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 **the Orion Power Midwest, L.P. – Avon Lake Power Plant**

Public Notice No.: 11-03-062
Public Notice Date: March 25, 2011
Comment Period Ends: April 25, 2011

OEPA Permit No.: **3IB00002*KD**
Application No.: (OH #) **OH0001112**

Name and Address of Applicant:

Orion Power Midwest, L.P.
121 Champion Way, Suite 200
Canonsburg, Pennsylvania 15317

Name and Address of Facility Where Discharge Occurs:

Avon Lake Power Plant
33570 Lake Road
Avon Lake, Ohio 44012
Lorain County

Receiving Water: **Lake Erie**

Subsequent Stream Network: --

Introduction

Development of a Fact Sheet for NPDES permits is required by Title 40 of the Code of Federal Regulations, 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 and other treatment-technology based standards, existing effluent quality, instream biological, chemical and physical conditions, and the allocations of pollutants to meet Ohio Water Quality Standards. This Fact Sheet details the discretionary decision-making process empowered to the director by the Clean Water Act and Ohio Water Pollution Control Law (ORC 6111). Decisions to award variances to Water Quality Standards 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 Proposed Permit Conditions

Monitoring requirements for water temperature, total residual oxidants (TRO), pH, flow rate, total residual chlorine (TRC), and chlorination/bromination duration is proposed to continue at outfall 001. In addition, limits for TRO, TRC, and chlorination/bromination duration are also proposed to remain in the permit. Monitoring requirements for thallium have been removed.

For outfall 002, monitoring requirements are proposed to continue from the existing permit for total suspended solids (TSS), oil and grease, copper, flow rate, mercury, and pH. Limits are proposed to continue for TSS, oil and grease, and pH. Monitoring for chlorine has been added to the draft permit. Based upon an application submitted by the permittee, the permit includes a variance-based limit for mercury at outfall 002 for the average criterion. Three new parameters have been added to the effluent table for this outfall to report exceedances of pH limits.

At outfall 004, all the existing monitoring requirements and limits are proposed to continue with the exception of selenium and toxicity which have been removed. Permit requirements at other monitoring stations are proposed to continue from the existing permit. In addition, the permittee must comply with the requirements of Section 316(b) of the Clean Water Act and any rules promulgated to implement Section 316(b) regarding the use of the best technology available to minimize adverse environmental impact (i.e., fish impingement and entrainment). Finally, Part II of the permit includes a requirement to install signs at all outfalls discharging to Lake Erie, and also a requirement to develop notification procedures with regard to the City of Avon Lake since their public water supply intakes are within 3000 feet of Avon Lake Power Plant discharge locations.

This permit renewal is proposed for a term of approximately **four and one-half years**, expiring on **July 31, 2015**. This schedule will allow the Avon Lake Power Plant permit to be on a similar schedule with the other facilities within the same watershed basin.

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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
Lazarus Government Center
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 and Compliance Section
Lazarus Government Center
P.O. Box 1049
Columbus, Ohio 43216-1049

The OEPA 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 Mike Stevens [phone: (330) 963-1143; email: mike.stevens@epa.state.oh.us] in Ohio EPA's Northeast District Office, or Mike McCullough [phone: (614) 644-4824; email: mike.mccullough@epa.state.oh.us] in Ohio EPA's Central Office.

Location of Discharge/Receiving Water Use Classification

The Avon Lake Power Plant owned by Orion Power Midwest discharges directly to Lake Erie through outfalls 001, 002, and 004. This segment of Lake Erie is described by Ohio EPA River Code 24-500, U.S. EPA River Reach # NA, and the Erie-Ontario Lake Plain (EOLP) Ecoregion. Lake Erie is presently designated for the following uses: Exceptional Warmwater Habitat (EWH), Superior High Quality Water (SHQW), Public Water Supply (PWS), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Bathing Waters (BW). The approximate location of this facility is shown in Figure 1.

