≈ 20.72 cfs	$Q_{discharge} = Q_{001}$ = 0.4002 MGD ≈ 0.62 cfs
$C_{discharge}$	Calculated non-degrading long-term averages for the combined "discharge" of Dunbar Creek and Outfall 001. Refer to Table 3. Detailed calculations are included in **Attachment B** of this Fact Sheet.	Calculated non-degrading long-term averages for Outfall 001. Refer to Table 3. Detailed calculations are included in **Attachment B** of this Fact Sheet.
$Q_{upstream}$	$Q_{upstream} = Q_{harmonic\ (Youghiogheny)}$ $= 7.43\ (Q_{7\text{-}10\ (Youghiogheny)})^{0.874}$† = $= 7.43\ (390\ cfs)^{0.874}$ ≈ 1366 cfs	$Q_{upstream} = Q_{harmonic\ (Dunbar)}$ = 12.99 MGD ≈ 20.10 cfs (calculated by USGS StreamStats)
$C_{upstream}$	Upstream concentrations for the Youghiogheny River are based on the median concentrations from analyses of in-stream samples collected at Water Quality Network (WQN) Station 709 – Youghiogheny River at Confluence. Data for WQN Station 709 are summarized in **Attachment A** of this Fact Sheet.	Upstream concentrations for Dunbar Creek are based on the long-term averages of lognormal or delta-lognormal distributions of analytical results from in-stream samples collected in Dunbar Creek in 2018, 2019, and 2021 summarized in **Attachment A**. Lognormal distributions are used because they best describe the water quality data.
Q_{total}	$Q_{total} = Q_{harmonic\ (Dunbar)} + Q_{001} + Q_{harmonic\ (Youghiogheny)}$ ≈ 20.72 cfs + 1366 cfs = 1386.72 cfs	$Q_{total} = Q_{harmonic\ (Dunbar)} + Q_{001}$ ≈ 20.72 cfs
C_{total}	Downstream concentrations for the Youghiogheny River (i.e., the water quality objectives or target in-stream concentrations that maintain high-quality uses) are based on the upper 95% confidence limit of water chemistry data collected at Water Quality Network (WQN) Station 709 – Youghiogheny River at Confluence. Data for WQN Station 709 are summarized in **Attachment A** of this Fact Sheet.	Downstream concentrations for Dunbar Creek are the $C_{discharge}$ concentrations calculated from the Point 1 Analysis.

† Harmonic mean flow ($Q_{harmonic}$ or Q_{HM}) is estimated using $Q_{7\text{-}10}$ flow and the empirical equation: $Q_{HM} = 7.43(Q_{7\text{-}10})^{0.874}$. The equation is from DEP's "Implementation Guidance Design Conditions" [Doc. No. 391-2000-006, December 12, 2003] and is a regression equation derived from the relationship between $Q_{7\text{-}10}$ stream flow and harmonic mean flow for the 290 USGS monitoring stations analyzed to develop that guidance.

Table 3 summarizes the calculated long-term average (LTA) concentrations for all pollutants with enough data to generate non-degrading limits and the average monthly and maximum daily limits for Outfall 001 necessary to maintain the HQ-CWF use of the Youghiogheny River. Table 3 also identifies the estimated maximum discharge concentrations reported by NFCMA on the NPDES permit application (based on samples of filter backwash discharges from NFCMA's Wheeler Bottom Plant) and an "RP?" column that reports whether the maximum reported discharge concentration has a reasonable potential to exceed the calculated non-degrading effluent limits and whether non-degrading limits should be imposed.

Table 3. Non-Degrading Long-Term Average Concentrations and Effluent Limits

Parameter	Point 1 LTA Conc. (mg/L)	Point 2 LTA Conc. (mg/L)	Average Monthly Limit (mg/L)	Maximum Daily Limit (mg/L)	Maximum Reported Discharge Conc. (mg/L)	RP?
Aluminum, Total	1.51	45.2	77.8	121.2	0.466 (0.59%)	No
Ammonia, Total as N	0.04	1.34	2.30	3.59	0.15 (6.52%)	No
Barium, Total	0.170	4.17	7.18	11.18	0.034 (0.47%)	No
Boron, Total	0.200	6.69	11.5	17.9	<0.100 (0.87%)	No
Bromide	25.0	836	1,439	2,242	<0.1 (0.007%)	No
Chloride	73.1	2,445	4,205	6,552	16 (0.38%)	No
Copper, Total	0.004	0.134	0.230	0.358	<0.010 (4.35%)	No
Hardness, Total	129	4,314	7,421	11,562	50.9 (0.69%)	No

Table 3 (continued). Non-Degrading Long-Term Average Concentrations and Effluent Limits

