National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
for the Washington Power Company LLC (Formerly Dynegy Washington II Plant)

Public Notice No.: 21-10-006
Public Notice Date: October 5, 2021
Comment Period Ends: November 5, 2021

Ohio EPA Permit No.: 0IB00028*FD
Application No.: OH0127841

Name and Address of Applicant:
Washington Power Company LLC
State Route 83
Beverly, Ohio 45715

Name and Address of Facility Where Discharge Occurs:
Washington Power Company LLC
State Route 83
Beverly, OH 45715
Washington County

Receiving Water: Muskingum River and Green Olive Creek

Subsequent Stream Network: Ohio River

INTRODUCTION

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations (CFR), 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.

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

New lower limits are proposed for total residual oxidants based on new Tier II water quality standards of bromine published on April 9, 2021.

New monitoring is proposed for barium and low-level Mercury based on the results of the waste load allocation.

Limits are proposed to be removed for total suspended solids at Outfall 001 and 091 because the Federal Effluent Guidelines that apply to these outfalls do not include a limitation for total suspended solids. Monitoring is proposed to continue.

Monitoring for thermal discharge is proposed to be removed from Outfalls 001 and 091 because recent effluent data suggest that there is no reasonable potential for temperature water quality standards to be exceeded. In the future, reasonable potential can be determined using discharge temperature data.

The sludge reporting code at Monitoring Station 596 is proposed to be changed to 51129 – Sludge Fee Weight (dry tons).

A new intake monitoring station, Station 802, is proposed to estimate the total amount of water Washington intakes from the Ohio River. Monitoring for 24-hour total estimated flow rate is proposed at this station.

In Part II of the permit, special conditions are included that address whole effluent toxicity (WET) testing; tracking of group 4 (copper) and group 5 (mercury) parameters that will not receive limits; 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 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 addressed 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 in person 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 Jack Knapp at 740-380-5268, jack.knapp@epa.ohio.gov or Nick McGovern at 614-644-2146, nicholas.mcgovern@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: http://epa.ohio.gov/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 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

Washington Power Company LLC (formerly Dynegy Washington II), hereinafter referred to as Washington, discharges to the Muskingum River at River Mile 27.1. Figure 1 shows the approximate location of the facility.

This segment of the Muskingum River is described by Ohio EPA River Code: 17-001, Hydrologic Unit Code: 05040004-11-05, County: Washington, Ecoregion: Western Allegheny Plateau. The Muskingum River is designated for the following uses under Ohio's water quality standards (OAC 3745-1-24): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Primary Contact Recreation (PCR).

Washington discharges stormwater through outfalls 002, 003, and 004 to Olive Green Creek.

The Olive Green Creek is designated for the following uses under Ohio's water quality standards (OAC 3745-1-24): State Resource Water, Exceptional Warmwater Habitat, AWS, IWS and 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

Washington is a natural gas-fired steam-electric generating station with a generating capacity of 620 megawatts.

The process operations at Washington are classified in the Standard Industrial Classification (SIC) category 4911, Electric Services.

The process wastewaters generated from these operations are regulated under federal effluent guidelines (FEGs) listed in 40 CFR 423, "Steam Electric Power Generating Point Source Category". See Appendix I for a summary of the applicable FEGs.

Washington obtains water from the Muskingum River for cooling water blow down and boiler blowdown.

DESCRIPTION OF EXISTING DISCHARGE

Table 1 highlights the primary outfalls, stormwater outfalls, internal monitoring stations, wastewater sources, treatment processes, discharge/receiving streams, and associated flows at Washington.

Figure 3 provides a flow schematic of the wastewater sources and supplies associated with Washington. Process wastewater is treated by the following processes:

- Sodium bisulfite to reduce chlorine concentration
- pH adjustment of the wastewater from the demineralizer water system
- Oil/water separation

The 95th percentile of monthly average flow from the treatment plant is 0.52 million gallons per day (MGD).

There were no effluent violations at outfall 001 in the past five years.

Table 3 presents data compiled from the NPDES permit renewal application Form 2C.

Table 4 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period January 2016 through December 2020, and current permit limits are provided for comparison.

Table 5 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 6 summarizes the results of acute and chronic WET tests of the final effluent.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

The Congress Run – Muskingum River watershed assessment unit, which includes the Muskingum River in the vicinity of Washington, is not listed as impaired on Ohio's 303(d) list.

The most recent data available for the Congress Run – Muskingum River watershed is from 2006. The Muskingum River is in full attainment both up and downstream of the Dynegy Washington Plant. No additional limits are recommended for the Washington facility. For more information please look at the 2006 Biological and Water Quality Study of the Muskingum River located at:

https://epa.ohio.gov/portals/35/documents/MuskingumTSD2007.pdf

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

Effluent data for the Washington facility were used to determine what parameters should undergo WLA. The parameters discharged are identified by the data available to Ohio EPA DMR data submitted by the permittee, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

Self-monitoring data (DMR)	January 2016 through December 2020
NPDES application Form 2C data	2019

Statistical Outliers and Other Non-representative Data
The data were examined and the following values were removed from the evaluation to give a more reliable PEQ:

- Copper – 0.0253 µg/l, 03/31/16, excluded as a statistical outlier.
- Total Residual Chlorine – 0.18 mg/L, 1/14/2020, excluded as a statistical outlier
- Total Residual Chlorine – 0.2 mg/L, 3/7/2020, excluded as a statistical outlier
- Total Filterable Residue – 1880 mg/l, 03/30/17, excluded as a statistical outlier.
- Total Filterable Residue – 130 mg/L, 2/27/2020, excluded as a statistical outlier

This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points (see Table 5).

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 7).

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 8, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 7 and Table 8. The WLA results to maintain all applicable criteria are presented in Table 9.

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 (TU_c) and 7Q10 flow for the average and the acute toxicity unit (TU_a) 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. The WLA values for outfall 001 are 2.5 TU_a and 87.63 TU_c.

However, Dynegy Washington Plant is not required to monitor for TU_c because the ratio of the downstream flow is more than twenty to one [OAC 3745-33-07(B)(11)(c)]. According to the data in Table 8, the dilution ratio for the Dynegy Washington Plant to the Muskingum River is approximately 872 to one.

$$\text{Stream Dilution Ratio} = \frac{7Q10 + [001\ \text{flow rate}]}{[001\ \text{flow rate}]} = \frac{697\ \text{cfs} + 0.80\ \text{cfs}}{0.80\ \text{cfs}} = 872$$

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 9. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 5, 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 10.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 11 presents the final effluent limits and monitoring requirements proposed for the Dynegy Washington Plant outfall(s) 001/091 and internal monitoring stations 602, 603, and 604 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Outfall 0IB00028001 and 0IB00028091

Oil and Grease, and pH
The limits for pH and oil and grease are based on WQS.

Total Suspended Solids
Final effluent limitations for total suspended solids (TSS) are proposed to be removed from monitoring stations 0IB00028001 and 0IB00028091. TSS effluent limitations were previously based on Federal Effluent Guidelines (ELGs), which are based on available treatment technology. Federal and State laws and regulations require that dischargers meet both the ELGs and any standards need to comply with state WQS. Permit limits are based on the more stringent of the two.

