National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for **Clean Energy Future - Trumbull, LLC Trumbull Energy Center**

Public Notice No.: 216336
Public Notice Date: November 25, 2025
Comment Period Ends: December 25, 2025

Ohio EPA Permit No.: **3IN00398*BD**
Application No.: **OH0148474**

Name and Address of Applicant:

Clean Energy Future - Trumbull, LLC
910 Sheraton Drive, Suite 3F
Mars, Pennsylvania 16046

Name and Address of Facility Where Discharge Occurs:

Trumbull Energy Center
7733 Tod Avenue SW
Lordstown, Ohio 44481
Trumbull County

Receiving Water: **Mud Creek**

Subsequent Stream Network: **Mahoning River to Beaver River to Ohio River**

INTRODUCTION

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations (40CFR), Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency (Ohio EPA), as well as the methods by which the public can participate in the process of finalizing those actions.

This Fact Sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES Permit effluent limitations. The technical basis for the Fact Sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This Fact Sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act (CWA) and Ohio Water Pollution Control Law (Ohio Revised Code [ORC] 6111). Decisions to award variances to Water Quality Standards (WQS) or promulgated effluent guidelines for economic or technological reasons will also be justified in the Fact Sheet where necessary.

Antidegradation provisions in Ohio Administrative Code (OAC) Chapter 3745-1 describe the conditions under which water quality may be lowered in surface waters. No anti-degradation review was applied to this renewal permit.

Effluent limits based on available treatment technologies are required by Section 301(b) of the CWA. Many of these have already been established by the United States Environmental Protection Agency (U.S. EPA) in the effluent guideline regulations (a.k.a. categorical regulations) for industry categories in 40 CFR Parts 405-499. Technology-based regulations for publicly-owned treatment works are listed in the Secondary Treatment Regulations (40 CFR Part 133). If regulations have not been established for a category of dischargers, the director may establish technology-based limits based on best professional judgment (BPJ).

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations (WLAs) are used to develop these limits based on the pollutants that have been detected in the

discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

The need for water-quality-based limits is determined by comparing the WLA for a pollutant to a measure of the effluent quality. The measure of effluent quality is called Projected Effluent Quality (PEQ). This is a statistical measure of the average and maximum effluent values for a pollutant. As with any statistical method, the more data that exists for a given pollutant, the more likely that PEQ will match the actual observed data. If there is a small data set for a given pollutant, the highest measured value is multiplied by a statistical factor to obtain a PEQ; for example if only one sample exists, the factor is 6.2, for two samples - 3.8, for three samples - 3.0. The factors continue to decline as samples sizes increase. These factors are intended to account for effluent variability, but if the pollutant concentrations are fairly constant, these factors may make PEQ appear larger than it would be shown to be if more sample results existed.

SUMMARY OF PERMIT CONDITIONS

This permit contains the following outfalls and/or monitoring stations: 3IN00398001 and 3IN00398601.

Final effluent limitations are recommended for ammonia, temperature, total residual chlorine, total filterable residue, oil & grease, pH, and acute toxicity.

Based on the WLA, the daily maximum ammonia limits have been reduced.

A compliance schedule is included for the facility to submit quantitative effluent discharge data for all parameters required by NPDES Application Form 2C.

Several conditions have been included in Part II of the permit that address the following requirements: whole effluent toxicity (WET) testing, discharge prohibitions required by federal treatment standards, and outfall signage.

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PROCEDURES FOR PARTICIPATION IN THE FORMULATION OF FINAL DETERMINATIONS

The draft action shall be issued as a final action unless the Director revises the draft after consideration of the record of a public meeting or written comments, or upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty (30) days of the date of the Public Notice, any person may request or petition for a public meeting for presentation of evidence, statements or opinions. The purpose of the public meeting is to obtain additional evidence. Statements concerning the issues raised by the party requesting the meeting are invited. Evidence may be presented by the applicant, the state, and other parties, and following presentation of such evidence other interested persons may present testimony of facts or statements of opinion.

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be emailed to epa.hclerk@epa.ohio.gov or mailed to:

Legal Records Section
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43216-1049

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted by email to epa.dswcomments@epa.ohio.gov (preferred method) or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

Ohio Environmental Protection Agency
Attention: Division of Surface Water
Permits Processing Unit
P.O. Box 1049
Columbus, Ohio 43216-1049

The Ohio EPA permit number and Public Notice numbers should appear on each page of any submitted comments. All comments received no later than 30 days after the date of the Public Notice will be considered.

Citizens may conduct file reviews regarding specific companies or sites. Appointments are necessary to conduct file reviews, because requests to review files have increased dramatically in recent years. The first 250 pages copied are free. For requests to copy more than 250 pages, there is a five-cent charge for each page copied. Payment is required by check or money order, made payable to Treasurer State of Ohio.

For additional information about this fact sheet or the draft permit, contact John Schmidt, (330) 963-1175, john.schmidt@epa.ohio.gov, or Erm Gomes, (330) 963-1196, erm.gomes@epa.ohio.gov.

INFORMATION REGARDING CERTAIN WATER QUALITY BASED EFFLUENT LIMITS

This draft permit may contain proposed water-quality-based effluent limits (WQBELs) for parameters that are not priority pollutants. (See the following link for a list of the priority pollutants: https://epa.ohio.gov/static/Portals/35/pretreatment/Pretreatment_Program_Priority_Pollutant_Detection_Limits.pdf. In accordance with ORC 6111.03(J)(3), the Director established these WQBELs after considering, to the extent consistent with the Federal Water Pollution Control Act, evidence relating to the technical feasibility and economic reasonableness of removing the polluting properties from those wastes and to evidence relating to

conditions calculated to result from that action and their relation to benefits to the people of the state and to accomplishment of the purposes of this chapter. This determination was made based on data and information

available at the time the permit was drafted, which included the contents of the timely submitted NPDES permit renewal application, along with any and all pertinent information available to the Director.

This public notice allows the permittee to provide to the Director for consideration during this public comment period additional site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness for achieving compliance with the proposed final effluent limitations for these parameters. The permittee shall email to epa.dswcomments@epa.ohio.gov (preferred method) or deliver or mail this information to:

Ohio Environmental Protection Agency
Attention: Division of Surface Water
Permits Processing Unit
P.O. Box 1049
Columbus, Ohio 43216-1049

Should the applicant need additional time to review, obtain or develop site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness of achieving compliance with these limitations, a written request for any additional time shall be sent to the above address no later than 30 days after the Public Notice Date on Page 1.