Parameter	Point 1 LTA Conc. (mg/L)	Point 2 LTA Conc. (mg/L)	Average Monthly Limit (mg/L)	Maximum Daily Limit (mg/L)	Maximum Reported Discharge Conc. (mg/L) and % of Avg. Mo. Limit	RP?
Iron, Total	2.88	96.5	165.9	258.6	0.040 (0.02%)	No
Lead, Total	0.001	0.033	0.058	0.090	0.00007 (0.12%)	No
Manganese, Total	2.46	80.6	138.6	216.0	0.169 (0.12%)	No
Nickel, Total	0.05	1.67	2.88	4.48	0.001 (0.03%)	No
Phosphorus, Total	0.08	0.93	1.59	2.48	<0.1 (6.3%)	No
Selenium, Total	0.007	0.23	0.40	0.63	<0.005 (1.25%)	No
Sulfate	29.4	985	1,693	2,639	44 (2.6%%)	No
TDS	200	2,692	4,631	7,216	120 (2.6%)	No
TSS	8.60	125.0	215.8	336.2	11 (5.1%)	No
Zinc, Total	0.030	1.00	1.73	2.69	0.011 (0.64%)	No
TRC	0.03	0.67	1.15	1.79	0.67 (58.3%)	Yes

The results summarized in Table 3 demonstrate that, except for TRC, non-degrading limits are not the limiting factor for regulation of Outfall 001's discharges because reasonable potential is not demonstrated for any of the analyzed pollutants except TRC. For the purposes of the non-degrading limit analysis, reasonable potential is demonstrated when a maximum reported discharge concentration is within 50% of the calculated average monthly non-degrading limit (percentages for the reported concentrations are shown in the table). TRC is already subject to more stringent TBELs than the non-degrading limits (see Table 1).

Toxics Management Spreadsheet Water Quality Modeling Program and Procedures for Evaluating Reasonable Potential

WQBELs are developed pursuant to Section 301(b)(1)(C) of the Clean Water Act and, per 40 CFR § 122.44(d)(1)(i), are imposed to "control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality." The Department of Environmental Protection developed the DEP Toxics Management Spreadsheet (TMS) to facilitate calculations necessary to complete a reasonable potential (RP) analysis and determine WQBELs for discharges of toxic and nonconventional pollutants.

The TMS is a single discharge, mass-balance water quality modeling program for Microsoft Excel® that considers mixing, first-order decay, and other factors to determine WQBELs for toxic and nonconventional pollutants. Required input data including stream code, river mile index, elevation, drainage area, discharge flow rate, low-flow yield, and the hardness and pH of both the discharge and the receiving stream are entered into the TMS to establish site-specific discharge conditions. Other data such as reach dimensions, partial mix factors, and the background concentrations of pollutants in the stream also may be entered to further characterize the discharge and receiving stream. The pollutants to be analyzed by the model are identified by inputting the maximum discharge concentration reported in the permit application or Discharge Monitoring Reports, or by inputting an Average Monthly Effluent Concentration (AMEC) calculated using DEP's TOXCONC.xls spreadsheet for datasets of 10 or more effluent samples. Pollutants with no entered discharge concentrations and pollutants with no numeric water quality criteria in 25 Pa. Code Chapter 93 are excluded from the modeling.

The TMS evaluates each pollutant by computing a Wasteload Allocation for each applicable criterion, determining the most stringent governing WQBEL, and comparing that governing WQBEL to the input discharge concentration to determine whether permit requirements apply in accordance with the following RP thresholds:

- Establish limits in the permit where the maximum reported effluent concentration or calculated AMEC equals or exceeds 50% of the WQBEL. Use the average monthly, maximum daily, and instantaneous maximum (IMAX) limits for the permit as recommended by the TMS (or, if appropriate, use a multiplier of 2 times the average monthly limit for the maximum daily limit and 2.5 times the average monthly limit for IMAX).

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

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

In most cases, pollutants with effluent concentrations less than DEP's Target Quantitation Limits are eliminated as candidates for WQBELs and water quality-based monitoring.

Reasonable Potential Analysis and WQBEL Development for Outfall 001

Table 4. TMS Inputs

Parameter	Value
River Mile Index	1.13
Discharge Flow (MGD)	0.4002
Discharge Hardness (mg/L)	44.5
Discharge pH (s.u.)	7.2
Basin/Stream Characteristics	
Parameter	**Value**
Area in Square Miles	36.2
Q_{7-10} (cfs)	0.851
Low-flow yield (cfs/mi^2)	0.0235
Elevation (ft)	910.35
Slope	0.01

Discharges from Outfall 001 are evaluated based on the maximum concentrations reported in the permit application, including updated Pollutant Group 2 (metals) results that achieve DEP's target quantitation limits. The reported concentrations are based on discharges from NFCMA's existing Wheeler Bottom Plant. The TMS model is run for Outfall 001 with the modeled discharge and receiving stream characteristics shown in Table 4. Pollutants for which specific water quality criteria have not been promulgated (e.g., TSS, oil and grease, etc.) are excluded from the modeling.

The Q_{7-10} flow of Dunbar Creek is estimated using USGS's StreamStats web application. StreamStats estimates flow statistics for ungaged sites using streamflow data from gaged sites and regression equations that account for the characteristics of the delineated drainage basin at the ungaged site.