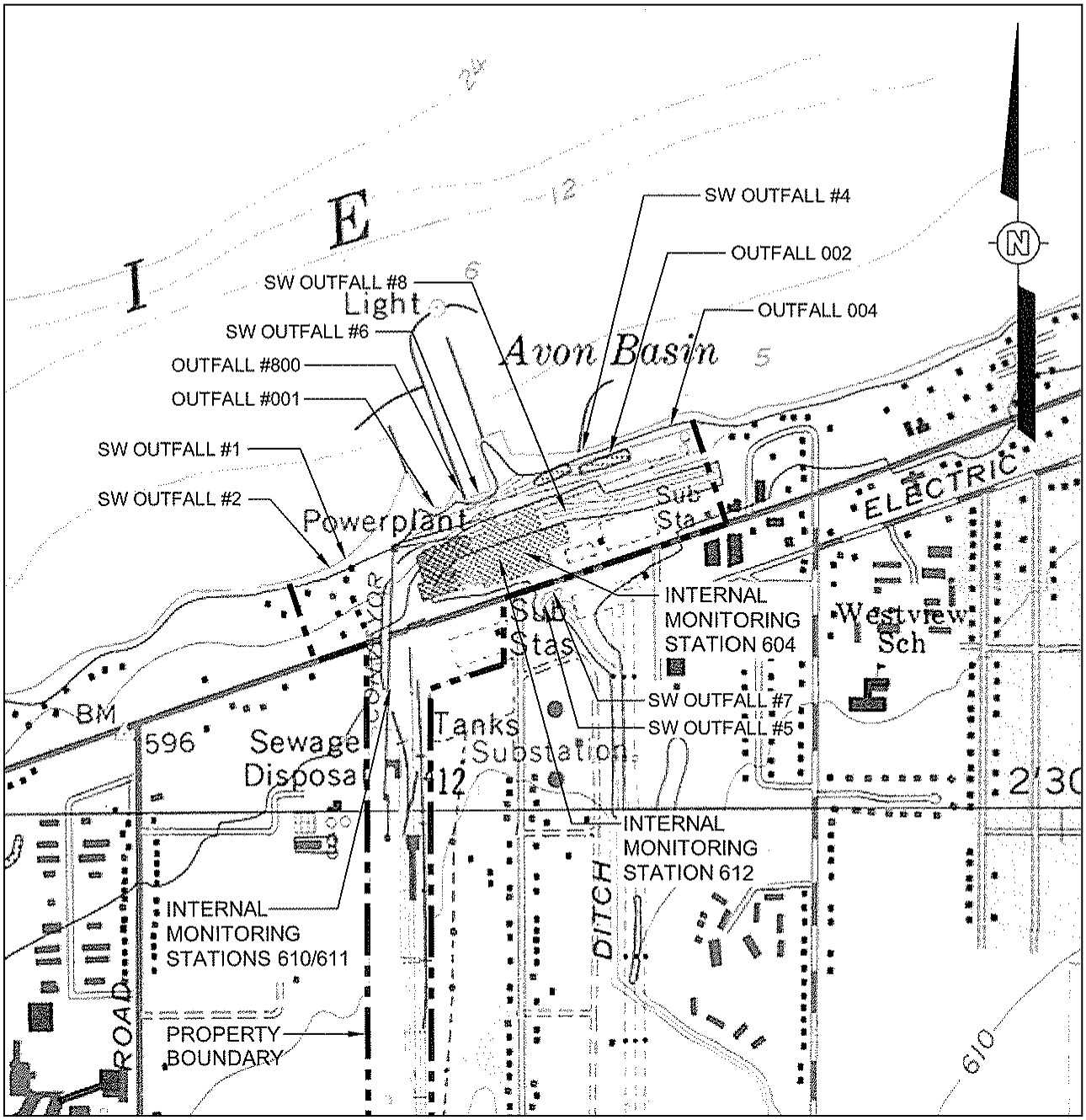

Figure 1. Location of Avon Lake Power Plant

Use designations define the goals and expectations for a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio Water Quality Standards, or the Ohio Administrative Code (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the OAC. Once the goals are set, numeric water quality standards are developed to protect these uses; higher quality uses typically have more protective 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 Water Quality Standards (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 Avon Lake Plant is a coal-fired steam-electric generating station. This facility is involved in the generation, transmission, and distribution of electric power. The daily production rate is approximately 800 megawatts of electricity.

