National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T S H E E T

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
for Dynegy Washington Plant

Public Notice No.: 15-05-074
Public Notice Date: May 28, 2015
Comment Period Ends: June 28, 2015

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

Name and Address of Applicant:
Dynegy Washington II, LLC
State Route 83
Beverly, Ohio

Name and Address of Facility Where Discharge Occurs:
Dynegy, Washington Plant
State Route 83
Beverly, Ohio
Washington County

Receiving Water: Muskingum River

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, 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 and Ohio Water Pollution Control Law, Chapter 6111 of the Ohio Revised Code (ORC). 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 Clean Water Act. Many of these have already been established by 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 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 wasteload allocation for a pollutant to a measure of the effluent quality. The measure of effluent quality is called PEQ - Projected Effluent Quality. 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

Outfalls 001 and 091
The effluent limits and monitoring requirements proposed for the following parameters are the same as in the current permit, although some monitoring frequencies have changed: thermal discharge, chemical oxygen demand, total suspended solids (TSS), zinc, copper, flow rate, chlorine, acute toxicity, pH, total filterable residue, chlorination/bromination duration and 5-day carbonaceous oxygen demand ($CBOD_5$).

A new water-quality-based limit is needed for oil and grease because the WQBEL for this parameter is more stringent than the FEGs applicable at outfalls 602 and 603. Since limits at an internal outfall cannot authorize the discharge of pollutants at levels greater than the WQBELs, which are calculated to protect water quality, the WQBEL has been included at outfall 001.

Current permit limits for temperature are being removed because effluent data show that temperature no longer has the reasonable potential to contribute to exceedances of water quality standards.

New monitoring is proposed for total residual oxidants based on best technical judgment. One of the cooling water additives to control microbial growth (Spectrus NX1100) contains bromine.

Outfalls 602, 603 and 604
Monitoring requirements and limits at internal stations 602, 603 and 604 are the same as in the current permit.

Outfall 801
New monitoring for temperature and hardness are proposed. Hardness is used when allocating metals. Upstream temperature is used to calculate thermal loading.

New Monitoring Stations
New Outfall 596 is proposed to track the amount of sludge that is hauled to a landfill.

New stormwater Outfall 004 is proposed based on the NPDES application which lists the outfall as a stormwater outfall.

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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 Ashley Ward at ashley.ward@epa.ohio.gov or (614) 644-4852.

Information Regarding Certain Water Quality Based Effluent Limits

This draft permit may contain proposed water quality based effluent limitations 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 Ohio Revised Code Section 6111.03(J)(3), the Director established these water quality based effluent limits 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 National Pollutant Discharge Elimination System (NDPES) 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, written notification 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 water quality based effluent limitations 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 water quality standard(s) used to develop the proposed effluent limitation in accordance with the terms and conditions set forth in Ohio Administrative Code (OAC) Rule 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 water quality standard(s) pursuant to OAC Rule 3745-1-35. The permittee shall submit written notification regarding their intent to develop site specific water quality standards 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

Dynegy Washington Plant discharges through outfall 001 to 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, U.S. EPA River Reach #: 05040004-011, 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 Class A Primary Contact Recreation (PCR).

Dynegy Washington Plant 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 water quality standards 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 Clean Water Act. Ohio WQS also include aquatic life use designations for waterbodies which can not meet the Clean Water Act goals because of human-caused conditions that can not 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) and wading only (Secondary Contact - 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 and industrial water supply.

Facility Description

The Dynegy Washington Plant is a natural gas-fired steam-electric generating station. This facility produces electric power, with a nominal generating capacity of 620 megawatts. The facility generates wastewaters that are regulated by the federal effluent guidelines (FEGs) listed in 40 CFR Part 423, Steam Electric Power Generating Point Source Category. See Appendix I for a summary of the applicable FEGs. The process operations at this facility are also defined by the standard industrial classification (SIC) category 4911 - Electric Services.

Description of Existing Discharge

The Dynegy Washington Plant discharges wastewater from one external outfall (001) into the Muskingum River. See Table 1 for a summary of outfalls.

Table 1. Summary of Dynegy Washington Plant Outfalls.