Output from the TMS model run is included in **Attachment C**. As explained previously, the TMS compares the input discharge concentrations to the calculated WQBELs using DEP's Reasonable Potential thresholds to evaluate the need to impose WQBELs or monitoring requirements in the permit. Based on the results of the TMS modeling, the WQBELs in Table 5 apply to Outfall 001.

Table 5. WQBELs and Water Quality-based Reporting Requirements for Outfall 001

Parameter	Concentration Limit (µg/L)			Discharge Conc. (µg/L)	Target QL (µg/L)
	Avg Mo.	Max Daily	IMAX		
Aluminum, Total	1000	1560	2499	4000†	10
Copper, Total	16.6	25.9	41.4	<10	4.0
Iron, Total	3561	5556	8903	2000†	20
Manganese, Total	Report	Report	—	1000†	2.0
Silver, Total	3.64	5.68	9.11	21.2	0.4
Thallium, Total	0.57	0.89	1.42	2.13	2.0
Zinc, Total	Report	Report	—	11	5.0

† Concentration is based on the average monthly technology-based limit.

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 those average monthly TRC limitations is imposed in the permit.

The results of the modeling, included in **Attachment D**, indicate that the following WQBELs are required for TRC at Outfall 001. The TRC WQBELs are more stringent than the non-degrading limits calculated for the Youghiogheny River.

Table 6. WQBELs for Total Residual Chlorine at Outfall 001

Parameter	Average Monthly (mg/L)	Instantaneous Maximum (mg/L)
Total Residual Chlorine	0.293	0.686

Effluent Limitations and Monitoring Requirements for Outfall 001

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61, effluent limits for Outfall 001's discharges are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements. Applicable effluent limits and monitoring requirements are summarized in the table below.

Table 7. Effluent Limits and Monitoring Requirements for Outfall 001

Parameter	Mass (pounds)		Concentration			Basis
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instant. Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(d)(1)
Total Suspended Solids (mg/L)	—	—	30.0	60.0	75.0	25 Pa. Code § 92a.48 & BPJ TBELs
Aluminum, Total (mg/L)	—	—	1.0	1.5	2.5	WQBELs; 25 Pa. Code §§ 92a.12(a)(1) & 96.4(b)
Copper, Total (µg/L)	—	—	16.6	25.9	41.4	WQBELs; 25 Pa. Code §§ 92a.12(a)(1) & 96.4(b)
Iron, Total (mg/L)	—	—	2.0	4.0	5.0	25 Pa. Code § 92a.48(a)(3) & BPJ
Manganese, Total (mg/L)	—	—	1.0	2.0	2.5	25 Pa. Code § 92a.48(a)(3) & BPJ
Silver, Total (µg/L)	—	—	3.64	5.68	9.11	WQBELs; 25 Pa. Code §§ 92a.12(a)(1) & 96.4(b)
Thallium, Total (µg/L)	—	—	0.57	0.89	1.42	WQBELs; 25 Pa. Code §§ 92a.12(a)(1) & 96.4(b)
Zinc, Total (µg/L)	—	—	Report	Report	—	25 Pa. Code § 92a.61(b)
Total Residual Chlorine (mg/L)	—	—	0.293	—	0.686	WQBELs; 25 Pa. Code §§ 92a.12(a)(1) & 96.4(b)
pH (s.u.)	within the range of 6.0 to 9.0					25 Pa. Code § 95.2(1)

Minimum measurement frequencies and sample types are based on Table 6-4 – Self-Monitoring Requirements for Industrial Dischargers in DEP's "Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits". Flow must be sampled weekly using a flow meter. TSS, TRC, and metals must be sampled 2/month using 24-hour composite sampling. TRC must be sampled 2/month using grab sampling and pH must be sampled 1/week using grab sampling.

The sampling frequencies identified for process wastewaters in Table 6-4 of DEP's guidance are relaxed from daily/weekly to weekly/monthly because filter backwash discharges from water treatment plants exhibit less variability than other types of industrial wastes.

IMAX limits will appear in the permit, but NFCMA is not required to report results for compliance with IMAX limits unless grab samples are taken. The IMAX limits for TRC and pH are an exception; IMAX results for TRC and pH must be reported because grab sampling is specified for those parameters. IMAX limits for pollutants other than TRC and pH will only be used by DEP personnel.