After reviewing the waste streams at Dynegy Washington, it is believed that TSS limitations are appropriately placed on internal monitoring stations, and this eliminates the need to have this limitation on the final outfall. Additionally, the wastewater discharged from this outfall primarily consists of cooling tower blowdown which does not have an ELG for TSS. Monitoring is proposed to remain in place based on best technical judgement. All ELGs are shown in Attachment 1.

Chlorine and Total Residual Oxidants

The chlorine limit at Outfall 001 is based Best Professional Judgement, based on an analysis of the inside-mixing-zone maximum (IMZM) WQS when discharges of chlorine are limited to two hours per day. This information indicates that WQS can be significantly higher for a two hour per day exposure than when organisms are exposed for 48- to 96-hours, as is typical of most acute aquatic toxicity tests. The 120-minute limit on chlorine/bromine duration regulates the exposure time so that chlorine levels will not exceed WQS.

Limits on total residual oxidants reflect the use of bromine and bromine/chlorine mixtures for control of biofouling in the cooling system. The analytical method for these pollutants does not easily distinguish between bromine and chlorine, and limits are set for the total measurement (residual oxidants) as a result. The permittee shall report results for residual chlorine when only chlorine is used as a biocide, and report residual oxidants when bromine or bromine/chlorine mixtures are used.

New and lower limits are proposed for total residual oxidants based on new Tier II water quality standards of bromine published on April 9, 2021. The limit for total residual oxidants at Outfall 001 is based on best technical judgement, and is calculated by multiplying the IMZM value for bromine by the ratio of the total residual chlorine IMZM values for continuous and limited (<120 min/day) use. See calculation below.

$$\text{[Bromine IMZM PEL]} * \frac{\text{[Chlorine IMZM PEL under 2 hours/day]}}{\text{[Chlorine IMZM PEL Over 2 hours/day]}} = 0.0048\ \text{mg/L} * \frac{0.2\ \text{mg/L}}{0.038\ \text{mg/L}} = 0.025\ \text{mg/L}$$

The chlorine and total residual oxidants limits for Outfall 091 are based on the WLA because this outfall allows chlorination/bromination more frequently than 2 hours/day.

Mercury

The Ohio EPA risk assessment (Table 10) places mercury in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring rather than limits is proposed for this parameter. The PEQ values calculated for mercury (Table 5) may not be representative of its actual levels in the plant effluent since they were based on one data point. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of this pollutant in the plant's effluent.

Considering the magnitude of the reported value compared to the WLA, a tracking provision is proposed in Part II of the permit that requires Dynegy Washington to notify Ohio EPA if a sample result exceeds the preliminary effluent limit (Table 9). If certain conditions are met, the facility is required to take steps to reduce the discharge level of this pollutant.

Barium and Copper

The Ohio EPA risk assessment (Table 10) places barium and copper in group 4. This placement, as well as the data in Table 4 and Table 5, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2).

In addition, the copper effluent quality falls within 75 percent of the WLA. Under OAC 3745-33-07(A)(2), parameters in this range must have a tracking requirement in the permit that specifies reductions in pollutant concentrations if effluent concentrations exceed the WLA. The tracking/reduction requirements are included in Part II of the permit.

Total Filterable Residue and Zinc
The Ohio EPA risk assessment (Table 10) places total filterable residue and zinc in groups 2 and 3. This placement, as well as the data in Table 4 and Table 5, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring is proposed to document that these pollutants continue to remain at low levels.

Arsenic, Boron, Cadmium, Chloroform, Chromium, Fluoride, Iron, Molybdenum, Nickel, and Nitrite + Nitrate
The Ohio EPA risk assessment (Table 10) places arsenic, boron, cadmium, chloroform, chromium, fluoride, iron, molybdenum, nickel, and nitrite + nitrate in groups 2 and 3. This placement, as well as the data in Table 4 and Table 5, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed.

Flow Rate, Thermal Discharge, and Water Temperature
Monitoring for these parameters is proposed to continue in order to evaluate the performance of the treatment plant.

Chemical Oxygen and Carbonaceous Biochemical Oxygen Demand (5 Day)
Monitoring is proposed to continue for chemical oxygen demand, and carbonaceous biochemical demand based on best technical judgment.

Whole Effluent Toxicity Reasonable Potential
Based on evaluating the WET data presented in Table 6 and other pertinent data under the provisions of OAC 3745-33-07(B), the Dynegy Washington Plant is placed in Category 3 with respect to WET. No limits are proposed, but acute testing is proposed to continue for the duration of the permit.

Outfalls 0IB00028602 and 0IB00028603

pH and Flow Rate
Monitoring for pH and flow rate is proposed to continue from the existing permit based on best technical judgment.

Total Suspended Solids and Oil and Grease
Limits for TSS and oil and grease are based on the FEGs found in 40 CFR 423.15(b)(3). Monitoring frequency for these parameters is proposed to be reduced to a monthly frequency because data in Table 4 indicates concentration levels of these parameters are well below limits required by FEGs at these monitoring outfalls. Additionally, this proposed monitoring frequency is consistent with the monitoring frequency from a similar facility, Dynegy Hanging Rock II (0IB00032).

Outfall 0IB00028604

Flow Rate
Monitoring for flow rate is proposed to continue from the existing permit and is based on best technical judgment.

Total Suspended Solids, Oil and Grease, Iron and Copper
Limits for TSS, oil and grease, iron and copper are based on the FEGs found in 40 CFR 423.15(b)(4).

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.

A new intake monitoring station, Station 802, is proposed to estimate the total amount of water Washington intakes from the Ohio River. Monitoring for 24-hour total estimated flow rate is proposed at this station.

Sludge
Limits and monitoring requirements proposed for the disposal of sludge by the following management practices are based on OAC 3745-40: removal to sanitary landfill. The sludge reporting code is proposed to be changed to 51129 – Sludge Fee Weight (dry tons).

Cooling Water Intake Structure Compliance

Under Section 316(b) of the federal CWA, cooling water intake structures (CWISs) are required to use best technology available (BTA) to minimize adverse environmental impact resulting from the operation of the intake. New rules were promulgated on October 14, 2014, and facilities with permits that expire after July 18, 2018 must be in compliance with the new rules. The CWIS is considered an existing unit at an existing facility and therefore must comply with 40 CFR 125, Subpart J. Information supplied from the permittee regarding the CWIS and other pertinent data are located in Attachment 4.

Ohio EPA has evaluated this information and at this time has determined that the CWIS represents BTA in accordance with Section 316(b) of the CWA. This BTA conclusion has been reached based on the use of a recirculating cooling system and a design intake velocity of less than 0.5 ft/s.

Thermal Discharge Compliance
Monitoring for thermal discharge is proposed to be removed because recent effluent data suggest that there is no reasonable potential for temperature water quality standards to be exceeded. In the future, reasonable potential can be determined using discharge temperature data. Details are presented in Attachment 3.

Because thermal discharge monitoring is proposed to be removed from Outfalls 0IB00028001 and 0IB00028091, special conditions regarding thermal discharge monitoring are proposed to be removed from Part II of the permit.