Outfall	Type of Outfall	Type of Wastewater	Treatment System Used	Discharge Point	Average Discharge (MGD)[A]
001	Final, when chlorination /bromination is less than 120 minutes.	Cooling tower blowdown, boiler blowdown, equipment and floor drains, reverse osmosis reject, process water preparation and chiller condensate.	Chemical conditioning, chlorination and dechlorination.	Muskingum River	0.38
002	Stormwater	Stormwater	None.	Olive Green Creek	--
003	Stormwater	Stormwater	None.	Olive Green Creek	--
004	Stormwater	Stormwater	None.	Olive Green Creek	--
091	Final, when chlorination /bromination is greater than 120 minutes.	Cooling tower blowdown, boiler blowdown, equipment and floor drains, reverse osmosis reject, process water preparation and chiller condensate.	Chemical conditioning, chlorination and dechlorination.	Muskingum River	0.38
602	Internal	Boiler blowdown, multi-media filter backwash, reverse osmosis filter, e-cell flush and reverse osmosis reject.	--	Outfall 001	0.0034
603	Internal	Oil/water separator.	Oil and water separation.	Outfall 001	0.0015
604	Internal	Chemical metal cleaning wastewater	--	Outfall 001	0[B]

[A] 95th percentile of monthly averages.
[B] The facility takes chemical metal cleaning wastewater to a landfill.

Treatment of the facility's wastewater includes use of sodium bisulfite to reduce chlorine concentration and pH adjustment of the wastewater from regeneration of the demineralizer water system. Water contaminated with oil is routed through the oil/water separator. In addition, several chemicals, listed in

Appendix II are added to the system to prevent corrosion, microbial growth, coagulate solids and inhibit scaling.

Consistent with 40 CFR 122.45(h), the current permit includes monitoring and limits at internal stations 0IB00028602, 0IB00028603 and 0IB00028604. Effluent guideline limits are applied at these outfalls to ensure that these treatment standards are met prior to combining with other waste streams. If monitoring was not done at this location, it would not be possible to verify compliance with these standards due to dilution. Federal rules at 40 CFR 125.3(f) prohibit attaining these standards by dilution.

Table 2 presents chemical specific data compiled from the NPDES renewal application, and data collected by Ohio EPA.

Table 3 presents a summary of unaltered discharge monitoring report (DMR) data for outfall 0IB00028001. Data are presented for the period February 2010 through January 2015, and current permit limits are provided for comparison.

Table 4 summarizes the chemical specific data for outfall 0IB00028001 by presenting the average and maximum PEQ values.

Table 5 summarizes the results of whole effluent toxicity tests performed by Ohio EPA.

Table 6 summarizes the results of acute whole effluent toxicity tests performed by the facility.

Assessment of Impact on Receiving Waters

Use attainment is a term which describes the degree to which environmental indicators are either above or below criteria specified by the Ohio Water Quality Standards (WQS; Ohio Administrative Code 3745-1). Assessing use attainment status for aquatic life uses primarily relies on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-15). 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 (IBI) and modified Index of Well-Being (MIwb), which indicate the response of the fish community, and the Invertebrate Community Index (ICI), 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. The Muskingum River is in full attainment both up and downstream of the Dynegy Washington Plant. For more information please look at the *2006 Biological and Water Quality Study of the Muskingum River* located at:

http://www.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 Dynegy Washington Plant were used to determine what parameters should undergo wasteload allocation. 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)	February 2010 through January 2015
NPDES Application data	2014
Ohio EPA compliance sampling data	March 2013

The data were examined, and the following values were removed from the evaluation of total filterable residue to give a more reliable projection of effluent quality: 620 mg/L on July 21, 2011 and 396 mg/L on March 30, 2014.

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. The average and maximum PEQ values are presented in Table 4.

The PEQ values are used according to Ohio rules to compare to applicable water quality standards (WQS) and allowable wasteload allocation (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 for a summary of the screening results.

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 water quality standards (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. Wasteload allocations 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 (WWH)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10

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 criteria.

The data used in the WLA are listed in Tables 8 and 9. The wasteload allocation results to maintain all applicable criteria are presented in Table 7. Ammonia has been evaluated using the WLA procedures and it has been determined that there is no reasonable potential and ammonia limits are not necessary.

Whole Effluent Toxicity WLA 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.

Water quality standards 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). Wasteload allocations can then be calculated using TUs as if they were water quality criteria.

The wasteload allocation 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. For Dynegy Washington Plant, the WLA values are $73TU_a$ (defaults to 1.0 TU_a in accordance with OAC 3745-2-9) and 287 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the 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 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.