The Avon Lake Plant's processes generate wastewaters which are regulated by the federal effluent guidelines (FEGs) listed in 40 CRF Part 423, Steam Electric Power Generating Point Source Category. The process operations at this facility are also defined by the standard industrial classification (SIC) category 4911 - Electric Services.

Discharges from the Avon Lake Power Plant

Outfall 001 discharges directly to Lake Erie at the rate of approximately 387 million gallons per day (MGD) based upon the permit renewal application. The wastewater flowing from this outfall consists of the once-through condenser cooling water and boiler blowdown.

Table 1. Description of Avon Lake Power Plant Outfalls

Outfall #	Type of Wastewater	Treatment System Used	Discharge Point	Ave. Discharge (in MGD)*
001	Cooling water discharge, boiler blowdown, heat exchanger	- Disinfection	Lake Erie	387
002	Ash transport water, coal pile runoff, metal cleaning	- Sedimentation - Chemical precipitation - Gravity filtration	Lake Erie	0.94
004	Low volume waste system, oily water separator, floor drains	- Sedimentation - Neutralization - Gravity filtration - Disinfection	Lake Erie	1.17

*Flow rates are based upon the NPDES permit renewal application.

Outfall 002 is designed to discharge the ash transport water from the ash settling basin. This basin receives fly ash and bottom ash as well as wastewater from the metal cleaning processes and coal pile run-off. Wastewater is treated by sedimentation and gravity filtration prior to being discharged into Lake Erie. The average discharge from this outfall is 0.94 MGD according to the NPDES application.

Oily wastewater which is a constituent of the low-volume waste system is discharged through outfall 004. Prior to being discharged to Lake Erie, this wastewater is treated by sedimentation and gravity filtration. The average daily flow at this outfall has been 1.17 MGD based upon the NPDES renewal application.

Several internal outfalls contribute flow to outfalls 001 and 002. Boiler blowdown from internal outfall 604 and non-contact cooling water from the unit #9 heat exchanger (internal outfall 612) flow through external outfall 001. In addition to coal pile runoff, metal

Table 2. Flows for Outfalls 001, 002, and 004

Year	Flow in MGD		
	50th Percentile	95th Percentile	Maximum
Outfall 001			
2005	379.	599.	599.
2006	379.	599.	599.
2007	391.	599.	599.
2008	379.	548.	599.
2009	317.	478.	599.
2010	379.	599.	599.
Overall	379.	599.	599.
Outfall 002			
2005	0.91	2.31	4.5
2006	1.06	1.39	1.96
2007	0.77	1.35	1.98
2008	0.83	1.24	9.88
2009	0.92	1.45	6.7
2010	0.84	1.28	1.82
Overall	0.89	1.4	9.88
Outfall 004			
2005	1.08	2.43	2.76
2006	1.21	1.70	2.15
2007	1.24	1.87	2.42
2008	1.08	1.78	2.14
2009	1.03	1.49	2.23
2010	0.76	1.36	1.85
Overall	1.07	1.9	2.76