Outfall Signage
Part II of the permit includes requirements for the permittee to place and maintain a sign at each outfall to the Muskingum River 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

No storm water requirements apply to Dynegy Washington because natural gas is the only fuel source the facility utilizes. Storm water discharges to Olive Green Creek via outfalls 002, 003, and 004.

Figure 1. Location of the Dynegy Washington Plant

Figure 2. Water Balance Diagram

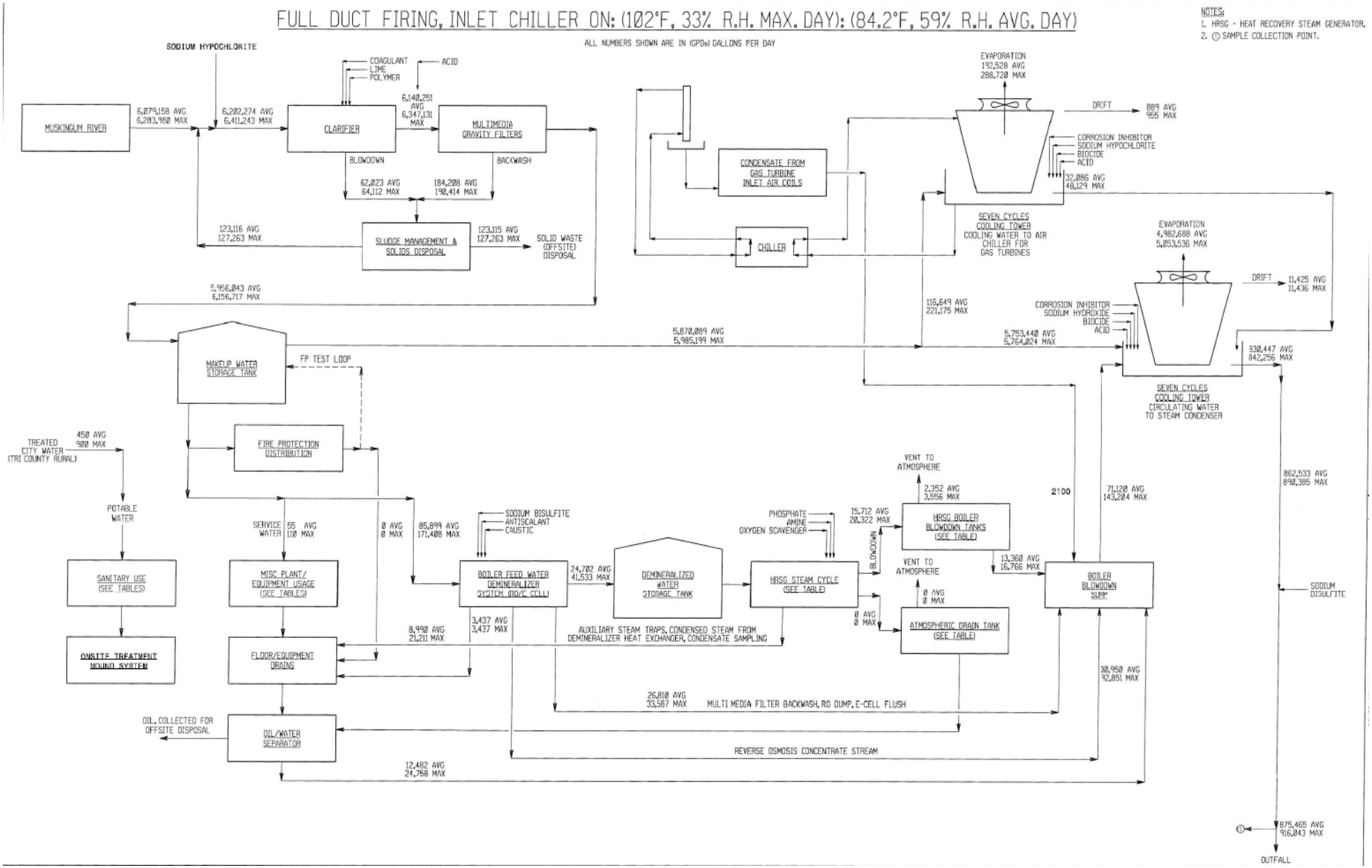

Table 1. Monitoring Stations, Wastewater Sources, Treatment Processes, Discharge Points, and Flow Rates

Station #	Wastewater Source	Treatment Utilized	Discharge/ Receiving Stream	Average Flow Rate (MGD)
001	Cooling tower blowdown, boiler blowdown, equipment and floor drains, reverse osmosis reject, process water preparation and chiller condensate. (Final; Chlorination / Brominatation is less than 120 minutes)	Chemical Conditioning Chlorination Dechlorination	Muskingum River	0.23
002	Stormwater	None	Olive Green Creek	--
003	Stormwater	None	Olive Green Creek	--
004	Stormwater	None	Olive Green Creek	--
091	Cooling tower blowdown, boiler blowdown, equipment and floor drains, reverse osmosis reject, process water preparation and chiller condensate. (Final; Chlorination / Brominatation is greater than 120 minutes)	Chemical Conditioning Chlorination Dechlorination	Muskingum River	0.23
602	Internal monitoring station. Boiler blowdown, multi-media filter backwash, reverse osmosis filter, e-cell flush and reverse osmosis reject.	--	Outfall 001	0.0034
603	Internal monitoring station. Oil/water separator.	Oil/Water Separator	Outfall 001	0.0015
604	Internal monitoring station. Chemical metal cleaning wastewater	--	Outfall 001	A

A The facility takes chemical metal cleaning wastewater to a landfill.

Table 2. Average Annual Effluent Flow Rates

Year	Obs.	Annual Flow in MGD		
		50th Percentile	95th Percentile	Maximum
2016	311	0.34	0.69	0.79
2017	344	0.27	0.46	0.79
2018	324	0.28	0.45	0.55
2019	345	0.28	0.58	0.77
2020	297	0.34	0.592	0.71

MGD = million gallons per day
Obs. = observations

Table 3. Effluent Characterization Based on Form 2C Data

Parameter	Units	4/25/2019
Aluminum	µg/l	59
Arsenic	µg/l	6.7
Barium	µg/l	330
Boron	µg/l	590
Bromide	µg/l	0.33
Cadmium	µg/l	0.7
Chloroform	µg/l	1.5
Chromium	µg/l	1.8
Fluoride	mg/l	1.4
Iron	µg/l	62
Magnesium	mg/l	170
Manganese	µg/l	7
Mercury	ng/l	2.3
Molybdenum	µg/l	27
Nickel	µg/l	12
Nitrite Plus Nitrate	mg/l	17
Organic Nitrogen	mg/l	4.5
Phosphorus	mg/l	1.9
Sulfate, (SO4)	mg/l	1900