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the water quality standards must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a water quality standard or do not require a wasteload allocation 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 wasteload allocations are selected from Table 7. The average PEL (PEL_{avg}) is compared to the average PEQ

(PEQ_{avg}) from Table 4, 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 Dynegy Washington Plant outfalls 0IB00028001, 0IB00028602, 0IB00028603 and 0IB00028604 and the basis for their recommendation.

Outfalls 0IB00028001 and 0IB00028091

Outfalls 001 and 091 are physically the same outfall. Outfall 001 is used when chlorination/bromination lasts less than 120 minutes. Outfall 091 is used when chlorination/bromination lasts more than 120 minutes. The monitoring requirements and limits are the same for both outfalls with the exclusion of chlorine and chlorination/bromination duration limits.

Water Temperature and Thermal Discharge
Limits for water temperature have been removed from the draft permit. Limits in the existing permit were modeled using background water temperatures assuming that Dynegy Washington Plant would be discharging into the heat flume created by the AEP Muskingum plant. AEP Muskingum is scheduled to close in June 2015. Appendix III summarizes the thermal WLA, which was calculated using background temperature data from upstream of AEP Muskingum. The thermal WLA demonstrates that the Dynegy Washington Plant does not have reasonable potential to cause exceedances of temperature WQS in the Muskingum River.

Daily monitoring for water temperature and thermal discharge is proposed to continue from the existing permit to document that there continues to be no temperature reasonable potential to violate WQS.

Chemical Oxygen Demand, Flow Rate, and $CBOD_5$
Monitoring is proposed to continue from the existing permit for chemical oxygen demand, flow rate and $CBOD_5$ based on best technical judgment.

pH and Oil and Grease
The limits for pH and oil and grease are based on WQS. New limits are proposed at outfall 001 for oil and grease. The WQBEL for this parameter is more stringent than the FEGs applicable at outfalls 602 and 603. Since limits at an internal outfall cannot authorize the discharge of pollutants at levels greater than the WQBELs, which are calculated to protect water quality, the WQBEL has been included at outfall 001.

Total Suspended Solids
Limits for TSS are based on the FEGs found in 40 CFR 423.15 (c).

Chlorine and Total Residual Oxidants
Limits for residual chlorine are required because chlorine is a BAT parameter under the federal effluent regulations for steam electric power facilities. The chlorine limit is based on an analysis of the inside-mixing-zone maximum 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 permit would require Dynegy to report results for residual chlorine when only chlorine is used as a biocide, and reports residual oxidants when bromine or bromine/chlorine mixtures are used.

The limit for residual oxidants is based on data submitted by the Chemical Manufacturers Association to U.S. EPA Region V that shows bromine being approximately four times as toxic as chlorine. The discharge limit for residual oxidants is therefore set at ¼ of the chlorine limit.

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

If chlorination occurs for two hours or less (outfall 001), the daily maximum limit is 0.2 mg/L and is based on 40 CFR 123.15. If chlorination occurs for more than two hours (outfall 091) the WQBEL daily maximum of 0.038 mg/L applies.

Total Residual Oxidants
New monitoring is proposed for total residual oxidants based on best technical judgment. One of the cooling water additives to control microbial growth (Spectrus NX1100) contains bromine.

Copper
Ohio EPA risk assessment (Table 10) places copper in group 4. This placement as well as the supporting data support that this parameter does 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 Rule 3745-33-07(A)(2).

Arsenic, Barium, Boron, Chloroform, Magnesium, Manganese, Nitrite + Nitrate, Selenium, Strontium, Total Filterable Residue and Zinc
Ohio EPA risk assessment (Table 10) places arsenic, barium, boron, chloroform, magnesium, manganese, nitrite + nitrate, selenium, strontium, total filterable residue and zinc in groups 2 and 3. This placement as well as the supporting data 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 continue from the existing permit for total filterable residue and zinc to document that these pollutants continue to remain at low levels.

Outfalls 0IB00028602 and 0IB00038603

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 (c).

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 (d).

Monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: removal to sanitary landfill.

Additional monitoring requirements proposed at the 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.

Whole Effluent Toxicity Reasonable Potential
Based on evaluating the whole effluent toxicity data presented in Tables 5 and 6 and other pertinent data under the provisions of OAC 3745-33-07(B), Dynegy Washington Plant is placed in Category 4with respect to whole effluent toxicity. Annual monitoring is proposed to continue from the existing permit.