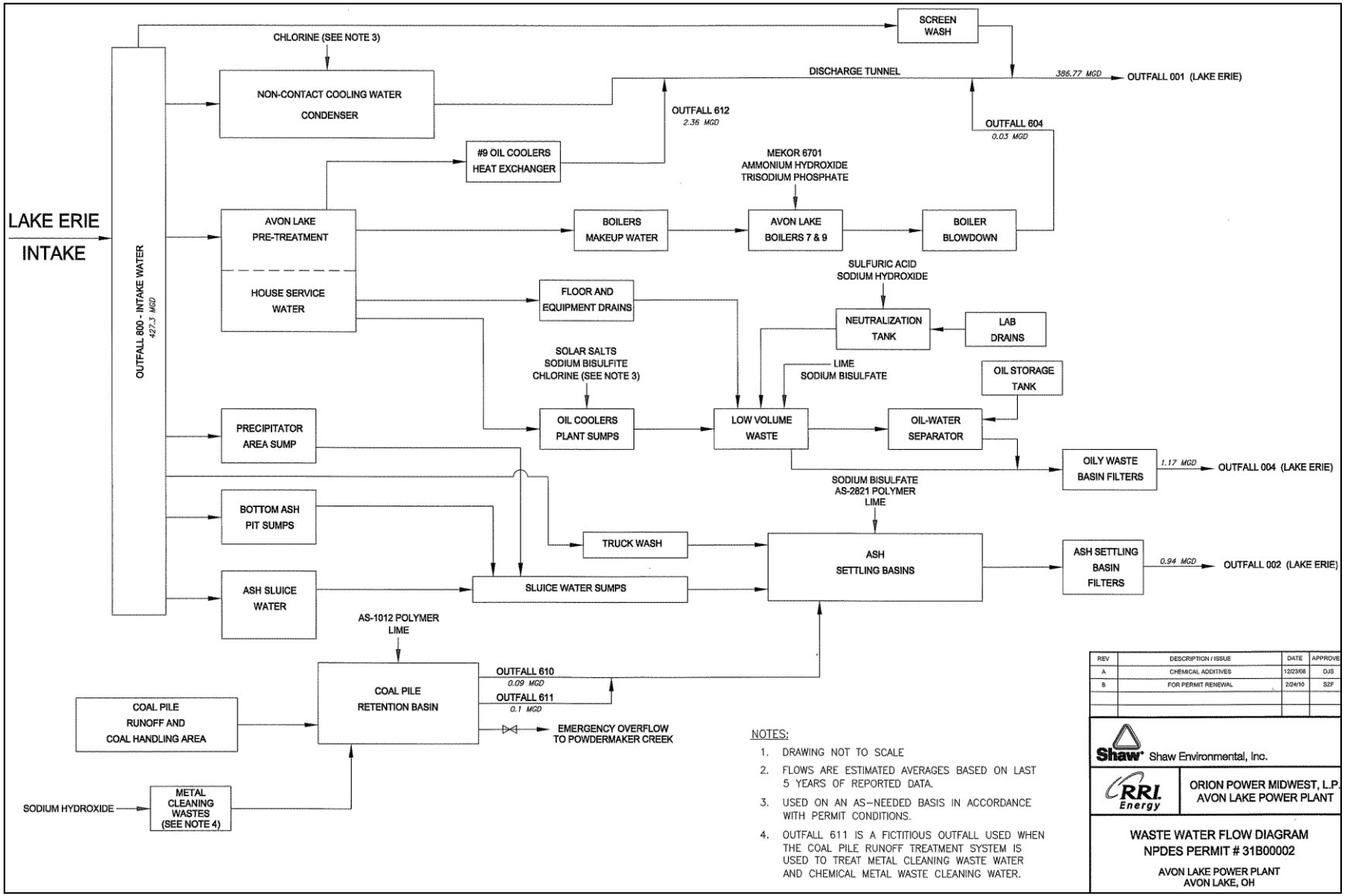

Figure 2. Wastewater Flow Diagram

cleaning wastewater is discharged into the coal pile retention basin and is treated by neutralization, chemical precipitation, and pressure filtration prior to flowing through internal monitoring station 610. Flow from internal station 610 enters the ash settling basin for ultimate discharge through external outfall 002.

The Avon Lake Plant obtains its water for cooling purposes from an intake located in Lake Erie. This water is disinfected with chlorine prior to its use in the plant. The NPDES renewal application states that the average daily flow value for intake station 800 is 427 MGD. See Figure 2 for a flow diagram of the facility outfalls and treatment systems.