Should the applicant determine that compliance with the proposed WQBELs for parameters other than the priority pollutants is technically and/or economically unattainable, the permittee may submit an application for a variance to the applicable WQS used to develop the proposed effluent limitation in accordance with the terms and conditions set forth in OAC 3745-33-07(D). The permittee shall submit this application to the above address no later than 30 days after the Public Notice Date.

Alternately, the applicant may propose the development of site-specific WQS pursuant to OAC 3745-1-39. The permittee shall submit written notification regarding their intent to develop site specific WQS for parameters that are not priority pollutants to the above address no later than 30 days after the Public Notice Date.

LOCATION OF DISCHARGE/RECEIVING WATER USE CLASSIFICATION

Trumbull Energy Center is proposing to discharge to Mud Creek at River Mile 7.0. Figure 1 shows the approximate location of the facility.

This segment of Mud Creek is described by Ohio EPA River Code: 18-019, 12-digit Watershed Assessment Unit (WAU) Code: 050301030602, County: Trumbull, Ecoregion: Erie Drift Plain. Mud Creek is designated for the following uses under Ohio's Water Quality Standards (OAC 3745-1-25): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Primary Contact Recreation (PCR).

Use designations define the goals and expectations of a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio WQS (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the Ohio WQS. Once the goals are set, numeric WQS are developed to protect these uses. Different uses have different water quality criteria.

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal CWA. Ohio WQS also include aquatic life use designations for waterbodies which cannot meet the CWA goals because of human-caused conditions that cannot be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact Recreation) and wading only (Secondary Contact which are generally waters too shallow for swimming or canoeing).

Water supply uses are defined by the actual or potential use of the waterbody. Public Water Supply designations apply near existing water intakes so that waters are safe to drink with standard treatment. Most other waters are designated for agricultural water supply and industrial water supply.

FACILITY DESCRIPTION

The proposed Trumbull Energy Center (TEC) will provide 940 MW of electrical capacity to residents of the region. Commercial operation is projected to commence in 2026. The facility will be combined cycle gas turbine plant, utilizing clean-burning natural gas technology and state of the art emissions control technologies. A combined cycle system is a combination of one or more combustion turbine electric generating units operating in conjunction with one or more steam turbine electric generating units.

A schematic of a typical combined cycle process is shown in Figure 2. Compressed air mixes with fuel that is heated to a very high temperature. The hot air-fuel mixture moves through the gas turbine blades, making them spin. The fast-spinning turbine drives a generator that converts a portion of the spinning energy into electricity. The exhaust gases exiting the combustion turbine still contain useful waste heat, so they are directed to heat recovery steam generators (HRSGs) to generate steam to drive an additional turbine. The steam turbine sends its energy to the generator drive shaft, where it is converted into additional electricity. Thus, combined cycle systems use steam turbine technology to increase the efficiency of the combustion turbines.

The process operations at Trumbull Energy Center are classified under Standard Industrial Classification (SIC) category 4911, Electric Services. The process wastewaters generated from these operations are regulated under 40 CFR 423, "Steam Electric Power Generating Point Source Category", Subpart 423.15 "New Source Performance Standards (NSPS)". Effluent limitation guidelines are national regulatory standards for wastewater

discharged to surface waters and municipal sewage treatment plants. ELGs are technology-based regulations based on the performance of demonstrated wastewater control and treatment technologies.

The Steam Electric Power Generating ELGs apply to "…discharges resulting from the operation of a generating unit by an establishment primarily engaged in the generation of electricity for distribution and sale which results primarily from a process utilizing fossil-type fuel (coal, oil, or gas) or nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium." Waste streams generated at combined cycle systems typically consist of the following:

> Condenser Cooling Water: A constant flow of cooling water is required to maintain steam condensation and a low pressure in the condenser. Plants typically use either once-through cooling water systems or recirculating cooling water systems to condense the steam from the process. In once-through cooling water systems, the cooling water is withdrawn from a body of water, flows through the condenser, and is discharged back to the body of water. A recirculating cooling system recirculates the cooling water required to maintain steam condensation and a low pressure in the condenser. Fresh water is periodically added to the cooling water system to make up for evaporative losses. To prevent minerals from building up to unacceptable levels in the recirculating system, a volume of water must be discharged periodically to purge the minerals from the system, which is referred to as "cooling tower blowdown."
>
> Low Volume Wastes: As defined by the effluent guidelines, low volume wastes include a variety of waste streams, such as wastewater associated with wet scrubber air pollution control systems, ion exchange water treatment systems, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes, and recirculating house service water systems.

Information received from Trumbull Energy Center indicates that there will not be any discharges of chemical cleaning wastes. If generated, such wastes will need to hauled offsite for proper disposal.

DESCRIPTION OF PROPOSED DISCHARGE

Figure 3 provides a flow schematic of the wastewater sources and supplies associated with the proposed Trumbull Energy Center. Trumbull Energy Center plans to obtain potable water from the City of Warren to serve its planned production and sanitary facilities. The City presently adds both chlorine and ammonia to the water for purposes of disinfection.

The present design calls for all plant wastewater sources, excluding sanitary flows, to be collected and routed to the plant's recirculating cooling tower. The blowdown discharge from this system will be an average of 0.62 MGD and a maximum of 1.1 MGD. The cooling water blowdown will combine with site storm water in a cooling pond prior to discharge via Outfall 3IN00398001 to Mud Creek.

Internal Station 3IN00398601 represents treated wastewater from boiler blowdown, water treatment processes and other service waters prior to the cooling tower. These wastewaters are considered Low Volume Discharges under the Steam Electric Generating Category treatment standards and will be treated by the following processes:

- Oil/water separation (misc. service waters only)

Sanitary wastes from the facility will be discharged to the Trumbull County sanitary sewer system that is tributary to the City of Warren Water Pollution Control Plant.

Table 2 presents anticipated/estimated chemical concentrations for the waste streams tributary to Outfall 3IN00398001. This information is from the facility's NPDES application.

Table 3 summarizes the calculated average and maximum PEQ values for select parameters at Outfall 3IN00398001.

Attachment 1 lists the applicable ELGs for Trumbull Energy Center. Federal and State laws and regulations require that dischargers meet both the ELGs and any standards needed to comply with state WQS. Permit limits are based on the more stringent of the two.