Other Requirements

Outfall Signage
Part II of the permit includes requirements for the permittee to place 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).

Cooling Water Intake Structures
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. Dynegy withdraws water from the Muskingum River.

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 a new unit at an existing facility and therefore must comply with 40 CFR 125, Subpart J. In order to determine compliance with BTA with the next permit renewal, Ohio EPA has included permit application submission requirements in Part II, Item P of the proposed permit.

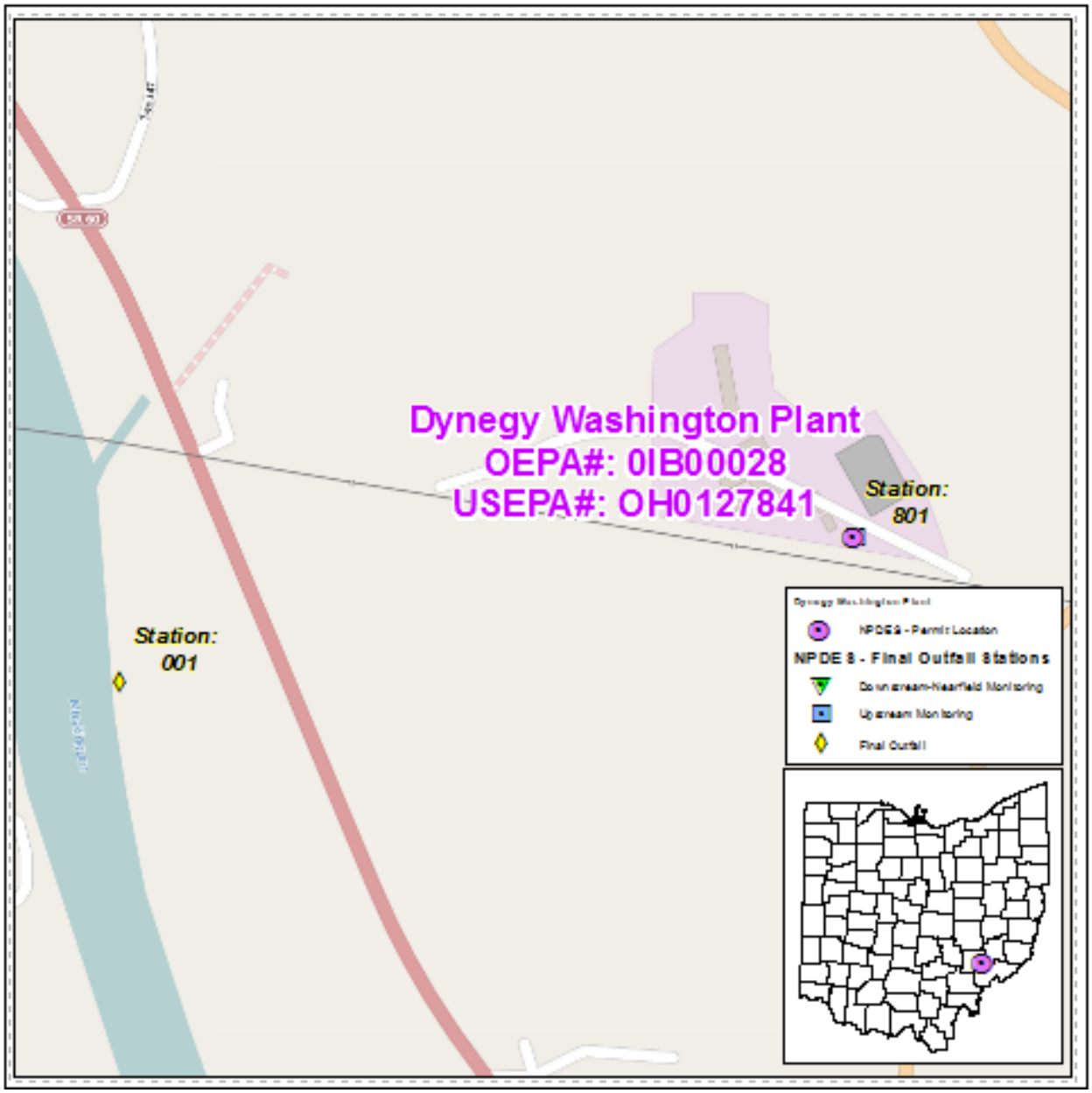

Figure 1. Location of Dynegy Washington Plant.