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, 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

Water Quality Network Station 709 and Dunbar Creek Stream Data

Water Quality Network Station 709 – Youghiogheny River at Confluence

WQN	Parameter	Unit	Start Date	End Date	Period of Record (Years)	n	Coverage	Lower 95%	Median	Upper 95%	DL Qualifier
WQN0709	Alkalinity (Lab)	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555	15.2	16.6	18.6	
WQN0709	Aluminum Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		62.5	84.1	
WQN0709	Ammonia as N Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		0.04	0.04	
WQN0709	Barium Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		36	38	
WQN0709	Boron Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		200	200	<
WQN0709	Bromide Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		25	25	<
WQN0709	Calcium Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		8.648	8.93	
WQN0709	Chloride Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		8.79	9.75	
WQN0709	Copper Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		4	4	<
WQN0709	Dissolved Oxygen % (Field)	%	2017-01-26	2021-10-18	4.726027397	53	0.901629	85.3	89.2		
WQN0709	Dissolved Oxygen (Field)	mg/L	2016-10-27	2021-10-18	4.975342466	56	0.918573	8.87	9.905		
WQN0709	Dissolved Solids Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		66	68	
WQN0709	Hardness Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		28.5	30	
WQN0709	Iron Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		205	245	
WQN0709	Lead Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		1	1	<
WQN0709	Lithium Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		25	25	<
WQN0709	Magnesium Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		1.697	1.78	
WQN0709	Manganese Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		80	115.5	
WQN0709	Nickel Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		50	50	<
WQN0709	Nitrate as N Total	mg/L	2016-10-27	2021-10-18	4.975342466	58	0.913051		0.645	0.68	
WQN0709	Nitrite as N Total	mg/L	2016-10-27	2021-10-18	4.975342466	58	0.913051		0.04	0.04	<
WQN0709	Nitrogen Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		0.79	0.86	
WQN0709	Orthophosphate Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		0.01	0.01	<
WQN0709	Osmotic Pressure	mosm/kg	2016-10-27	2021-10-18	4.975342466	35	0.910469		1	1	<
WQN0709	pH	pH units	2016-10-27	2021-10-18	4.975342466	59	0.963657	7.035	7.175	7.285	
WQN0709	Phosphorus Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		0.012	0.013	
WQN0709	Potassium Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		1.201	1.318	
WQN0709	Selenium Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		7	7	<
WQN0709	Sodium Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		5.701	5.876	
WQN0709	Specific Conductance	umhos/cm	2016-10-27	2021-10-18	4.975342466	59	0.932555		95.35	99.5	
WQN0709	Strontium Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		30	31	
WQN0709	Sulfate Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		10.01	10.3	
WQN0709	Suspended Solids Total	mg/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		5	5	<
WQN0709	Temperature Water (Field)	C	2016-10-27	2021-10-18	4.975342466	58	0.913051		10.1	12	