Table 4. Effluent Characterization Using Self-Monitoring Data

Outfall	Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
			30 Day	Daily		50th	95th	
001	Water Temperature	°F	Monitoring Only		1656	81.1	94.4	49.2 - 109
	Thermal Discharge	Million BTU/Hr	Monitoring Only		1636	1.92	4.67	0 - 9.9
	Chemical Oxygen Demand	mg/L	Monitoring Only		56	56.2	79.3	0 - 88.2
	pH	S.U.	--	6.5 - 9.0	1576	7.68	7.96	6.92 - 8.64
	Total Suspended Solids	kg/day	26.1	87.1	233	< 2.08	14.9	0 - 31.5
	Total Suspended Solids	mg/L	30	100	241	< 2.5	10.5	0 - 26
	Oil and Grease	mg/L	--	10	241	--	--	< 1.4
	Zinc, TR	µg/L	Monitoring Only		56	--	--	< .01
	Copper, TR	µg/L	Monitoring Only		241	21.9	45.2	0 - 110
	Flow Rate	MGD	Monitoring Only		1624	.29	.59	0 - .79
	Chlorine, Total Residual	mg/L	--	0.20	1577	.01	.02	0 - .2
	Acute Toxicity, Ceriodaphnia dubia	TUa	Monitoring Only		5	0	.24	0 - .3
	Acute Toxicity, Pimephales promelas	TUa	Monitoring Only		5	--	--	0 - 0
	Residue, Total Filterable	mg/L	Monitoring Only		241	3670	3970	130 - 4720
	Chlorination/Bromination Duration	Minutes	--	120	556	110	110	.01 - 112
	CBOD 5 day	mg/L	Monitoring Only		56	--	--	< 1
091	Water Temperature	°F	Monitoring Only		24	78.5	82.9	70.3 - 84.8
	Thermal Discharge	Million BTU/Hr	Monitoring Only		24	2.77	4.01	0 - 4.09
	Chemical Oxygen Demand	mg/L	Monitoring Only		1	67.1	67.1	67.1 - 67.1
	pH	S.U.	--	6.5 - 9.0	24	7.85	7.94	7.68 - 7.96
	Total Suspended Solids	kg/day	26.1	87.1	5	11.2	15.9	4.67 - 16.7
	Total Suspended Solids	mg/L	30	100	5	10	21.8	6.5 - 24.5
	Oil and Grease	mg/L	--	10	5	--	--	< 5
	Zinc, TR	µg/L	Monitoring Only		1	--	--	< 20
	Copper, TR	µg/L	Monitoring Only		5	16.6	20	13.6 - 20.7
	Flow Rate	MGD	Monitoring Only		24	.24	.406	.06 - .53
	Chlorine, Total Residual	mg/L	--	0.038	24	.02	.03	.01 - .03
	Residue, Total Filterable	mg/L	Monitoring Only		5	3710	3960	3600 - 3990
	Chlorination/Bromination Duration	Minutes	Monitoring Only		9	110	131	110 - 145
	CBOD 5 day	mg/L	Monitoring Only		1	--	--	< 3

Outfall	Parameter	Unit	Current Limits		Percentiles			
			30 Day	Daily	# Obs	50th	95th	Data Range
602	pH	S.U.	Monitoring Only		1719	7.91	8.17	7.15 - 8.68
	Total Suspended Solids	kg/day	8.06	26.9	246	< .0379	.0483	0 - .257
	Total Suspended Solids	mg/L	30	100	246	< 2.5	7.25	0 - 28
	Oil and Grease	kg/day	4.0	5.4	246	--	--	< .0106
	Oil and Grease	mg/L	15	20	246	--	--	< 1.4
	Flow Rate	MGD	Monitoring Only		1719	.002	.005	0 - .018
603	pH	S.U.	Monitoring Only		1718	7.68	7.98	6.89 - 9.46
	Total Suspended Solids	kg/day	1.42	4.73	246	0	.0156	0 - .17
	Total Suspended Solids	mg/L	30	100	246	< 2.5	8.38	0 - 47
	Oil and Grease	kg/day	0.71	0.95	246	0	0	0 - .00623
	Oil and Grease	mg/L	15	20	246	< 1.4	< 1.4	0 - 8.23
	Flow Rate	MGD	Monitoring Only		1717	.0004	.002	0 - .41

Table 5. Projected Effluent Quality

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Aluminum	µg/L	1	1	267.034	365.8
Arsenic - TR	µg/L	1	1	30.3242	41.54
Barium	µg/L	1	1	1493.58	2046
Boron	µg/L	1	1	2670.34	3658
Cadmium - TR	µg/L	1	1	3.30398	4.526
Chlorine, Total Residual	mg/L	1599	1533	0.015377	0.024706
Chloroform (Trichloromethane)	µg/L	1	1	6.789	9.3
Chromium - TR	µg/L	1	1	8.1468	11.16
Copper - TR	µg/L	245	185	38.785	55.47
Fluoride	mg/L	1	1	6.3364	8.68
Iron - TR	µg/L	1	1	280.612	384.4
Magnesium	mg/L	1	1	769.42	1054
Manganese - TR	µg/L	1	1	31.682	43.4
Molybdenum	µg/L	1	1	122.202	167.4
Mercury	ng/L	1	1	10.4098	14.26
Nickel - TR	µg/L	1	1	54.312	74.4
Nitrate-N + Nitrite-N	mg/L	1	1	76.942	105.4
Phosphorus	mg/L	1	1	8.5994	11.78
Sulfates	mg/L	1	1	8599.4	11780
Total Filterable Residue	mg/L	244	244	3868.3	4075.8
Zinc - TR	µg/L	57	0	--	--

MDL = analytical method detection limit
PEQ = projected effluent quality

Table 6. Summary of Acute and Chronic Toxicity Results

Date	*Ceriodaphnia Dubia* (TU_a)	*Pimephales promelas* (TU_a)
8/9/2016	AA	AA
8/23/2017	AA	AA
8/9/2018	AA	AA
8/15/2019	AA	AA
8/20/2020	0.3	AA

AA = non-detection; analytical method detection limit of 0.2 TU_a,
TU_a = acute toxicity unit

Table 7. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria: Average: Human Health	Outside Mixing Zone Criteria: Average: Agri-culture	Outside Mixing Zone Criteria: Average: Aquatic Life	Outside Mixing Zone Criteria: Maximum: Aquatic Life	Inside Mixing Zone Maximum
Aluminum	µg/L	--	--	--	--	--
Arsenic - TR	µg/L	--	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Boron	µg/L	--	--	3900	33000	65000
Bromine	mg/L	--	--	0.0024	0.00026	0.0048
Cadmium - TR	µg/L	--	50	5	12	25
Chlorine	mg/L	--	--	0.011	0.019	0.038
Chloroform (Trichloromethane)	µg/L	4700c	--	140	1300	2600
Chromium - TR	µg/L	--	100	180	3700	7500
Copper - TR	µg/L	1300	500	20	32	65
Dissolved solids (ave)	mg/L	--	--	1500	--	--
Fluoride	mg/L	--	2	--	--	--
Iron - TR	µg/L	--	5000	--	--	--
Magnesium	mg/L	--	--	--	--	--
Manganese - TR	µg/L	--	--	--	--	--
Mercury - TR (BCC)	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20000	190000	370000
Nickel - TR	µg/L	4600	200	110	1000	2000
Nitrate-N + Nitrite-N	mg/L	--	100	--	--	--
Phosphorus	mg/L	--	--	--	--	--
Sulfates	mg/L	--	--	--	--	--
Zinc - TR	µg/L	69000	25000	260	260	510