Trumbull Energy Center obtains all water used for cooling purposes from the City of Warren Water Treatment plant. As such, CWA Section 316(b) cooling water intake regulations do not apply to this facility.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

The attainment status of Mud Creek is reported in the 2024 *Ohio Integrated Water Quality Monitoring and Assessment Report* (Integrated Report). An assessment of the impact of a permitted point source on the immediate receiving waters includes an evaluation of the available chemical/physical, biological, and habitat data which have been collected by Ohio EPA pursuant to the Five-Year Basin Approach for Monitoring and NPDES Reissuance. Other data may be used provided it was collected in accordance with Ohio EPA methods and protocols as specified by the Ohio WQS and Ohio EPA guidance documents. Other information which may be evaluated includes, but is not limited to: NPDES permittee self-monitoring data; effluent and mixing zone bioassays conducted by Ohio EPA, the permittee, or U.S. EPA.

In evaluating this data, Ohio EPA attempts to link environmental stresses and measured pollutant exposure to the health and diversity of biological communities. Stresses can include pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. Indicators of exposure to these stresses include whole effluent toxicity tests, fish tissue chemical data, and fish health biomarkers (for example, fish blood tests).

Use attainment is a term which describes the degree to which environmental indicators are either above or below criteria specified by the Ohio WQS (OAC 3745-1). Assessing use attainment status for aquatic life uses primarily relies on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-1). These criteria apply to rivers and streams outside of mixing zones. Numerical biological criteria are based on measuring several characteristics of the fish and macroinvertebrate communities; these characteristics are combined into multimetric biological indices including the Index of Biotic Integrity and modified Index of Well-Being, which indicate the response of the fish community, and the Invertebrate Community Index, which indicates the response of the macroinvertebrate community. Numerical criteria are broken down by ecoregion, use designation, and stream or river size. Ohio has five ecoregions defined by common topography, land use, potential vegetation and soil type.

Three attainment status results are possible at each sampling location -full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails meet the biocriteria. Nonattainment means that either none of the applicable indices meet the biocriteria or one of the organism groups indicates poor or very poor performance. An aquatic life use attainment table (see Table 4) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (i.e., full, partial, or non), the Qualitative Habitat Evaluation Index, and comments and observations for each sampling location.

The full Integrated Report is available through the Ohio EPA Division of Surface Water website at:

https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/ohio-integrated-water-quality-monitoring-and-assessment-report

The Mud Creek watershed assessment unit, which includes the receiving stream in the vicinity of the proposed Trumbull Energy Center, is listed as impaired for aquatic life and recreation uses pursuant to Section 303(d) of the Clean Water Act. Sources of the impairment are listed as a dam or impoundment in the 2018 *Mahoning River Water Quality Report*. Paramount Lake is formed by a dam at approximately River Mile 0.05 and another impoundment is created by a dam at Westwood Lake Park at approximately River Mile 1.0, effectively blocking upstream fish migration. Macroinvertebrate communities upstream of the dam were in compliance with biological criteria. Thus, the proposed discharge from Trumbull Energy Center will not contribute to the existing causes of impairment.

The Total Maximum Daily Load (TMDL) program focuses on identifying and restoring polluted rivers, streams, lakes and other surface water bodies. TMDLs are prepared for waters identified as impaired on the 303(d) list in Ohio's Integrated Report. A TMDL is a written, quantitative assessment of water quality problems in a water body and contributing sources of pollution. It specifies the amount a pollutant needs to be reduced to meet water quality standards (WQS), allocates pollutant load reductions, and provides the basis for taking actions needed to restore a water body.

Comprehensive chemical, physical, and biological monitoring was conducted in the lower Mahoning River basin in 2011 and 2013 to identify pollutants impairing beneficial uses and to support the development of TMDLs for those pollutants. Ohio EPA's 2018 technical report on the findings of the basin survey, *Biological and Water Quality Study of the Lower Mahoning River Watershed, 2011 and 2013,* is available at:

https://dam.assets.ohio.gov/image/upload/epa.ohio.gov/Portals/35/tmdl/TSD/Lower%20Mahoning%202013/2013-LMAHO-2_Mahoning%20TSD_FINAL.pdf

Development of TMDLs for pollutants impairing designated or recommended aquatic life uses is presently under development. Status of reports and analyses are available via the Mahoning River (lower) tab at:

https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/mahoning-river-watershed

DEVELOPMENT OF WATER-QUALITY-BASED EFFLUENT LIMITS

Determining appropriate effluent concentrations is a multiple-step process in which parameters are identified as likely to be discharged by a facility, evaluated with respect to Ohio water quality criteria, and examined to determine the likelihood that the existing effluent could violate the calculated limits.

Parameter Selection

Projected/estimated effluent data for Trumbull Energy Center were used to determine what parameters should undergo wasteload allocation. The parameters discharged are identified by the data submitted to Ohio EPA in the NPDES application. This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95^{th} percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95^{th} percentile of all data points (see Table 3).

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either

PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required (see Table 5).

For more information on PEQ calculations, see Modeling Guidance #1 at the following webpage: https://epa.ohio.gov/static/Portals/35/guidance/model1.pdf

Wasteload Allocation

For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio WQS (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. For free flowing streams, WLAs using this method are done using the following general equation: Discharger WLA = (downstream flow x WQS) - (upstream flow x background concentration). Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations.

The applicable waterbody uses for this facility's discharge and the associated stream design flows are as follows:

Aquatic life (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
Wildlife		Annual 90Q10
Agricultural Water Supply		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 6, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria. Where noted, the background flow statistics have been updated utilizing the web-based United States Geological Survey (USGS) StreamStats Ver. 4.29.3 software.

The data used in the WLA are listed in Table 5 and Table 6. The WLA results to maintain all applicable criteria are presented in Table 7.

Whole Effluent Toxicity Wasteload Allocation

Whole effluent toxicity (WET) is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent.

WQS for WET are expressed in Ohio's narrative "free from" WQS rule [OAC 3745-1-04(D)]. These "free froms" are translated into toxicity units (TUs) by the associated WQS Implementation Rule (OAC 3745-2-09). WLAs can then be calculated using TUs as if they were water quality criteria.

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TUc) and 7Q10 flow for the average and the acute toxicity unit (TUa) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For Trumbull Energy Center, the WLA values for outfall 3IN00398001 are 0.3 TUa and 1.03 TUc.

According to the data in Table 6, the dilution ratio for Trumbull Energy Center to the receiving stream is approximately 1.03 to 1.