WQN0709	Zinc Total	ug/L	2016-10-27	2021-10-18	4.975342466	59	0.932555		30	30	<

Dunbar Creek Sampling Data (May 2019 – November 2021)

Date Collected	Aluminum Total	Ammonia-Nitrogen	Barium, Total	Boron, Total	Bromide, Total	Copper, Total	Iron, Total	Lead, Total	Manganese, Total	Nickel, Total	Selenium, Total	Strontium, Total	Zinc, Total	Phosphorus, Total (mg/L)	Nitrogen, Total (mg/L)	TDS (mg/L)
5/22/2019 9:30	95.9	0.02	39	<200	<25	<4	128	<1	30	<50	<7	42	<30	<0.01	0.48	108
6/3/2019 12:15	177	0.02	35	<200	<25	<4	228	<1	57	<50	<7	53	<30	0.03	0.54	80
1/21/2021 13:54	359	0.06	41	<200	<25	<4	181	<1	138	<50	<7	78	<30	0.018	0.73	122
2/17/2021 11:09	219	0.02	37	<200	<25	<4	151	<1	66	<50	<7	55	<30	0.012	0.61	108
3/11/2021 11:04	264	0.5	37	<200	<25	<4	171	<1	83	<50	<7	63	<30	0.058	1.08	104
3/30/2021 11:06	171	0.22	30	<200	<25	<4	<100	<1	45	<50	<7	42	<30	0.026	0.64	68
4/27/2021 10:35	186	0.02	31	<200	<25	<4	<100	<1	51	<50	<7	57	<30	0.016	0.3	98
5/25/2021 8:06	145	0.04	40	<200	<25	<4	<100	<1	45	<50	<7	77	<30	0.033	0.49	142
7/1/2021 11:14		0.19	164	<200	<25	<40		26.2		57	<4	104	208	0.495	2.84	130
7/20/2021 13:20	147	0.02	35	<200	<25	<4	<100	<1	17	<50	<4	70	<30	0.016	0.29	106
8/17/2021 13:00	163	0.03	43	<200	<25	<4	167	<1	58	<50	<4	70	<30	<0.01	0.45	136
8/30/2021 12:18	105	0.52	59	<200	<25	<4	135	<1	29	<50	<4	126	<30	0.102	1.52	188
9/13/2021 12:30	183	0.02	47	<200	<25	<4	118	<1	75	<50	<4	91	<30	<0.01	0.42	132
9/27/2021 12:23	66	0.02	52	<200	<25	<4	<100	<1	15	<50	<4	124	<30	0.079	0.54	178
10/12/2021 13:00	93.8	0.02	54	<200	<25	<4	143	<1	16	<50	<4	114	<30	<0.01	<0.25	172
10/25/2021 13:06	119	0.07	37	<200	<25	<4	<100	<1	20	<50	<4	73	<30	0.073	0.42	120
11/8/2021 11:39	85.2	0.02	30	<200	<25	<4	<100	<1	36	<50	<4	61	<30	0.016	0.37	96
LOGNORMAL																
Log MEAN	4.9896573		3.7632250						3.6977174			4.2815295				4.7764114
Log VAR.	0.1967634		0.1577343						0.4181910			0.1168468				0.0737618
(LTA) [E(x)]	162.0717236		46.6229137						49.7401728			76.7039232				123.1363530
Variance [V(x)]	5711.967307		371.3870656						1284.571523			729.2425573				1160.699792
CV (raw)	0.4663217		0.4133462						0.7205628			0.3520614				0.2766774
CV (n)	0.2331608		0.2066731						0.3602814			0.1760307				0.1383387
Mo. Avg. (99%, n-day)	269.5464717		73.4703948						105.4641925			113.4114502				168.0171353
DELTA-LOGNORMAL																
Delta-Log MEAN		-2.2924511					5.0439571							-3.2616994	-0.5228199	
Delta-Log VAR.		1.4510840					0.0406840							1.0879560	0.3573308	
(LTA) [E(x)]		0.1198943					132.776582							0.0528427	0.6818300	
Variance [V(x)]		0.0842128					1420.63638							0.0071259	0.2147568	
CV (raw)		2.4204183					0.2838704							1.5974827	0.6796688	
Delta-Log VAR. (n)		0.8676222					0.0180005							0.4914921	0.1092868	
A, Table E-2, TSD		1.4888668					0.0213051							0.6387285	0.1154884	
B, Table E-2, TSD		-0.0013192					-0.0211720							-0.0001096	-0.0000016	
C, Table E-2, TSD		0.0164966					0.0567509							0.0011608	0.0000088	
Delta-Log MEAN (n)		-2.5128854					4.8890116							-3.1836927	-0.4376107	
phi (Φ)		0.9811111					0.9822222							0.9869231	0.9893750	
Z*		2.0700000					2.1000000							2.2200000	2.3000000	
Mo. Avg. (99%, n-day)		0.5572405					176.048664							0.1964537	1.3809009	