[c] = carcinogen

Table 8. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	551	USGS Gage 03150000
7Q10	cfs	annual	651	USGS Gage 03150000
		summer	655	USGS Gage 03150000
		winter	1050	USGS Gage 03150000
30Q10	cfs	summer	751	USGS Gage 03150000
		winter	1466	USGS Gage 03150000
Harmonic Mean	cfs	annual	2890	USGS Gage 03150500
Mixing Assumption	%	average	25	
		maximum	25	
Hardness, OMZ	mg/L	annual	244	Station 801; Jan 2016 – Dec 2020; Median.
Hardness, IMZ	mg/L	annual	244	Station 801; Jan 2016 – Dec 2020; Median.
Washington flow	cfs	annual	0.805	95th Percentile of Monthly Average Flows
Background Water Quality				
Aluminum	µg/L		274	R16P01; 2006; n=5; 3<MDL; Average
Arsenic - TR	µg/L		2.66	R16P01; 2006; n=5; 0<MDL; Average
Barium	µg/L		52.2	R16P01; 2006; n=5; 0<MDL; Average
Boron	µg/L		0	No representative data available.
Cadmium - TR	µg/L		0	No representative data available.
Chlorine, Total Residual	mg/L		0	No representative data available.
Chloroform (Trichloromethane)	µg/L		0	No representative data available.
Chromium - TR	µg/L		0	No representative data available.
Copper - TR	µg/L		0	No representative data available.
Dissolved Solids	mg/L		371.2	R16P01; 2006; n=5; 0<MDL; Average
Fluoride	mg/L		0	No representative data available.
Iron - TR	µg/L		692	R16P01; 2006; n=5; 0<MDL; Average
Magnesium	mg/L		20.2	R16P01; 2006; n=5; 0<MDL; Average
Manganese - TR	µg/L		113.8	R16P01; 2006; n=5; 0<MDL; Average
Mercury	ng/L		0	No representative data available.
Molybdenum	µg/L		0	No representative data available.
Nickel - TR	µg/L		0	No representative data available.
Nitrate-N + Nitrite-N	mg/L		1.706	R16P01; 2006; n=5; 0<MDL; Average
Phosphorus	mg/L		0.1072	R16P01; 2006; n=5; 0<MDL; Average
Sulfates	mg/L		95.56	R16P01; 2006; n=5; 0<MDL; Average
Zinc - TR	µg/L		0	No representative data available.

MDL = analytical method detection limit
n = number of samples
NPDES = National Pollutant Discharge Elimination System
Ohio EPA = Ohio Environmental Protection Agency
R16P01 = Ohio EPA Monitoring Station. R16P01
Drainage Area Yield calculation using USGS Gage 03150000

Table 9. 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	
Aluminum	µg/L	--	--	--	--	--
Arsenic - TR	µg/L	--	35065	12072	2650	680
Barium	µg/L	--	--	13797	15339	4000
Boron	µg/L	--	--	319464	258999	65000
Bromine	mg/L	--	--	0.488	0.045	0.0048
Cadmium - TR	µg/L	--	18010	410	94	25
Chlorine	mg/L	--	--	0.9	0.15	0.038
Chloroform (Trichloromethane)	µg/L	1692952	--	11468	10203	2600
Chromium - TR	µg/L	--	36020	14744	29039	7500
Copper - TR	µg/L	1053179	180101	1638	251	65
Dissolved solids (ave)	mg/L	--	--	92835	--	--
Fluoride	mg/L	--	720	--	--	--
Iron - TR	µg/L	--	1552445	--	--	--
Magnesium	mg/L	--	--	--	--	--
Manganese - TR	µg/L	--	--	--	--	--
Mercury - TR (BCC)	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	1638276	1491208	370000
Nickel - TR	µg/L	3726634	72041	9011	7848	2000
Nitrate-N + Nitrite-N	mg/L	--	35407	--	--	--
Phosphorus	mg/L	--	--	--	--	--
Sulfates	mg/L	--	--	--	--	--
Zinc - TR	µg/L	55899516	9005064	21298	2041	510

Table 10. Parameter Assessment

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

Aluminum	Magnesium	Manganese - TR
Sulfates		

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

Chloroform (Trichloromethane)	Chromium - TR	Iron - TR
Molybdenum	Zinc - TR	

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

Arsenic - TR	Boron	Cadmium - TR
Dissolved Solids	Fluoride	Nickel - TR
Nitrate-N + Nitrite-N		

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.

Barium	Copper - TR	Chlorine, Total Residual

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*
Mercury[a]	ng/L	12	1700

Mercury becomes a Group 5 parameter based upon the loading test [OAC 3745-2-06(B)]
PEL = preliminary effluent limit
PEQ = projected effluent quality
WLA = wasteload allocation
WQS = water quality standard
[a] = See reasonable potential discussion section beginning on page 9

Table 11. Final Effluent Limits

Parameter	Units	Concentration		Loadings (kg/day)[a]		Basis
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Outfall 001 / 091						
Water Temperature	°F	---------- Monitor ----------				M[c]
Chemical Oxygen Demand	mg/l	---------- Monitor ----------				BTJ
Total Suspended Solids	mg/l	---------- Monitor ----------				BTJ
Oil and Grease	mg/l	--	10.0	--	--	WQS
Barium	mg/l	---------- Monitor ----------				RP
Zinc	µg/l	---------- Monitor ----------				BTJ
Copper	µg/l	---------- Monitor ----------				RP
Total Residual Oxidants	mg/l	--	0.025[d] / 0.0048[e]	--	--	BTJ[d]/WLA[e]
Flow Rate	MGD	---------- Monitor ----------				M[c]
Chlorine, Total Residual	mg/l	--	0.20[d] / 0.038[e]	--	--	BPJ[d]/WLA[e]
Low Level Mercury	ng/l	---------- Monitor ----------				RP
Acute Toxicity, Ceriodaphnia dubia	TU_a	---------- Monitor ----------				WET
Acute Toxicity, Pimephales Promelas	TU_a	---------- Monitor ----------				WET
pH Maximum	S.U.	--	9.0	--	--	WQS
pH Minimum	S.U.	--	6.5	--	--	WQS
Residue, Total Filterable	mg/l	---------- Monitor ----------				BTJ
Chlorination/Bromination Duration	Minutes	--	120[f]	--	--	BTJ
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/l	---------- Monitor ----------				BTJ
Outfall 602						
pH	S.U.	---------- Monitor ----------				BTJ
Total Suspended Solids	mg/l	30.0	100.0	8.06	26.9	FEG[1]
Oil and Grease	mg/l	15.0	20.0	4.0	5.4	FEG[1]
Flow Rate	MGD	---------- Monitor ----------				BTJ
Outfall 603						
pH	S.U.	---------- Monitor ----------				BTJ
Total Suspended Solids	mg/l	30.0	100.0	8.06	26.9	FEG[1]
Oil and Grease	mg/l	15.0	20.0	4.0	5.4	FEG[1]
Flow Rate	MGD	---------- Monitor ----------				BTJ

Parameter	Units	Concentration 30 Day Average	Concentration Daily Maximum	Loadings (kg/day)[a] 30 Day Average	Loadings (kg/day)[a] Daily Maximum	Basis
Outfall 604						
Total Suspended Solids	mg/l	30.0	100.0	--	--	FEG[2]
Oil and Grease	mg/l	15.0	20.0	--	--	FEG[2]
Iron	µg/l	1000	1000	--	--	FEG[2]
Copper	µg/l	1000	1000	--	--	FEG[2]
Flow Rate	MGD	- - - - - - - - - - - - - Monitor - - - - - - - - - - - - -				BTJ

[b] Definitions:

BTJ = Best Technical Judgment
BPJ = Best Professional Judgement
FEG[1] = Federal Effluent Guidelines – 40 CFR 423.15(b)(3)
FEG[2] = Federal Effluent Guidelines – 40 CFR 423.15(b)(4)
FEG[3] = Federal Effluent Guidelines – 40 CFR 423.15(b)(10)(i)
M = BEJ of Permit Guidance 2: Determination of Sampling Frequency Formula for Industrial Waste Discharges
RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))
WET = Whole Effluent Toxicity (OAC 3745-33-07(B))
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.