Stream Dilution Ratio = [7Q10 + (001 flow rate)]/(001 flow rate) = (0.03 + 0.96)/0.96 = 1.03

The chronic toxicity unit (TU_c) is defined as 100 divided by the estimate of the effluent concentration which causes a 25% reduction in growth or reproduction of test organisms (IC_{25}):

$TU_c = 100/IC_{25}$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (*Ceriodaphnia dubia* only):

TU_c = 100/geometric mean of No Observed Effect Concentration and Lowest Observed Effect Concentration

The acute toxicity unit (TU_a) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (LC_{50}) for the most sensitive test species:

$TU_a = 100/LC_{50}$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations.

When the acute WLA is less than 1.0 TU_a, it may be defined as:

Dilution Ratio (downstream flow to discharger flow)	Allowable Effluent Toxicity (percent effects in 100% effluent)
up to 2 to 1	30
greater than 2 to 1 but less than 2.7 to 1	40
2.7 to 1 to 3.3 to 1	50

Acute Dilution Ratio = [1Q10 + (001 flow rate)]/(001 flow rate) = (0.02 + 0.96)/0.96 = 1.02

The acute WLA for Trumbull Energy Center is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.02 to 1.

REASONABLE POTENTIAL/EFFLUENT LIMITS/MANAGEMENT DECISIONS

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 7. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 3, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) X 100, or ($PEQ_{max} \div PEL_{max}$) X 100)], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 8.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 9 presents the final effluent limits and monitoring requirements proposed for Trumbull

Energy Center Outfall 3IN00398001 and Internal Monitoring Station 3IN000398601 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Outfall 3IN00398001

Temperature

Due to the small size of the receiving stream, monthly temperature limits, derived from Table 35-11(A) in OAC 3745-1-35, have been included in the permit (See Attachment 2). These limits are intended to ensure that the cooling systems at the proposed facility are properly operated and maintained to meet WQS. For months with split criteria, e.g. March, the permit limits have been averaged.

Oil and Grease

The limit proposed for oil & grease is based on application of Ohio WQS (OAC 3745-1-37). Ohio does not have an average WQS for oil and grease and, therefore, only a daily maximum concentration limit is proposed.

pH Minimum, pH Maximum, and pH Range Excursions

Limits recommended for pH, i.e. 6.5 - 9.0 S.U., are based on Ohio's Water Quality Standards (OAC 3745-1-35).

Trumbull Energy Center has installed monitoring equipment to continuously measure the pH of wastewater discharged via Outfall 3IN00198001. Pursuant to 40 CFR 401.17, permittees that continuously measure pH are required to maintain the pH of such wastewater within the specified permit range, except that excursions from the range are permitted subject to the following limitations and conditions:

(1) The total time during which the pH values are outside the required range of pH values shall not exceed 7 hours and 26 minutes in any calendar month; and

(2) No individual excursion from the range of pH values shall exceed 60 minutes.

An excursion is defined as "an unintentional and temporary incident in which the pH value of discharge wastewater exceeds the range set forth" in the NPDES permit.

Total Residual Chlorine

The proposed daily maximum limit for total residual chlorine is based on the WLA as limited by the Outside Mixing Zone Maximum (OMZM) WQS. The OMZM is a value calculated to avoid lethal conditions in the effluent mixing zone. Total residual chlorine monitors for all chlorine species dissolved in water, including free available chlorine. This limit is more restrictive than the New Source Performance Standards (NSPS) in 40 CFR 423.15 (b)(10) and, thus, more protective of the overall health of Mud Creek. Therefore, monitoring for free available chlorine is not necessary.

The effluent limit for total residual chlorine is less than the quantification level of 0.050 mg/L. However, a pollutant minimization program will not be required provided that the dosing rate of dechlorination chemicals, i.e. sodium bisulfite, ensures that the water quality based effluent limit will be met.

Ammonia (Summer and Winter) and Total Filterable Residue

The Ohio EPA risk assessment (Table 8) places these parameters in group 5. This placement indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters, the PEQ is greater than 100 percent of the WLA and/or the PEQ is between 75 and 100 percent of the WLA and certain conditions exist that increase the risk to the environment. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1).

Ammonia is expected to be present mainly due to its presence as a disinfection residual in the City of Warren potable water supply. Since this water will be recirculated numerous times through the cooling tower system, the potential exists that the concentration may increase prior to blowdown. The limits are based on the ammonia-nitrogen WQS in OAC 3745-1-35 (Tables 35-2 and 35-5).

Although the current wasteload would allow for a slight increase in the monthly limits for total filterable residue and ammonia (winter), the antibacksliding provision in OAC 3745-33-05(F) stipulate that "*Ohio NPDES permits may not be renewed, reissued or modified to contain effluent limitations that are less stringent than the comparable final effluent limitations in the previous permit…"* unless certain conditions are satisfied. None of the conditions identified in OAC 3745-33-05(F) are applicable to the permit renewal. In addition, the permittee did not request additional loading in the NPDES application for these parameters.

Phosphorus, Copper, Chromium, Mercury, and Zinc

Monitoring requirements are included for these parameters in order to determine their possible presence in the proposed discharge.

Whole Effluent Toxicity Reasonable Potential

The draft NPDES permit contains a maximum toxicity limit of 1.0 TUa. This limit is based on the WLA and is included to control toxicity from the discharge as a whole. Cooling tower discharges can contain toxic concentrations of total dissolved solids if not managed carefully. The macroinvertebrates that form a significant part of fish diets are particularly susceptible to TDS-related toxicity. As Ohio has no maximum standard for TDS, acute toxicity limits are needed to ensure that the no-rapid-lethality narrative WQS is met.

Internal Station 3IN000398601

The limits for total suspended Solids (TSS), oil and grease, and pH are based on the New Source Performance Standards (NSPS) effluent guideline limitations (ELGs) in 40 CFR 423.15 for Low Volume Wastewaters (LVW) at power plants. ELGs establish technology-based standards to limit the discharge of pollutants in industrial wastewater. Consistent with 40 CFR 122.45(h), the current permit includes monitoring and limits at internal station 3IN00398601. The ELGs are applied at this station to ensure that the treatment standards are met prior to combining with other waste streams. Federal rules at 40 CFR 125.3(f) prohibit attaining these standards by dilution. If monitoring was not performed at this location, it would not be possible to verify compliance with these standards due to dilution.