Table 2. Effluent Characterization Using Ohio EPA and Application Form 2C Data.

		Form 2C	Ohio EPA
Parameter	**Units**	**7/5/2014**	**3/4/2013**
Total Filterable Residue	mg/L	NT	3870
Arsenic	µg/L	<100	6.2
Selenium	µg/L	<80	5.9
Barium	µg/L	148	160
Iron	µg/L	310	315
Magnesium	mg/L	173	210
Strontium	µg/L	NT	2380
Ammonia	mg/L	0.108	0.132
Nitrate + Nitrite	mg/L	10.9	23.9
Chloroform	µg/L	7.57	2.3
Boron	µg/L	672	NT
Manganese	µg/L	10	<10
Copper	µg/L	89.2	NT

Definitions NT Not tested.

Table 3. Effluent Characterization Using Self-Monitoring Data

Summary of current permit limits and unaltered discharge monitoring report data for Dynegy Washington Plant outfall 0IB00028001 (February 2010 - January 2015). All values are based on annual records unless otherwise indicated. * = For minimum pH, 5th percentile shown in place of 50th percentile; ** = For dissolved oxygen, 5th percentile shown in place of 95th percentile.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001								
Water Temperature	Annual	°F	75-85[a]	80-90[b]	1451	72	84	39.7-109
Thermal Discharge	Annual	Million BTU/Hr	Monitor		1448	1.7	36.9	0-159
Chemical Oxygen Demand	Annual	mg/L	Monitor		61	54.5	97.4	0-104
pH	Annual	S.U.	6.5 Min	9.0 Max	1449	7.96	8.4	7-9
Total Filterable Residue	Annual	mg/L	Monitor		251	3490	3950	396-4000
Total Suspended Solids	Annual	mg/L	30	100	251	0	19.3	0-88
Oil and Grease	Annual	mg/L	Monitor		251	0	0	0-7.08
Zinc	Annual	µg/L	Monitor		62	0	0	0-134
Copper	Annual	µg/L	Monitor		251	0	36	0-89.2
Flow Rate	Annual	MGD	Monitor		1459	0.216	0.476	0-1.14
Chlorine, Total Residual	Annual	mg/L		0.20	1451	0.01	0.04	0-0.18
Acute Toxicity, *Ceriodaphnia dubia*	Annual	TU_a	Monitor		6	0	0	0-0
Acute Toxicity, *Pimephales promelas*	Annual	TU_a	Monitor		6	0	0	0-0
Chlorination/Bromination Duration	Annual	Minutes		120	572	120	120	25-120
CBOD 5 day	Summer	mg/L	Monitor		29	0	2.14	0-6.07
CBOD 5 day	Winter	mg/L	Monitor		30	0	0	0-3.49

[a] 75 in May and October, 85 June through September

[b] 80 in May and October, 90 June through September

Definitions CBOD Carbonaceous oxygen demand.

Table 4. Projected Effluent Quality (PEQ).

Parameter	PEQ ave	PEQ max
Chemical Oxygen Demand	1302	1367.9
Total Filterable Residue	3862	4307.3
Total Suspended Solids	58.044	43.222
Oil and Grease	3.618	4.956
Zinc	97.82	134
Copper	36.245	48.386
Chlorine, Total Residual	0.017257	0.036758
Winter CBOD 5 day	--	--
Summer CBOD 5 day	3.638	4.984
Acute Toxicity, Ceriodaphnia dubia	--	--
Acute Toxicity, Pimephales promelas	--	--
Arsenic	28.06	38.44
Selenium	26.7	36.58
Barium	443.8	608
Iron	873.8	1197
Magnesium	582.5	798
Strontium	10770	14760
Nitrite Plus Nitrate	66.3	90.82
Chloroform	21	28.77
Boron	3041	4166
Manganese	45.26	62
Ammonia	0.3662	0.5016

Table 5. Summary of toxicity results reported by Ohio EPA.										
Collection Date	*Ceriodaphnia dubia*									
	24 Hours					48 Hours				
	UP	C	%M	MMZ	COM	UP	C	%M	MMZ	COM
3/4/2013	0	0	0	0	0	0	0	25	0	10
Collection Date	*Pimephales promelas*									
	24 Hours					48 Hours				
	UP	C	%M	MMZ	COM	UP	C	%M	MMZ	COM
3/4/2013	0	0	0	0	0	0	0	0	0	0

Definitions: C Laboratory control water;
COM Composite 001;
MMZ Manual mixing zone;
%M Percent mortality in 100% effluent;
UP Percent mortality in upstream control.