[d] Applies to Outfall 001

[e] Applies to Outfall 091

[f] No limitation for Outfall 091, but monitoring applies

Attachment 1. Applicable Federal Effluent Limitation Guidelines

40 CFR 423.15(b)(3) New Source Performance Standard (NSPS) limitations for low volume waste sources applicable to Outfalls 602 and 603

	NSPS	
Pollutant or pollutant property	**Maximum for any 1 day (mg/l)**	**Average of daily values for 30 consecutive days shall not exceed (mg/l)**
TSS	100.0	30.0
Oil and grease	20.0	15.0

40 CFR 423.15(b)(4) NSPS limitations for chemical metal cleaning wastes applicable to Outfall 604

	NSPS	
Pollutant or pollutant property	**Maximum for any 1 day (mg/l)**	**Average of daily values for 30 consecutive days shall not exceed (mg/l)**
TSS	100.0	30.0
Oil and grease	20.0	15.0
Copper, total	1.0	1.0
Iron, total	1.0	1.0

40 CFR 423.15(b)(10)(i) NSPS limitations for cooling tower blowdown applicable to Outfalls 001 and 091

	NSPS	
Pollutant or pollutant property	**Maximum concentration (mg/l)**	**Average concentration (mg/l)**
Free available chlorine	0.5	0.2

	NSPS	
Pollutant or pollutant property	**Maximum for any 1 day (mg/l)**	**Average of daily values for 30 consecutive days shall not exceed (mg/l)**
The 126 priority pollutants (appendix A) contained in chemicals added for cooling tower maintenance, except:	([1])	([1])
Chromium, total	0.2	0.2
zinc, total	1.0	1.0

Attachment 2. List of Approved Boiler/Cooling Water System Additives

Product	Use/Purpose	Expected Outfall Concentration	Date Approved
Spectrus NX1100	Control Cooling Water Microbial Growth	0.0 mg/L	1/27/2003
Spectrus DT1404/ Sodium Bisulfate	Dechlorinate Cooling Tower Blowdown	5.0 mg/L	11/12/2003
Sodium Hypochlorite	Cooling System Biocide	<0.038 mg/L	11/12/2003
Sulfuric Acid	pH Control (Cooling System)	Within pH limits of the NPDES Permit	11/12/2003
Flogard MS6222	Corrosion Inhibitor for the Main Cooling System	8 mg/L	11/12/2003
Steamate NA1321/Ammonium Hydroxide	pH Control for Boiler Water	0.5 mg/L	11/12/2003
Optisperse HP3100	pH Control for Aux Boiler	1 mg/L	11/12/2003
Inhibitor AZ8104	Corrosion Inhibitor for the Inlet Chiller System	0.0 mg/L	8/12/2003
Sodium Hydroxide	Control pH in the Cooling Tower System	Within pH limits of the NPDES Permit	8/12/2016
Depositrol BL6501	Control Deposits in the Cooling Tower System	5.0 mg/L	1/12/2012
Depositrol BL5400	Control Scaling in the Cooling Tower System	4.0 mg/L	10/29/2013
Gengard GN7004	Control Scaling in the Cooling Tower System	9.0 mg/L	10/29/2013
Klaraid IC1172	Reduce Turbidity of Intake Water	0.5 mg/L	2/3/2014
Foamtrol AF2290	Antifoam Product	1.3 mg/L	12/16/2015
Pels Caustic Soda Beads	pH Control for the Cooling Tower System	0.007 mg/L	6/24/2016
Steamate PAS6079	Corrosion Inhibitor for the Boiler System	0.0068 mg/L	9/15/2017
Trisodium Phosphate Anhydrous	pH Control for the Boiler System	1.0 mg/L	11/21/2018

Attachment 3. Thermal Wasteload Allocation

Background flows: Average = Summer 30Q10 = 804 cfs
Maximum = Summer 1Q10 = 590 cfs

25% of flows: Average = 201 cfs
Maximum = 148 cfs

Facility flow: 0.51 MGD = 0.79 cfs (95th percentile of monthly averages for past two years)

Summer Temperatures

	Maximum	Average
Upstream	80.7	80.6
WQS	89	85

Upstream temperature data from 0IB00002801.
Average = 75th percentile of monthly averages June through September
Maximum = 75th percentile of data from June through September

WQS from OAC 3745-1-06 E

Summer maximum = (148 cfs)(0.646 MGD/cfs)(8.34 lb/gal)(89-80.7)
= 6600 MBTU/day
= 275 MBTU/hr

Summer average = (201 cfs)(0.646 MGD/cfs)(8.34 lb/day)(85-80.6)
= 4760 MBTU/day
= 198 MBTU/hr

Reasonable Potential Analysis

	Allocation MBTU/hr	PEQ MBTU	PEQ % of WLA	Group
Maximum	275	6.69	2.43	2
Average	198	3.04	1.53	2

Attachment 4. Cooling Water Intake Structure Compliance

Cooling water intake structure information

The CWIS is considered an existing unit at an existing facility and therefore must comply with 40 CFR 125, Subpart J. Information supplied from the permittee regarding the CWIS and other pertinent data include the following:

- The design intake flow (DIF) is 6.3 million gallons per day (MGD).
- Approximately 96.5 percent of the water withdrawn from the river is used for cooling within the cooling tower system, with the remainder used for service water and fire protection.
- The Dynegy Washington Plant utilizes a closed-cycle mechanical-draft cooling tower, which achieves a flow reduction of approximately 97% from the DIF and approximately 99% from the actual intake flows from 2014 to 2018.
- Biological data were compiled from Ohio EPA biological sampling, American Electric Power (AEP) fish and mussel surveys, and an EnviroScience mussel survey.
- Through-screen design intake velocity – 0.25 feet per second (fps).
- Description of screens, technologies, and operations measures used to reduce impingement and entrainment – closed-cycle recirculation, fine-mesh screens, offshore intake structure.

Description of intake structure

The facility withdrawals water through four intake screens located approximately 140 feet offshore. Intake screens are equipped with #10 stainless wire mesh with 0.075-inch openings. Water travels through a 30" diameter pipe to the pump house well, which feeds the three raw water pumps.