Additional Monitoring Requirements

Additional monitoring requirements proposed at the final effluent, influent and upstream/downstream stations are included for all facilities in Ohio and vary according to the type and size of the discharge. In addition to permit compliance, this data is used to assist in the evaluation of effluent quality and treatment plant performance and for designing plant improvements and conducting future stream studies.

OTHER REQUIREMENTS

Compliance Schedule

NPDES Application Form 2C Discharge Data - A compliance schedule has been included for the facility to submit quantitative data for the pollutants and parameters listed in NPDES Application Form 2C at Outfall 3IN00198001 within 13 months of the effective date of the permit.

Priority Pollutant Monitoring

Part II of the permit prohibits the discharge of detectable amounts of priority pollutants, including zinc and chromium, attributable to cooling tower maintenance chemicals in the cooling tower blowdown.

Outfall Signage

Part II of the permit includes requirements for the permittee to place and maintain a sign at each outfall to the receiving stream providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

Part III

Part III of the permit details standard conditions that include monitoring, reporting requirements, compliance responsibilities, and general requirements.

Storm Water Compliance

Storm water permit conditions are not included in this permit because gas-fired power plants are not considered industrial storm water point sources under state and federal NPDES rules.

Figure 1. Location of Trumbull Energy Center

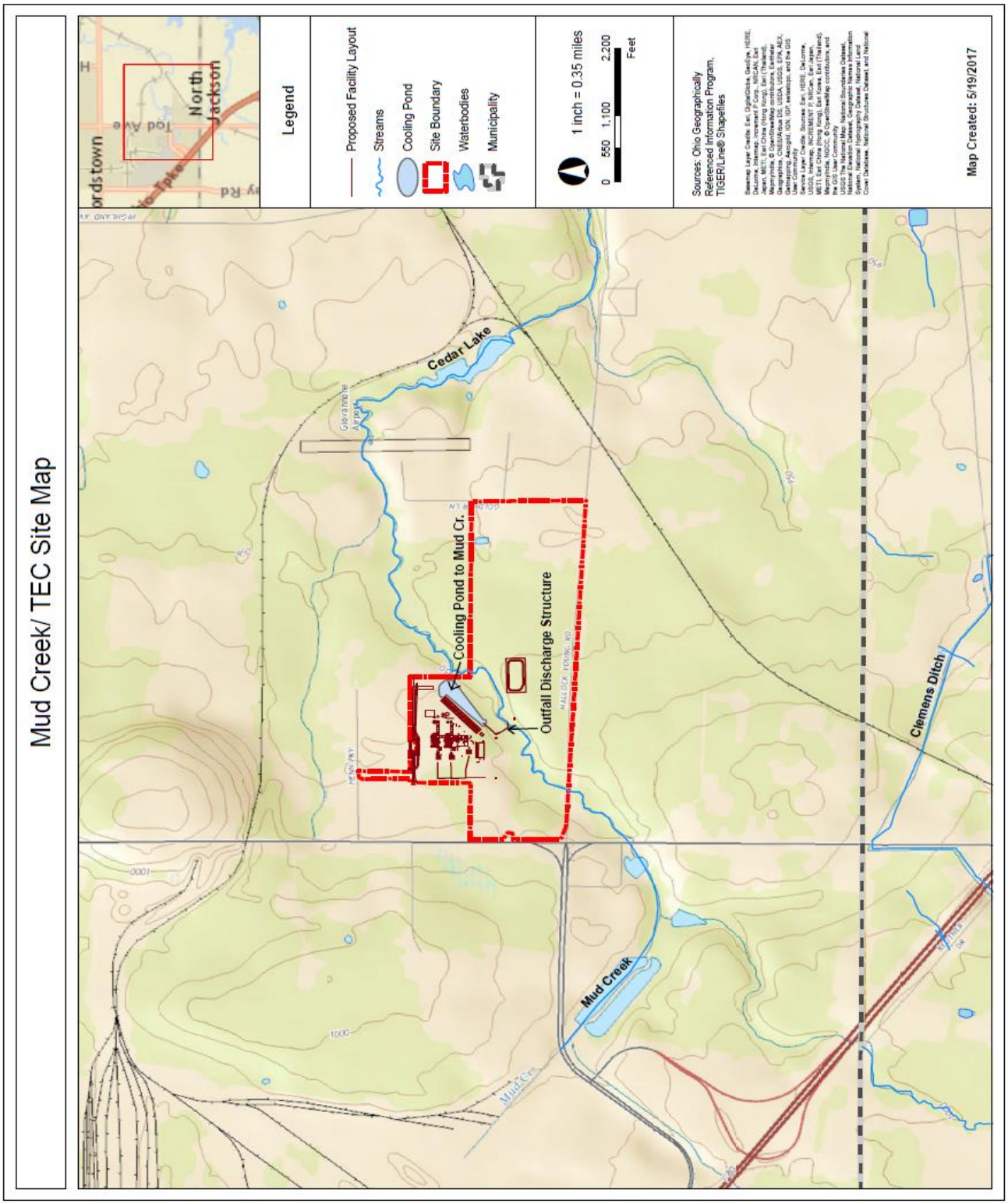

Figure 2: Schematic of a Typical Combined Cycle Process

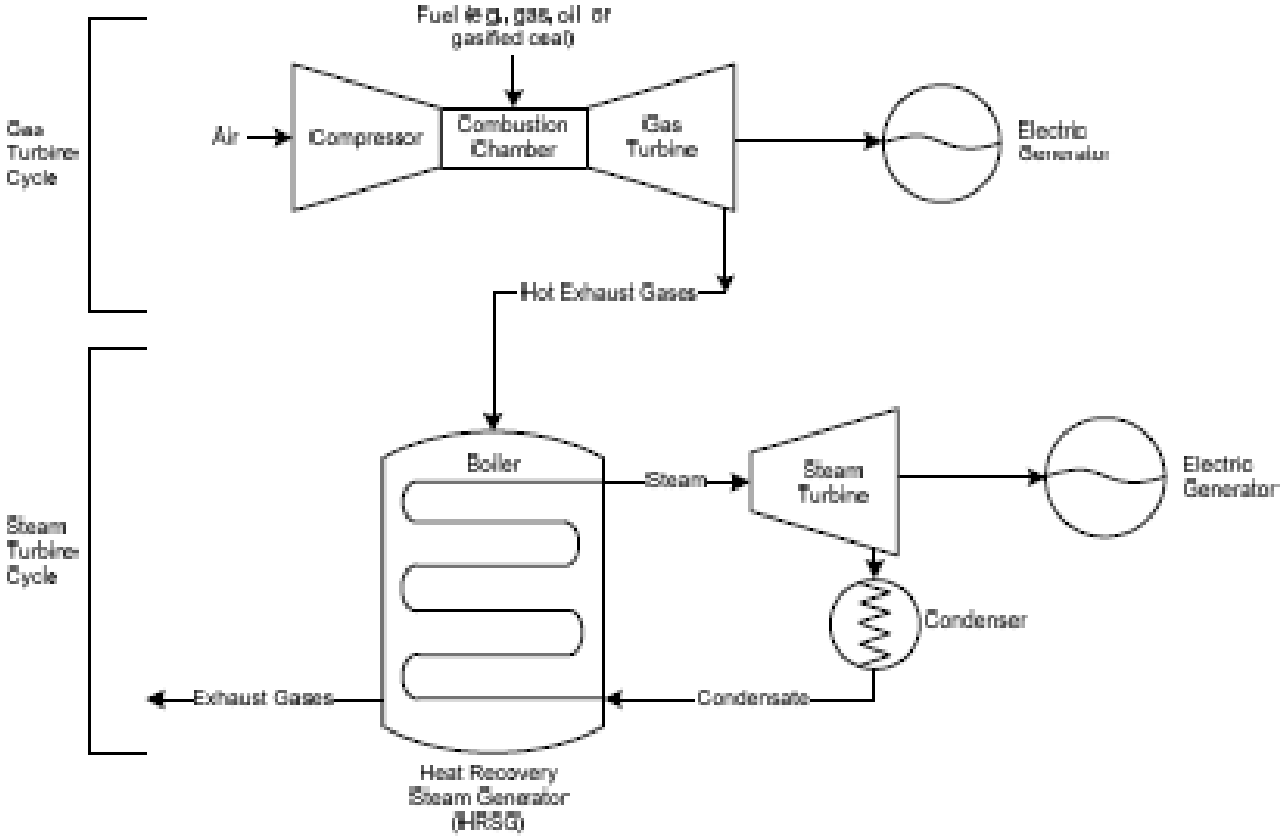

Figure 3. Trumbull Energy Center Water Balance Diagram

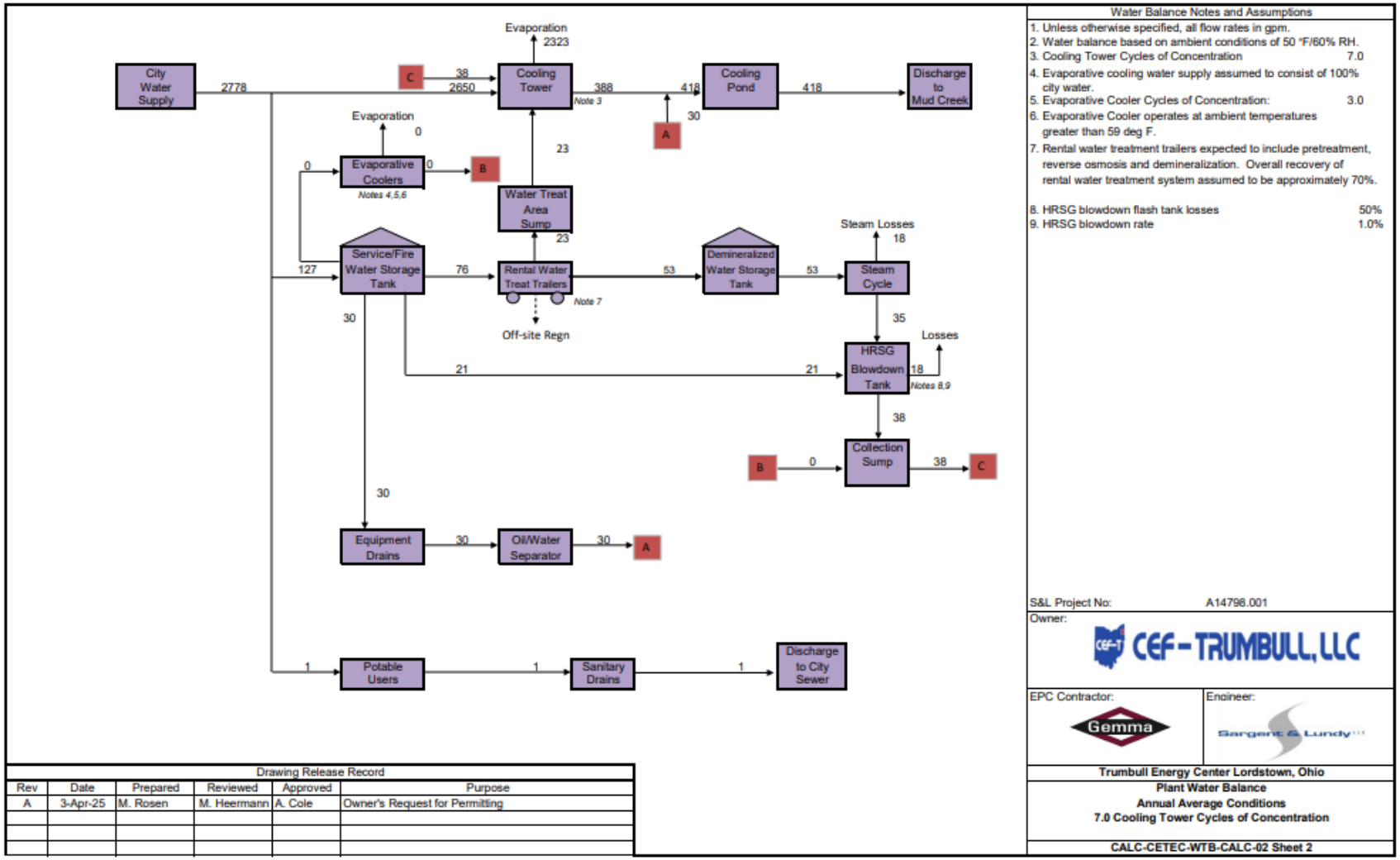

Table 1. Monitoring Stations, Wastewater Sources, Treatment Processes, Discharge Points, and Flow Rates

Station #	Wastewater Source	Treatment Utilized	Discharge/ Receiving Stream	Average Flow Rate (MGD)
001	Cooling Tower Blowdown, Low Volume Wastes, and Storm Water	Cooling Pond	Mud Creek	0.62
601	Low Volume Wastes	Oil Water Separator	Outfall 001	0.0432