The highlighted values are Dunbar Creek's long-term average background concentrations. Those LTAs are used in the non-degrading limit calculations (Point 2 Analysis). Parameters without lognormal or delta-lognormal statistics have datasets that are not adequately described by one of those distributions. The long-term average background concentrations for pollutants without calculated statistics are assumed to be zero.

ATTACHMENT B

Spreadsheet to Evaluate Non-Degradation of Water Quality

Spreadsheet to Evaluate Non-Degradation of Water Quality

Parameter	Discharge Flow (cfs)	WQ Objective	Stream Flow (cfs)	Median Concentration	Combined Flow (cfs)	Long-Term Avg. Concentration	AML Multiplier	Non-Degrading AML	MDL Multiplier	Non-Degrading MDL	Concentration Units
	Q discharge	C total	Q upstream	C upstream	Q total	C LTA		C AML		C MDL	
Aluminum, Total	20.7146	84.1	1366.4045	62.5	1387.1191	1508.91	1.72	2595.32	2.68	4043.87	µg/L
Ammonia, Total as N	20.7146	0.04	1366.4045	0.04	1387.1191	0.04	1.72	0.07	2.68	0.11	mg/L
Barium, Total	20.7146	38	1366.4045	36	1387.1191	169.93	1.72	292.27	2.68	455.40	µg/L
Boron, Total	20.7146	200	1366.4045	200	1387.1191	200.00	1.72	344.00	2.68	536.00	µg/L
Bromide	20.7146	25	1366.4045	25	1387.1191	25.00	1.72	43.00	2.68	67.00	mg/L
Calcium, Total	20.7146	8.93	1366.4045	8.648	1387.1191	27.53	1.72	47.35	2.68	73.78	mg/L
Chloride	20.7146	9.75	1366.4045	8.79	1387.1191	73.07	1.72	125.69	2.68	195.84	mg/L
Copper, Total	20.7146	4	1366.4045	4	1387.1191	4.00	1.72	6.88	2.68	10.72	µg/L
Hardness, Total	20.7146	30	1366.4045	28.5	1387.1191	128.94	1.72	221.79	2.68	345.57	mg/L
Iron, Total	20.7146	245	1366.4045	205	1387.1191	2883.53	1.72	4959.67	2.68	7727.86	µg/L
Lead, Total	20.7146	1	1366.4045	1	1387.1191	1.00	1.72	1.72	2.68	2.68	µg/L
Lithium, Total	20.7146	25	1366.4045	25	1387.1191	25.00	1.72	43.00	2.68	67.00	µg/L
Magnesium, Dissolved	20.7146	25	1366.4045	25	1387.1191	25.00	1.72	43.00	2.68	67.00	mg/L
Magnesium, Total	20.7146	1.78	1366.4045	1.697	1387.1191	7.25	1.72	12.48	2.68	19.44	mg/L
Manganese, Total	20.7146	115.5	1366.4045	80	1387.1191	2457.19	1.72	4226.37	2.68	6585.28	µg/L
Nickel, Total	20.7146	50	1366.4045	50	1387.1191	50.00	1.72	86.00	2.68	134.00	µg/L
Nitrate-Nitrogen, Total	20.7146	0.68	1366.4045	0.645	1387.1191	2.99	1.72	5.14	2.68	8.01	mg/L
Nitrite-Nitrogen, Total	20.7146	0.04	1366.4045	0.04	1387.1191	0.04	1.72	0.07	2.68	0.11	mg/L
Nitrogen, Total as N	20.7146	0.84	1366.4045	0.78	1387.1191	4.80	1.72	8.25	2.68	12.86	mg/L
pH (Field)	20.7146	7.285	1366.4045	7.175	1387.1191		1.72		2.68		s.u.
Phosphorus, Total as P	20.7146	0.013	1366.4045	0.012	1387.1191	0.08	1.72	0.14	2.68	0.21	mg/L
Selenium, Total	20.7146	7	1366.4045	7	1387.1191	7.00	1.72	12.04	2.68	18.76	µg/L
Silver, Total	20.7146		1366.4045		1387.1191	0.00	1.72	0.00	2.68	0.00	µg/L
Sodium, Total	20.7146	5.876	1366.4045	5.701	1387.1191	17.42	1.72	29.96	2.68	46.68	mg/L
Strontium, Total	20.7146	31	1366.4045	30	1387.1191	96.96	1.72	166.78	2.68	259.86	µg/L
Sulfate	20.7146	10.3	1366.4045	10.01	1387.1191	29.43	1.72	50.62	2.68	78.87	mg/L
TDS @105 C	20.7146	68	1366.4045	66	1387.1191	199.93	1.72	343.87	2.68	535.80	mg/L
Thallium, Total	20.7146		1366.4045		1387.1191	0.00	1.72	0.00	2.68	0.00	µg/L
Total Suspended Solids	20.7146	5	1366.4045	5	1387.1191	5.00	1.72	8.60	2.68	13.40	mg/L
Zinc, Total	20.7146	30	1366.4045	30	1387.1191	30.00	1.72	51.60	2.68	80.40	µg/L
Total Residual Chlorine	20.7146	0.02	1366.4045	0.02	1387.1191	0.02	1.72	0.03	2.68	0.05	mg/L

Q Discharge	13.3902	MGD	=	20.71464	cfs
Q Upstream Q_{7-10}	390	cfs	=	1366.404	Q_{HM} cfs

Source of information:
WQ Objective and Upstream Concentrations: WQN0709
Multiplier from LTA to AML @ CV of 0.5 - Table on Page 64

$Q_{HM} = 7.43 \times (Q_{7-10})^{.874}$

C total	Values are from WQN Station (Upper 95% confidence limit)
C upstream	Values are from WQN Station Median Concentration

Discharge Flow from NFCMA Porter Hill		Dunbar Creek $Q_{harmonic}$		Flow at Dunbar Mouth (Discharge + Dunbar Creek $Q_{harmonic}$)	
0.4002	MGD	12.99	MGD	13.3902	MGD
0.62	CFS	20.09	CFS	20.71	CFS