In order to maintain functionality of the intake screens and through-screen velocity, the system is equipped with a water pressure backwash system to blow debris away from the intake openings. In addition, the facility contracts commercial divers 1-2 times per year to clear debris and sediment from the intake area.

Average Monthly Flow (January 2013 through December 2018)

Year	Monthly Mean Flow											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
2013	11090	10860	13180	11850	6051	7277	20770	4228	2491	3409	6474	15810
2014	12400	13390	9804	19020	24710	11640	7178	6964	2733	2209	3261	5937
2015	7405	7456	23210	23350	5809	14810	10640	2205	1884	1651	2995	7319
2016	8039	11670	17670	15340	9659	3831	1625	1815	1482	2136	2283	6816
2017	14570	9791	14700	--	14240	6327	11340	2969	1744	2001	14380	5521
2018	12330	23820	22810	32720	12140	11470	3859	3041	10880	--	--	--
Mean	11000	12800	16900	20500	12100	9230	9240	3540	3540	2300	5920	8300

*Data from Dynegy Washington 316(b) requirements report (2019).

Fish and wildlife in the vicinity of the intake structure

Dynegy submitted biological characterization data based on fish and mussel surveys including:

- Ohio EPA day & night electrofishing survey; Muskingum River; 1988
- AEP (EA Engineering) fish population survey; Muskingum River in the vicinity of the Muskingum River Power Plant; 2005-2006
- Ohio EPA biological and water quality study; Muskingum River; 2006

The facility indicated that no site-specific impingement or entrainment studies have been done.

Federal and State-Listed Endangered Mussel Species
The U.S. Fish and Wildlife Services (USFWS) and Ohio Department of Natural Resources (ODNR) lists the mussel species in the table below as endangered or threatened in the State of Ohio and nationally.

Common Name	**Scientific Name**	**Listing Status**	
Black sandshell	*Ligumia recta*	Threatened	State
Butterfly	*Ellipsaria lineolate*	Endangered	State
Ebonyshell	*Fusconaia ebena*	Endangered	State and Federal
Elephant-ear	*Elliptio crassidens crassidens*	Endangered	State
Fanshell	*Cyprogenia stegaria*	Endangered	State and Federal
Fawnsfoot	*Truncilla donaciformis*	Threatened	State
Little spectaclecase	*Villosa lienosa*	Endangered	State
Long-solid	*Fuscunaia malculata malculata*	Endangered	State
Monkeyface	*Quadrula metanevra*	Endangered	State
Ohio pigtoe	*Pleurobema cordatum*	Endangered	State
Pink mucket	*Lampsilis abrupta*	Endangered	State and Federal
Rabbitsfoot	*Quadrula cylindrica cylindrica*	Threatened	Federal
Rayed bean	*Villosa fabalis*	Endangered	State and Federal
Sheepnose mussel	*Plethobasus cyphyus*	Endangered	Federal
Snuffbox mussel	*Epioblasma triquetra*	Endangered	State and Federal
Threehorn wartyback	*Obliquaria reflexa*	Threatened	State
Washboard	*Megalonaias nervosa*	Endangered	State
Wartyback	*Quadrula nodulata*	Endangered	State

*Data from Dynegy Miami Fort 316(b) requirements report (2017).

Federal Critical Habitat
None were identified.

State-Listed Endangered or Threatened Fish Species
The ODNR lists the fish species in the table below as endangered or threatened in the State of Ohio.

Common Name	Scientific Name	Listing Status
Bigeye shiner	*Notropis boops*	Threatened
Blue sucker	*Cycleptus elongates*	Threatened
Channel darter	*Percina copelandi*	Threatened
Goldeye	*Hiodon alosoides*	Endangered
Lake sturgeon	*Acipenser fulvescens*	Endangered
Mountain madtom	*Noturus eleutherus*	Threatened
Northern madtom	*Noturus stigmosus*	Endangered
Paddlefish	*Polyodon spathula*	Threatened
River darter	*Percina shumardi*	Threatened
Shoal chub	*Macrhybopsis hyostoma*	Endangered
Shortnose gar	*Lepisosteus platostomus*	Endangered
Shovelnose sturgeon	*Scaphirhynchus platorynchus*	Endangered

Fragile Species
Fragile species are defined in 40 CFR 125.92 (m) as *"... a species of fish or shellfish that has an impingement survival rate of less than 30 percent even when the BTA technology of modified travelling screens are in operation.*" The fragile species at the Dynegy Washington Plant include gizzard shad.

Other Agency Reviews

The USFWS, Ohio Ecological Services office was provided the Dynegy Washington Plant's 316(b) information submittal for a 60-day review period. No objections regarding the facility's biological data were received by Ohio EPA.

The USFWS and ODNR-Division of Wildlife provided a formal review of potential impacts on State and Federally-listed species in 2017. Both the USFWS and ODNR response letters stated that a mussel survey would only be required if in-water work were to be proposed.

Cooling Water Intake Structure and System Information

Location
The CWIS is located on located approximately 140 feet from the pump house on the Muskingum River bank.

Withdrawal Rates
There are three raw water pumps utilized at the Dynegy Washington Plant, a maximum of two pumps are operated at a time, with the third acting as a spare. Each of these pumps is rated for 2,500 gallons per minute (gpm). The maximum design intake flow (DIF) of Washington is 4,400 gpm (6.3 MGD or 9.8 cfs).

Screens
The four intake screens are arranged in two tee sections. Each intake screen is two feet in diameter and 33.5 inches long. The screens are all comprised of #10 stainless wire mesh, which has 0.075-inch (1.9 mm) openings, resulting in a percent open area of 56 percent.

Intake Velocity
The design intake velocity is calculated below.

$$Through\ Screen\ Velocity\ (TSV) = \frac{Intake\ Velocity}{Screen\ Opening\ Area}$$

Intake Velocity = 9.8 cfs
Screen Area = 70 ft^2
Screen Opening Area = 39.5 ft^2

$$TSV = \frac{9.8\,cfs}{39.5\,ft2} = 0.25 \text{ ft/s}$$

Seasonal Operations
The amount of water withdrawn slightly increases during the summer.

Impingement and Entrainment

Impingement
Due to lack of facility-specific impingement data, an impingement study conducted only two miles downstream, at the Tanners Creek Station was used to evaluate susceptibility. In this study, a total of 16,244 fish and shellfish representing 40 species was collected. The most abundance taxa included gizzard shad (72 percent), freshwater drum (21.3 percent), skipjack herring (1.7 percent), and crayfish (1.6 percent), while all other taxa accounted for less than one percent of the total number collected. Of these species, gizzard shad and freshwater drum were prevalent in fish surveys conducted near the Miami Fort Station by ORSANCO and ORERP. It can be inferred that those species most abundant within the impingement samples collected at Tanners Creek have a potentially high susceptibility of impingement at the Miami Fort CWIS due to the proximity of the intakes to one another and the known distribution of species within this section of the Ohio River.

In addition, the use of an offshore, open top intake structure is likely to reduce the probability of fish exposure in comparison to an onshore intake within a more biologically productive area. Furthermore, the velocity at the face of the Miami Fort intake tunnel was calculated to be 0.43 fps, which is below the impingement mortality option of 0.5 fps.