Table 2. Projected Effluent Characterization Based on Form 2D Data

Parameter	Units	Max daily	Average
Biochemical Oxygen Demand	mg/L	--	--
Chemical Oxygen Demand	mg/L	--	--
Total Organic Carbon	mg/L	--	--
Total Suspended Solids	mg/L	--	--
Ammonia	mg/L	1.6	0.8
Nitrate	mg/L	1.61	1.61
Flow Rate	MGD	1.1	0.62
Temperature (Winter)	°C	11.1	8.3
Temperature (Summer)	°C	29.4	27.8
pH	SU	8.8	8.3
Barium	µg/L	74.74	74.74
Chlorine, Total Residual (*)	mg/L	0.019	0
Oil and Grease	mg/L	0.0003	0.0003
Phosphorus	mg/L	0.23	0.23
Sulfate	mg/L	420.1	420.1
Iron (Dissolved)	µg/L	230	230
Magnesium	µg/L	2587	2587
Manganese	µg/L	60	60
Residue, Total Filterable	mg/L	-	977.50

*Characterization based on maximum water quality criteria.

Table 3. Projected Effluent Quality

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Ammonia (Summer)	mg/L	1	1	7.24	9.92
Ammonia (Winter)	mg/L	1	1	7.24	9.92
Chlorine, Total Residual	mg/L	--	--	--	--
Chromium - TR	µg/L	--	--	--	--
Copper - TR	µg/L	--	--	--	--
Residue, Total Filterable	mg/L	1	1	4424.2	6060.5
Mercury	ng/L	--	--	--	--
Zinc - TR	µg/L	--	--	--	--

MDL = analytical method detection limit
PEQ = projected effluent quality

Table 4. Use Attainment Table

Year	Location	River Mile	Use	Status	Causes	Sources
2013	Mud Creek @ Carson-Salt Springs Rd.	2.30	WWH	Partial	Fish-Passage Barrier, Direct Habitat Alterations	Dam or Impoundment
2013	Mud Creek @ Carson-Salt Springs Rd.	0.70	WWH	Partial	Fish-Passage Barrier, Direct Habitat Alterations	Dam or Impoundment
2013	Trib. to Mud Creek (0.84) @ West Park Ave.	0.5	WWH	Non	Natural Conditions (Flow or Habitat)	Natural Sources

WWH = warmwater habitat

Table 5. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (Summer)	mg/L	--	--	1.4	10.7	--
Ammonia (Winter)	mg/L	--	--	4	11.4	--
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Chromium - TR	µg/L	--	100	130	2700	5400
Copper - TR	µg/L	--	500	14	22	44
Residue, Total Filterable	mg/L	--	--	1500	--	--
Mercury	ng/L	12	10000	910	1700	3400
Zinc - TR	µg/L	26000	25000	180	180	360

TR = total recoverable

Table 6. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	0.02	Derived from USGS 03092090 - West Branch Mahoning River near Ravenna OH. Drainage Area at outfall = 2.28 square miles
7Q10	cfs	annual	0.05	
30Q10	cfs	summer	0.14	
		winter	0.57	
90Q10	cfs	annual	0.32	
Harmonic Mean	cfs	annual	0.356	
Mixing Assumption	%	average	100	Wasteload Allocation Procedure (OAC 3745-2)
		maximum	100	
Hardness, OMZ	mg/L	annual	162	2018 BWQR - Mahoning River; n=478
Hardness, IMZ	mg/L	annual	162	2018 BWQR - Mahoning River; n=478
pH	S.U.	summer	7.9	2018 BWQR - Mahoning River; n=410
		winter	7.9	2018 BWQR - Mahoning River; n=410
Temperature	ºC	summer	21.7	2018 BWQR - Mahoning River; n=408
		winter	8.8	Derived from Mahoning County Boardman WWTP (3PK00002) Station 801 in Mill Creek
Trumbull Energy Center flow	cfs (mgd)	annual	0.96 (0.62)	NPDES Permit Application
Background Water Quality				
Ammonia (Summer)	mg/L	summer	0.06	Ohio EPA; 2018; n=368; 160<MDL; 2018 BWQR - Mahoning River; Median Value
Ammonia (Winter)	mg/L	winter	0.12	Ohio EPA; 2018; n=21; 2<MDL; 2018 BWQR - Mahoning River; Median Value
Chlorine, Total Residual	mg/L	annual	0	No representative data available.
Chromium - TR	µg/L	annual	1	Ohio EPA; 2018; n=475; 448<MDL; 2018 BWQR - Mahoning River; Median Value
Copper - TR	µg/L	annual	1	Ohio EPA; 2018; n=475; 318<MDL; 2018 BWQR - Mahoning River; Median Value
Residue, Total Filterable	mg/L	annual	300	Ohio EPA; 2018; n=475; 0<MDL; 2018 BWQR - Mahoning River; Median Value
Mercury	ng/L	annual	0	No representative data available.
Zinc - TR	µg/L	annual	5	Ohio EPA; 2018; n=478; 363<MDL; 2018 BWQR - Mahoning River; Median Value

BWQR = *Background Water Quality Report*, Ohio EPA, December 2018
DA = drainage area
MDL = analytical method detection limit
n = number of samples
NPDES = National Pollutant Discharge Elimination System
Ohio EPA = Ohio Environmental Protection Agency
TR = total recoverable
USGS = United States Geological Survey

Table 7. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (Summer)	mg/L	--	--	1.6	10.7	--
Ammonia (Winter)	mg/L	--	--	6.3	11.4	--
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Chromium - TR	µg/L	--	158	137	2756	5400
Copper - TR	µg/L	--	791	15	22	44
Residue, Total Filterable	mg/L	--	--	1563	--	--
Mercury	ng/L	12	10000	910	1700	3400
Zinc - TR	µg/L	41175	39591	188	184	360

TR = total recoverable

Table 8. Parameter Assessment

Group 1: Due to a lack of numeric criteria, the following parameters could not be evaluated at this time.

No parameters placed in this group.

Group 2: PEQ < 25 percent of WQS or all data below minimum detection limit. WLA not required. No limit recommended; monitoring optional.

Chlorine, Total Residual	Chromium - TR	Copper - TR
Mercury	Zinc - TR	

Group 3: PEQmax < 50 percent of maximum PEL and PEQavg < 50 percent of average PEL. No limit recommended; monitoring optional.

No parameters placed in this group.