Table 6. Summary of Acute Toxicity Results Reported by Dynegy Washington Plant.		
	Acute Toxicity	
Date	*Ceriodaphnia dubia* (TU_a)	*Pimephales promelas* (TU_a)
3/11/2010	AA	AA
6/10/2010	AA	AA
9/15/2011	AA	AA
9/13/2012	AA	AA
9/12/2013	AA	AA
9/11/2014	AA	AA

Definitions: AA Below detection (0.2 TU_a).

Table 7. Summary of Effluent Limits to Maintain Applicable WQ Criteria

		Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Arsenic	µg/L	--	125601	42343	82092	680
Barium	µg/L	--	--	47483	473415	4000
Boron	µg/L	--	--	1121019	8031305	65000
Chlorine	mg/L	--	--	3.2	4.6	0.038
Chloroform	µg/L	6066903	--	40242	316385	2600
Copper	µg/L	1678080	645415	5174	7301	59
Total Filterable Residue	mg/L	--	--	325751	--	--
Iron	µg/L	--	5885337	--	--	--
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--
Nitrate + Nitrite	mg/L	--	127110	--	--	--
Selenium	µg/L	14199136	64542	1437	--	--
Strontium	µg/L	--	--	5962353	9672383	81000
Zinc	µg/L	89067305	32270763	68986	58409	470
Ammonia, Summer	mg/L	--	--	298	--	--
Ammonia, Winter	mg/L	--	--	--	--	--

Table 8. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	572	USGS 03150000
7Q10	cfs	annual	676	USGS 03150000
30Q10	cfs	summer	780	USGS 03150000
		winter	1527	USGS 03150000
Harmonic Mean	cfs	annual	3044	USGS 03150000
Mixing Assumption	%	average	25	
	%	maximum	25	
Hardness	mg/L	annual	222	OEPA Station 611780, N=5, 2006-07
pH	S.U.	summer	8.04	Stations R19S09 and R19S06
Temperature	°C	summer	25.3	Stations R19S09 and R19S06
Duke Energy flow	cfs	annual	0.59	95th percentile monthly averages
Background Water Quality				
Arsenic	µg/L		2.7	OEPA; 2006; N=5; 0<MDL; Station R16P01, Median Value
Barium	µg/L		55	OEPA; 2006; N=5; 0<MDL; Station R16P01, Median Value
Boron	µg/L		0	No representative data available.
Chlorine	mg/L		0	No representative data available.
Chloroform (Trichloromethane)	µg/L		0	No representative data available.
Copper	µg/L		0	OEPA; 2006; N=5; 5<MDL; Station R16P01, Median Value
Total Filterable Residue	mg/L		368	OEPA; 2006; N=5; 0<MDL; Station R16P01, Median Value
Iron	µg/L		441	OEPA; 2006; N=5; 0<MDL; Station R16P01, Median Value
Magnesium	mg/L		21	OEPA; 2006; N=5; 0<MDL; Station R16P01, Median Value
Manganese	µg/L		104	OEPA; 2006; N=5; 0<MDL; Station R16P01, Median Value
Nitrate + Nitrite	mg/L		1.53	OEPA; 2006; N=5; 0<MDL; Station R16P01, Median Value
Selenium	µg/L		0	OEPA; 2006; N=5; 5<MDL; Station R16P01, Median Value
Strontium	µg/L		258	OEPA; 2006; N=5; 0<MDL; Station R16P01, Median Value
Zinc	µg/L		0	OEPA; 2006; N=5; 5<MDL; Station R16P01, Median Value
Ammonia, Summer	mg/L		0	OEPA; 2006; N=5; 4<MDL; Station R16P01, Median Value

Table 8. Instream Conditions and Discharger Flow - Continued.

Parameter	Units	Season	Value	Basis
Ammonia, Winter	mg/L		0	OEPA; 2006; N=5; 4<MDL; Station R16P01, Median Value

Definitions:
MDL Minimum detection level;
N Number of samples;
OEPA Ohio Environmental Protection Agency;
USGS United States Geological Survey.

Table 9. Water Quality Criteria in the Study Area.

		Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Arsenic	µg/L	--	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Boron	µg/L	--	--	3900	33000	65000
Chlorine	mg/L	--	--	0.011	0.019	0.038
Chloroform (Trichloromethane)	µg/L	4700c	--	140	1300	2600
Copper	µg/L	1300	500	18	30	59
Total Filterable Residue	mg/L	--	--	1500	--	--
Iron	µg/L	--	5000	--	--	--
Magnesium	mg/L	--	--	--	--	--
Manganese	µg/L	--	--	--	--	--
Nitrate + Nitrite	mg/L	--	100	--	--	--
Selenium	µg/L	11000	50	5	--	--
Strontium	µg/L	--	--	21000	40000	81000
Zinc	µg/L	69000	25000	240	240	470
Ammonia, Summer	mg/L	--	--	0.9	--	--
Ammonia, Winter	mg/L	--	--	--	--	--

Table 10. Parameter Assessment

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

Magnesium	Manganese

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

Chloroform (Trichloromethane)	Iron

Group 3: PEQ_{max} < 50 percent of maximum PEL and PEQ_{avg} < 50 percent of average PEL.
No limit recommended; monitoring optional.

Arsenic	Barium	Boron
Total Filterable Residue	Nitrate + Nitrite	Selenium
Strontium	Zinc	

Group 4: PEQ_{max} >= 50 percent, but < 100 percent of the maximum PEL or
PEQ_{avg} >= 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.

Chlorine	Copper

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.

There are no Group 5 Parameters.

Definitions:
- PEL Preliminary effluent limit;
- PEQ Projected effluent quality;
- WLA Wasteload allocation;
- WQS Water quality standards.

Table 11. Final effluent limits and monitoring requirements for Dynegy Washington Plant, Outfalls 0IB00028001, 0IB00028602, 0IB00028603 and 0IB00028604 and the basis for their recommendation.

Parameter	Units	Effluent Limits				Basis
		Concentration		Loading (kg/day)		
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Outfall 001:						
Water Temperature	°F	Monitor		--	--	BTJ
Thermal Discharge	MBTU/hr	Monitor		--	--	BTJ
Chemical Oxygen Demand	mg/L	Monitor		--	--	BTJ
Total Suspended Solids	mg/L	30	100	26.1	87.1	FEG
Oil and Grease	mg/L	10	--	--	--	WQS
Zinc	µg/L	Monitor		--	--	BTJ
Copper	µg/L	Monitor		--	--	RP
Total Residual Oxidants	mg/L	Monitor		--	--	BTJ
Flow Rate	MGD	Monitor		--	--	BTJ
Total Residual Chlorine	mg/L	--	0.20*	--	--	FEG
Acute Toxicity, Ceriodaphnia dubia	TUa	Monitor		--	--	BTJ
Acute Toxicity, Pimephaels promelas	TUa	Monitor		--	--	BTJ
pH	S.U.	6.5 Min	9.0 Max	--	--	WQS
Total Filterable Residue	mg/L	Monitor		--	--	BTJ
Chlorination/bromination duration	min	--	120*	--	--	FEG/WQS
Carbonaceous Oxygen Demand, 5 day	mg/L	Monitor		--	--	BTJ
Outfall 602:						
pH	S.U.	Monitor		--	--	BTJ
Total Suspended Solids	mg/L	30	100	8.06	26.9	FEG
Oil and Grease	mg/L	15	20	4.0	5.4	FEG
Flow Rate	MGD	Monitor		--	--	BTJ
Outfall 603:						
pH	S.U.	Monitor		--	--	BTJ
Total Suspended Solids	mg/L	30	100	1.42	4.73	FEG
Oil and Grease	mg/L	15	20	0.71	0.95	FEG
Flow Rate	MGD	Monitor			--	BTJ
Outfall 604:						
Flow Rate	GPD	Monitor		--	--	BTJ
Total Suspended Solids	mg/L	30	100	--	--	FEG
Oil and Grease	mg/L	15	20	--	--	FEG
Iron	µg/L	1000	1000	--	--	FEG
Copper	µg/L	1000	1000	--	--	FEG

*Outfall 001 is used when chlorination/bromination lasts less than 120 minutes and the limit for chlorine is 0.20 mg/L based on FEG. Outfall 091 is used when chlorination/bromination lasts greater than 120 minutes and the limit for chlorine is 0.038 mg/L based on WQS.