Entrainment
No entrainment data is available for the Miami Fort Station, but a Tanners Creek study from 1978-1980 indicated that entrained species were predominantly gizzard shad, freshwater drum, suckers, and common carp. In the absence of site-specific and more recent study data, the susceptibility of relevant species to entrainment may be inferred from the distribution and life history of relevant species. Generally, species that gather in large schools, are attracted to warmer temperatures, and disperse semi-buoyant eggs into the water column or lay demersal eggs on the bottom, are more vulnerable to entrainment. Evaluation of species vulnerability based on these factors supports that herrings (gizzard shad), drum, suckers, and carp have the highest risk for entrainment.

However, the operation and structure of the CWIS also influences the potential for entrainment of various life stages. Similar to impingement, the location of the actual withdrawal minimizes the number of organisms that may occur near the intake structure. Also, the intake flow reduction results in an area of influence (AOI) of only 2.5 percent of the river's cross-sectional area during low-flow conditions.

Compliance with 40 CFR 125.94(c) and (d)

This facility utilizes the following to minimize adverse environmental impacts:

1. **Impingement**

    a. ***Impingement Mortality BTA - 40 CFR 125.94(c)(2):*** Dynegy proposes 0.5 fps through-screen design velocity as the impingement BTA compliance option.

2. **Entrainment**

    a. ***Site-Specific Entrainment Standards – 40 CFR 125.94(d):*** The permittee proposes closed-cycle recirculation to minimize entrainment. Assuming that the reduction in entrainment is commensurate with reduction in flow, the CWIS reduces entrainment by approximately 99 percent. By rule, closed-cycle recirculating systems are considered BTA for both new units at existing facilities and new facilities.

Director Requirements

The Director is required to include monitoring requirements, record keeping requirements, and reporting requirements within the permit. Additionally, the Director is required to make site-specific entrainment requirements weighing various factors.

Monitoring

40 CFR 125.96(a) – Monitoring requirements for impingement mortality for existing facilities:

The Director may establish monitoring requirements such as intake velocity, biological monitoring, and flow measurements. New flow monitoring of the intake is proposed. Intake flow monitoring is expected to be sufficient for characterizing the intake velocity.

40 CFR 125.96(b) – Monitoring requirements for entrainment for existing facilities:

The Director may establish monitoring requirements for entrainment. A flow monitoring requirement is proposed for the intake station to characterize makeup withdrawals.

40 CFR 125.96(e) – Visual or remote inspections:

To comply with the regulation, the permit proposes weekly visual or remote monitoring devices to ensure that all technologies installed are maintained and operated as designed. However, this weekly requirement is not extended to the offshore intake per the discretion allowed by the rule.

Should the facility be performing work or an inspection on the offshore intake scheduled as a result of maintenance or conditions required by other regulatory agencies, the permittee shall also perform an inspection (remotely or visually) of the offshore intake crib for 316(b) purposes. The inspection, for 316(b) purposes, will ensure that the offshore intake is being operated with good engineering and maintenance practices. This condition does not require the permittee to conduct any inspections beyond what is scheduled for other purposes. The results of the inspection shall be documented and retained by the facility for Agency review until the subsequent permit is issued.

Reporting and Recordkeeping Requirements

40 CFR 125.97(a) – Monitoring Reports

The permittee is required to submit eDMRs which will characterize blowdown rates.

40 CFR 125.97(c) – Annual certification

The permittee is required to submit an annual certification indicating any substantial changes at any unit which may impact cooling water intake. This is consistent with the rule.

40 CFR 125.97(d) – Permit reporting records retention

The permittee shall retain all records of all submissions related to 316(b) until the subsequent permit is issued.

Site Specific Entrainment BTA Determination

The permittee proposes closed-cycle recirculating system to minimize entrainment. For both *new units at existing facilities* and *new facilities*, closed-cycle recirculating systems are indicated as the best technology available according to the 40 CFR 125.94(e) and 40 CFR 125.85, respectively, although additional measures may be required depending on site conditions and *new facilities* also require additional flow requirements based on water source body. For *existing units*, the Director must weigh factors to determine whether there are entrainment control technologies that perform better than the selected technologies. However, since this facility employs closed cycle cooling and minimizes the amount of makeup water withdrawn, it was the only technology evaluated.

Must Consider Factors

The following correlate to subparagraphs of 40 CFR 125.98(f)(2) and are factors the Director must consider in BTA determination.

Numbers and types of organism entrained, including, specifically, the numbers and species (or lowest taxonomic classification possible) of Federally-listed, threatened and endangered species, and designated critical habitat (e.g., prey base).

Impact of changes in particulate emissions or other pollutants associated with entrainment technologies.

Dynegy Washington currently uses a CCRS, which is BTA for entrainment. Continued operation of the CCRS will not impact particulate emissions or other pollutants.

Land availability inasmuch as it relates to the feasibility of entrainment technology.

Dynegy Washington currently uses a CCRS, which is BTA for entrainment. There are no land availability issues associated with continued operation of the CCRS.

Remaining useful plant life.

Washington has been in service since 2002. Vistra plans to continue operation of Washington for the foreseeable future. However, should the existing CCRS not be determined to be BTA for entrainment, Vistra may be forced to retire this facility earlier than expected.

Quantified and qualitative social benefits and costs of available entrainment technologies when such information on both benefits and costs is of sufficient rigor to make a decision.

Dynegy Washington currently uses a CCRS, which is BTA for entrainment. Continued operation would not have any impact to the social costs or benefits associated with this facility.

May consider factors

The following correlate to subparagraphs of 40 CFR 125.98(f)(3) and are factors the Director may consider when determining BTA.

Entrainment impacts on the waterbody.

Dynegy Washington currently uses a closed-cycle recirculating system (CCRS), which is BTA for entrainment. Therefore, any entrainment impacts on the Muskingum River should be considered as minimized.

Thermal discharge impacts.

Dynegy Washington currently uses a CCRS, which is BTA for entrainment. Continued operation of this facility will not have any thermal impacts beyond what is currently permitted.

Credit for reductions in flow associated with the retirement of units occurring within the ten years preceding October 14, 2014.

Dynegy Washington has not retired any units and, therefore, Vistra is not expecting to take credit for flow reduction as part of the entrainment BTA determination for Washington.

Impacts on the reliability of energy delivery within the immediate area.

Maintaining current operations will not impact the reliability of energy delivery within the immediate area.

Impacts on water consumption.

Dynegy Washington currently uses a CCRS, which is BTA for entrainment because it minimizes the amount of cooling water withdrawn from the Muskingum River. CCRSs remove heat through evaporative cooling. Maintaining current operations will not impact water consumption.

Availability of process water, gray water, waste water, reclaimed water, or other waters of appropriate quantity and quality for reuse as cooling water.

The use of process water from any nearby facilities by Dynegy Washington is not considered because of the nature of these discharges and concern for increased pollutant concentrations.

Summary

The Director considers the Dynegy Washington Plant's cooling water intake structure to be BTA to minimize adverse environmental impacts based on the use of a recirculating cooling system and a design intake velocity that is less than 0.5 fps.

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