Group 4: PEQmax >= 50 percent, but < 100 percent of the maximum PEL or PEQavg >= 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.

No parameters placed in this group.

Group 5: Maximum PEQ >= 100 percent of the maximum PEL or average PEQ >= 100 percent of the average PEL, or either the average or maximum PEQ is between 75 and 100 percent of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

		Recommended Effluent Limits	
Parameter	***Units***	***Average***	***Maximum***
Ammonia (Summer)	mg/L	1.6	10.7
Ammonia (Winter)	mg/L	6.3	11.4
Residue, Total Filterable	mg/L	1563	--

PEL = preliminary effluent limit
PEQ = projected effluent quality
TR = total recoverable
WLA = wasteload allocation
WQS = water quality standard

Table 9. Final Effluent Limits for Outfall 3IN00398001 and Station 3IN00398601

Parameter	Units	Concentration		Loading (kg/day)[a]		Basis[b]
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Outfall 001						
Water Temperature						
January	°F	47	52	--	--	WQS
February	°F	47	52	--	--	WQS
March	°F	52	57	--	--	WQS
April	°F	62	67	--	--	WQS
May	°F	68	74	--	--	WQS
June	°F	78	82	--	--	WQS
July	°F	82	85	--	--	WQS
August	°F	82	85	--	--	WQS
September	°F	77	81	--	--	WQS
October	°F	68	73	--	--	WQS
November	°F	60	65	--	--	WQS
December	°F	47	52	--	--	WQS
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Ammonia-N (Summer)	mg/L	1.6	10.7	3.8	25.1	WLA
Ammonia-N (Winter)	mg/L	6.1	11.4	14.3	26.8	WLA/ABS
Chlorine, Total Residual	mg/L	--	0.019	--	--	WLA/OMZM
Oil & Grease	mg/L	--	10	--	--	WQS
Residue, Total Filterable	mg/L	1533	--	3597	--	WLA/ABS
Phosphorus, Total	mg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Chromium	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Copper	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Zinc	µg/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Mercury	ng/L	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]
Acute Toxicity	TUa	--	1.0	--	--	BTJ
pH, Maximum (i.e. 9.0 S.U.)	S.U.	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ/WQS
pH, Minimum (i.e. 6.5 S.U.)	S.U.	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				BTJ/WQS
pH Range Excursion, Maximum Duration	Minutes	--	60	--	--	CFR
pH Range Excursions, > 60 Minutes	No./Day	--	0	--	--	CFR
pH Range Excursion, Monthly Total Duration	Minutes	--	446	--	--	CFR
Internal Monitoring Station 601						
pH	S.U.	6.0 - 9.0		--	--	NSPS
Total Suspended Solids	mg/L	30	100	--	--	NSPS
Oil & Grease	mg/L	15	20	--	--	NSPS

Parameter	Units	Concentration		Loading (kg/day)[a]		Basis[b]
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Flow Rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - -				M[c]

[a] Effluent loadings based on flow of 0.62 MGD.

[b] Definitions:

ABS = Antibacksliding Rule (OAC 3745-33-05(F) and 40 CFR Part 122.44(l))
BTJ = Best Technical Judgment
CFR = Code of Federal Regulations, 40 CFR 401.17
M = BEJ of Permit Guidance 2: Determination of Sampling Frequency Formula for Industrial Waste Discharges
NSPS = New Source Performance Standards, 40 CFR 423 Steam Electric Power Category, Cooling Tower Blowdown and Low Volume Wastewater Dischargers.
RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))
WLA = Wasteload Allocation procedures (OAC 3745-2)
WLA/OMZM = Wasteload Allocation limited by Outside Mixing Zone Maximum
WQS = Ohio Water Quality Standards (OAC 3745-1)

[c] Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

Attachment 1. Applicable Federal Effluent Limitation Guidelines

40 CFR 423.15 - New Source Performance Standards		
Parameter (mg/L)	Daily Maximum	30-Day Average
Low Volume Wastes		
TSS	100.0	30.0
Oil and Grease	20.0	15.0
pH	6.0 to 9.0	-
Cooling Tower Blowdown		
Chlorine, Free Available	0.5*	0.2*
Chromium, Total	0.2	0.2
Zinc, Total	1.0	1.0
Other Priority Pollutants	**	**

* - Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or state, if the state has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

** - There shall be no detectable amount of other priority pollutants contained in chemicals added for cooling tower maintenance.

Attachment 2: Mud Creek Temperature Criteria (OAC 3745-1-35, Table 35-11(A))

Month (days)	**°F**	**°F**
January	47	52
February	47	52
March (1-15)	51	56
March (16-31)	54	59
April (1-15)	59	65
April (16-30)	65	70
May (1-15)	67	73
May (16-31)	70	76
June (1-15)	74	80
June (16-30)	82	85
July	82	85
August	82	85
September (1-15)	82	85
September (16-30)	73	78
October (1-15)	71	76
October (16-31)	65	70
November	60	65
December	47	52

Attachment 3. List of Approved Boiler/Cooling Water System Additives

Ammonium Hydroxide
Sodium Hypochlorite
Sodium Hydroxide
Sodium Bisulfite
Sulfuric Acid
Polyacrylic Acid
ChemTreat CL-4435
Steamate NA0760

Addendum 1. Acronyms

ABS	Anti-backsliding
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BPJ	Best professional judgment
BPT	Best Practicable Control Technology Currently Available
BTJ	Best technical judgment
CFR	Code of Federal Regulations
CONSWLA	Conservative substance wasteload allocation
CWA	Clean Water Act
CWIS	Cooling water intake structure
DMR	Discharge Monitoring Report
DMT	Dissolved metal translator
ELG	Federal effluent limitation guideline
gpm	Gallons per minute
IMZM	Inside mixing zone maximum
MDL	Analytical method detection limit
MGD	Million gallons per day
NPDES	National Pollutant Discharge Elimination System
NSPS	New source performance standards
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
ORSANCO	Ohio River Valley Water Sanitation Commission
PEL	Preliminary effluent limit
PEQ	Projected effluent quality
PMP	Pollution Minimization Program
PPE	Plant performance evaluation
SIC	Standard Industrial Classification
TBEL	Technology-based effluent limit
TMDL	Total Daily Maximum Load
TRE	Toxicity reduction evaluation
TU	Toxicity unit
U.S. EPA	United States Environmental Protection Agency
WET	Whole effluent toxicity
WLA	Wasteload allocation
WQBEL	Water-quality-based effluent limit
WQS	Water Quality Standards