Parameter	Allowable Conc. at Dunbar Mouth ("C LTA" from Non-Deg Analysis Worksheet)	Dunbar Creek Background Conc.	Non-Degrading Effluent Limits for Dunbar Creek Discharge to protect the Youghiogheny		WQBELs for Dunbar Creek Discharge from Toxics Management Spreadsheet		TBELs from Water Treatment Plant Guidance		Most Stringent Effluent Limits (Non-Deg., WQBELs, or TBELs)		Units
			Avg. Mo.	Max. Daily	Avg. Mo.	Max. Daily	Avg. Mo.	Max. Daily	Avg. Mo.	Max. Daily	
Aluminum, Total	1508.91	162.0717236	77787.83	121204.29	1000	1560	4000	8000	**1000.00**	**1560.00**	µg/L
Ammonia, Total as Nitrogen	0.04		2.30	3.59					2.30	3.59	mg/L
Barium, Total	169.93	46.6229137	7176.20	11181.52					7176.20	11181.52	µg/L
Boron, Total	200.00		11509.82	17933.90					11509.82	17933.90	µg/L
Bromide	25.00		1438.73	2241.74					1438.73	2241.74	mg/L
Calcium, Total	27.53		1584.42	2468.75					1584.42	2468.75	mg/L
Chloride	73.07		4205.38	6552.57					4205.38	6552.57	mg/L
Copper, Total	4.00		230.20	358.68	16.6	25.9			**16.60**	**25.90**	µg/L
Hardness, Total	128.94		7420.66	11562.42					7420.66	11562.42	mg/L
Iron, Total	2883.53	132.7765826	158531.67	247014.46	3561	5556	2000	4000	**2000.00**	**4000.00**	µg/L
Lead, Total	1.00		57.55	89.67					57.55	89.67	µg/L
Lithium, Total	25.00		1438.73	2241.74					1438.73	2241.74	µg/L
Magnesium, Dissolved	25.00		1438.73	2241.74					1438.73	2241.74	mg/L
Magnesium, Total	7.25		417.52	650.55					417.52	650.55	mg/L
Manganese, Total	2457.19	49.7401728	138632.35	216008.55	Report	Report	1000	2000	**1000.00**	**2000.00**	µg/L
Nickel, Total	50.00		2877.45	4483.48					2877.45	4483.48	µg/L
Nitrate-Nitrogen, Total	2.99		172.00	268.00					172.00	268.00	mg/L
Nitrite-Nitrogen, Total	0.04		2.30	3.59					2.30	3.59	mg/L
Nitrogen, Total as N	4.80	0.68183	238.04	370.90					238.04	370.90	mg/L
Osmotic Pressure	1.00		57.55	89.67					57.55	89.67	mOs/kg
pH (Field)											
Phosphorus, Total as P	0.08	0.0528427	1.59	2.48					1.59	2.48	mg/L
Selenium, Total	7.00		402.84	627.69					402.84	627.69	µg/L
Silver, Total					3.64	5.68			**3.64**	**5.68**	µg/L
Sodium, Total	17.42		1002.48	1562.00					1002.48	1562.00	mg/L
Specific Conductance - Field	373.25		21480.05	33468.91					21480.05	33468.91	µmhos/cm
Strontium, Total	96.96	76.7039232	1297.84	2022.21					1297.84	2022.21	µg/L
Sulfate	29.43		984.67	2638.91					984.67	2638.91	mg/L
TDS @105 C	199.93	123.136353	2692.44	7215.74					2692.44	7215.74	mg/L
Thallium, Total					0.57	0.89			**0.57**	**0.89**	µg/L
Total Suspended Solids	5.00		287.75	448.35			30.0	60.0	**30.00**	**60.00**	mg/L
Zinc, Total	30.00		1726.47	2690.09	Report	Report			1726.47	2690.09	µg/L
Total Residual Chlorine	0.02		1.15	1.79	0.293	0.686	0.5	1	**0.293**	**0.686**	mg/L

Highlighted limits are imposed at Outfall 001. Effluent limits for other parameters are calculated, but not imposed because reasonable potential is not demonstrated.

ATTACHMENT C

Toxics Management Spreadsheet Analyses for Outfalls 001

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: NFCMA Porter Hill Plant NPDES Permit No.: PA0255602 Outfall No.: 001

Evaluation Type: Major Sewage / Industrial Waste Wastewater Description: 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
0.4002	44.5	7.2						

					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		120									
	Chloride (PWS)	mg/L		16									
	Bromide	mg/L	<	0.1		0.025							
	Sulfate (PWS)	mg/L		44									
	Fluoride (PWS)	mg/L		0.31									
Group 2	Total Aluminum	µg/L		4000		160.69							
	Total Antimony	µg/L		0.1									
	Total Arsenic	µg/L		0.4									
	Total Barium	µg/L		34		48.677							
	Total Beryllium	µg/L	<	0.05									
	Total Boron	µg/L	<	100									
	Total Cadmium	µg/L	<	0.08									
	Total Chromium (III)	µg/L		0.5									
	Hexavalent Chromium	µg/L		0.33									
	Total Cobalt	µg/L		0.2									
	Total Copper	µg/L	<	10									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L		10									
	Dissolved Iron	µg/L	<	20									
	Total Iron	µg/L		2000									
	Total Lead	µg/L		0.07									
	Total Manganese	µg/L		1000		45.58							
	Total Mercury	µg/L	<	0.09									
	Total Nickel	µg/L		1									
	Total Phenols (Phenolics) (PWS)	µg/L	<	10									
	Total Selenium	µg/L	<	5									
	Total Silver	µg/L		21.2									
	Total Thallium	µg/L		2.13									
	Total Zinc	µg/L		40									
	Total Molybdenum	µg/L		0.2									
	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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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Stream / Surface Water Information

NFCMA Porter Hill Plant, NPDES Permit No. PA0255602, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Dunbar Creek**

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	038164	1.13	910.35	36.2	0.01		Yes
End of Reach 1	036164	0.5	896.65	36.8	0.01		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	1.13	0.0235										100	7.83		
End of Reach 1	0.5	0.0235													

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	1.13														
End of Reach 1	0.5														

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Toxics Management Spreadsheet
Version 1.3, March 2021

Model Results

NFCMA Porter Hill Plant, NPDES Permit No. PA0255602, Outfall 001

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

☑ ***Hydrodynamics***

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

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
1.13	0.85		0.85	0.619	0.01	0.579	20.247	34.963	0.125	0.307	4.271
0.5	0.86		0.865								