Definitions: BTJ = Best Technical Judgment;
FEG = Federal Effluent Guidelines found in 40 CFR 423.15;
RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits [OAC 3745-33-07(A)];
WQS = Ohio Water Quality Standards (OAC 3745-1-07).

APPENDIX I. Summary of Applicable Federal Effluent Guidelines (FEG)

40 CFR 423.15 (c) New Source Performance Standard (NSPS) limitations for low volume waste sources.

Pollutant or pollutant property	NSPS effluent limitations	
	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

(Applicable to outfalls 001, 091, 602 and 603)

40 CFR 423.15 (d) NSPS limitations for chemical metal cleaning wastes.

Pollutant or pollutant property	NSPS effluent limitations	
	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

(Applicable to outfall 604)

40 CFR 423.15 (h)

Pollutant or pollutant property	NSPS effluent limitations
	Maximum concentration (mg/l)
Total residual chlorine	0.20

(Applicable to outfall 001)

APPENDIX II Approved Cooling Water Additives

Product / Chemical	Manufacturer	Use – Purpose	Expected Outfall Concentration (mg/L)	Date Approved
Spectrus NX1100	GE Betz	Control cooling water microbial growth	0.0	01/27/2003
Spectrus DT1404	GE Betz	Dechlorinate cooling tower blowdown	5	11/12/2003
Cortrol OS5607	GE Betz	Corrosion protection for cooling tower system	10	11/12/2003
Sodium Hypochlorite	Brenntag	Cooling system biocide	0.038	11/12/2003
Sulfuric Acid		pH control for cooling system	Within pH limits of the NPDES permit	11/12/2003
Depositrol BL5323	GE Betz	Corrosion inhibitor/deposit control for cooling system	30	11/12/2003
Flogard MS6222	GE Betz	Corrosion inhibitor for main cooling system	8	11/12/2003
Dianodic DN300	GE Betz	Corrosion inhibitor/dispersant for intake chiller system	8	11/12/2003
Steamate NA1321	GE Betz	pH control for boiler water	0.5	11/12/2003
Optisperse PO 5070	GE Betz	Aux Boiler corrosion protection	0.4	11/12/2003
Optisperse HP3100	GE Betz	pH control for Aux Boiler	1	11/12/2003
Inhibitor AZ8104	GE Betz	Corrosion inhibitor for inlet chiller system	0.00	08/12/2003
Sodium Hydroxide		Control pH in cooling tower system	Within pH limits of the NPDES permit	06/14/2005

Product / Chemical	Manufacturer	Use – Purpose	Expected Outfall Concentration (mg/L)	Date Approved
Gengard GN7113	GE Betz	Inhibit corrosion in the cooling tower system	5.0	01/12/2012
Depositrol BL6501	GE Betz	Control deposits in the cooling tower system	5.0	01/12/2012
Depositrol BL5400	GE Betz	Control scaling in cooling tower system	4.0	10/29/2013
Gengard GN 7004	GE Betz	Control scaling in cooling tower system	9.0	10/29/2013
Klaraid IC1172	GE Betz	Reduce turbidity of intake water system	0.5	02/03/2014

APPENDIX III. Thermal Wasteload Allocation

Background flows:	Average = Summer 30Q10 = 726.8 cfs Maximum = Summer 1Q10 = 537 cfs
25% of flows:	Average = 181.7 cfs Maximum = 134.3 cfs
Facility flow:	0.39 MGD = 0.60 cfs (95th percentile of monthly averages for past two years)

Summer Temperatures

	Maximum	Average
Upstream	76.7	75.8
WQS	89	85

Upstream temperature data from 0IB00003801.
Average = 75th percentile of monthly averages June through September
Maximum = 75th perceentile of data from June through September

WQS from OAC 3745-1-07 E

Summer maximum = (134.3 cfs)(0.646 MGD/cfs)(8.34 lb/gal)(89-76.7)
= 8900 MBTU/day
= 370 MBTU/hr

Summer average = (181.7 cfs)(0.646 MGD/cfs)(8.34 lb/day)(85-75.8)
= 9006 MBTU/day
= 375 MBTU/hr

Reasonable Potential Analysis

	Allocation MBTU/hr	PEQ MBTU/hr	PEQ % of WLA	Group
Maximum	370	22	5.9	2
Average	375	16	4.3	2