Q_h

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
1.13	6.45		6.45	0.619	0.01	1.156	20.247	17.517	0.302	0.127	3.764
0.5	6.544		6.54								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 4.271 PMF: 1 Analysis Hardness (mg/l): 76.622 Analysis pH: 7.45

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	160.68763	0		0	750	750	1,560	
Total Antimony	0	0		0	1,100	1,100	2,611	
Total Arsenic	0	0		0	340	340	807	Chem Translator of 1 applied
Total Barium	48.676673	0		0	21,000	21,000	49,789	
Total Boron	0	0		0	8,100	8,100	19,230	
Total Cadmium	0	0		0	1.554	1.63	3.86	Chem Translator of 0.955 applied
Total Chromium (III)	0	0		0	458.123	1,450	3,442	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	38.7	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	226	
Total Copper	0	0		0	10.457	10.9	25.9	Chem Translator of 0.96 applied

Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	48.271	58.2	138	Chem Translator of 0.83 applied
Total Manganese	45.579959	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	3.91	Chem Translator of 0.85 applied
Total Nickel	0	0		0	373.792	375	889	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	2.035	2.39	5.68	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	154	
Total Zinc	0	0		0	93.513	95.6	227	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 4.271 PMF: 1 Analysis Hardness (mg/l): 76.622 Analysis pH: 7.45

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	160.68763	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	522	
Total Arsenic	0	0		0	150	150	356	Chem Translator of 1 applied
Total Barium	48.676673	0		0	4,100	4,100	9,667	
Total Boron	0	0		0	1,600	1,600	3,799	
Total Cadmium	0	0		0	0.204	0.22	0.53	Chem Translator of 0.92 applied
Total Chromium (III)	0	0		0	59.592	69.3	165	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	24.7	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	45.1	
Total Copper	0	0		0	7.133	7.43	17.6	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	3,561	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	1.881	2.27	5.38	Chem Translator of 0.83 applied
Total Manganese	45.579959	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	2.15	Chem Translator of 0.85 applied
Total Nickel	0	0		0	41.517	41.6	98.9	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	11.8	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	30.9	
Total Zinc	0	0		0	94.277	95.6	227	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 4.271 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	160.68763	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	13.3	
Total Arsenic	0	0		0	10	10.0	23.7	
Total Barium	48.676673	0		0	2,400	2,400	5,631	
Total Boron	0	0		0	3,100	3,100	7,360	
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	712	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	45.579959	0		0	1,000	1,000	2,311	
Total Mercury	0	0		0	0.050	0.05	0.12	
Total Nickel	0	0		0	610	610	1,448	
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	0.57	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 3.764 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	160.68763	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	48.676673	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	45.579959	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

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

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Aluminum	3.34	5.21	1,000	1,560	2,499	µg/L	1,000	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Copper	0.055	0.086	16.6	25.9	41.4	µg/L	16.6	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Iron	11.9	18.5	3,561	5,556	8,903	µg/L	3,561	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Manganese	Report	Report	Report	Report	Report	µg/L	2,311	THH	Discharge Conc > 10% WQBEL (no RP)
Total Silver	0.012	0.019	3.64	5.68	9.11	µg/L	3.64	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Thallium	0.002	0.003	0.57	0.89	1.42	µg/L	0.57	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	145	AFC	Discharge Conc > 10% WQBEL (no RP)

☑ ***Other Pollutants without Limits or Monitoring***

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

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	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 Antimony	13.3	µg/L	Discharge Conc ≤ 10% WQBEL
Total Arsenic	23.7	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	5,631	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	3,799	µg/L	Discharge Conc < TQL
Total Cadmium	0.53	µg/L	Discharge Conc < TQL
Total Chromium (III)	165	µg/L	Discharge Conc ≤ 10% WQBEL
Hexavalent Chromium	24.7	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	45.1	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	712	µg/L	Discharge Conc < TQL
Total Lead	5.38	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	0.12	µg/L	Discharge Conc < TQL
Total Nickel	98.9	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	PWS Not Applicable
Total Selenium	11.8	µg/L	Discharge Conc < TQL
Total Molybdenum	N/A	N/A	No WQS

ATTACHMENT D

TRC Modeling Results

TRC EVALUATION – Outfall 001

0.851	= Q stream (cfs)	0.5	= CV Daily
0.4002	= Q discharge (MGD)	0.5	= CV Hourly
4	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	**1.3.2.iii**	WLA afc = 0.457	**1.3.2.iii**	WLA cfc = 0.438
PENTOXSD TRG	**5.1a**	LTAMULT afc = 0.373	**5.1c**	LTAMULT cfc = 0.581
PENTOXSD TRG	**5.1b**	LTA_afc= 0.170	**5.1d**	LTA_cfc = 0.255

Source	Reference	Effluent Limit Calculations	
PENTOXSD TRG	**5.1f**	AML MULT = 1.720	
PENTOXSD TRG	**5.1g**	AVG MON LIMIT (mg/l) = 0.293	AFC
		INST MAX LIMIT (mg/l) = 0.686	

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)**