Table 3. Reported Effluent Limit Violations at Avon Lake Power Plant: 2005 – July 2010

Parameter	Concentration	Loadings
Outfall 002		
Total suspended solids	2	--
pH, Minimum	8	
pH, Maximum	8	
Outfall 004		
pH, Minimum	6	
pH, Maximum	8	
Outfall 604		
Total suspended solids	--	1
Outfall 610		
Total suspended solids	2	10
Outfall 611		
Total suspended solids	2	18

The wastewater discharge flow rates from 2005 through July 2010 for outfalls 001, 002, and 004 are shown in Table 2 on page 8. Reported 50th percentile flow rates for these outfalls have remained constant throughout this period. The 95th percentile discharge amounts have shown somewhat more variability.

From January 2005 through July 2010, the Avon Lake Power Plant has reported a number of sample results which were numeric violations of permit limits. (See Table 3.) Many of these violations involved the limits for total suspended solids (TSS) at internal stations 604, 610, and 611. However, numerous pH violations were reported as well at outfalls 002 and 004. The majority of the TSS violations occurred in 2005 and 2006, while pH violations occurred throughout the time period.

Assessment of Impact on Receiving Waters

Recent biological data for Lake Erie is not available to assess the water quality impact of permitted discharges from the Avon Lake Power Plant. Figure 3 on page 11 shows the assessment of water quality based upon information in Ohio EPA's *2010 Integrated Report*.

Impingement and Entrainment

In order to fulfill requirements under federal regulations adopted in 2004 associated with large, existing power plants[1], the Avon Lake Power Plant conducted sampling in 2006 at their cooling water intake structure (CWIS) to determine the number of fish impinged on the screens and entrained through the facility. Based upon this study, Orion Power estimated impingement to be approximately 12.2 million fish using actual flows rates to extrapolate to an annualized value. The annual rate of impingement is 21.9 million when the design flow rate (or the maximum withdrawal flow rate for the facility which is possible) is used for extrapolation. The majority of the impinged fish were identified as emerald shiner and gizzard shad.

[1] These regulations, which were adopted to implement Section 316(b) of the Clean Water Act, were suspended by U.S. EPA in 2007 after a federal court overturned significant provisions. States have been directed by U.S. EPA to use best professional judgement (BPJ) to implement the requirements of Section 316(b) in the absence of federal regulations.

Based upon actual withdrawal flow rates, the annual estimates for entrainment were approximately 25.8 million larval and juvenile-size fish. (No fish eggs were reported for the entrainment sampling.) Annual entrainment is estimated at 33 million when extrapolation is done using the design flow. Emerald shiner, yellow perch, and gizzard shad characterized the dominant species which were entrained at the Avon Lake Power Plant during 2006.

The cooling water intake structure (CWIS) at the Avon Lake Power Plant includes vertical traveling screens for nine of ten operating intake bays. The screens consist of 3/8 inch openings, and through-screen intake flow velocity is 1.5 feet per second at maximum capacity.

Ohio EPA has determined that the current intake structure does not represent "best technology available" (or BTA) as required by the Clean Water Act. However, at this time, Ohio EPA has decided to defer imposing a solution for meeting BTA for this facility, awaiting: 1) further information from the permittee regarding technical and economic analyses of possible technological and/or operational changes to reduce impingement and entrainment (I/E); 2) publication of draft federal rules addressing cooling water intake structures applicable to large power plants; and 3) possible comments and suggestions from U.S EPA for reducing I/E.

Assessment Unit Name: Lake Erie Central Basin Shoreline

Monitoring Scheduled: 2012
TMDL Scheduled: 2015

Aquatic Life Use Assessment

Reporting Category: 5
Sampling Years: 1999, 2000, 2002
Total Shoreline Miles: 132.4
Shoreline Miles Monitored: 72.7
Sites Monitored: 17
Sites Full Attainment: 3 (17.7%)
Sites Partial Attainment: 4 (23.5%)
Sites Non Attainment: 10 (58.8%)

Causes of Impairment:

- nutrients
- siltation
- direct habitat alterations
- exotic species

Sources of Impairment:

- municipal point sources
- combined sewer overflows
- non-irrigated crop production
- urban runoff/storm sewers
- streambank modification/destabilization
- habitat modifications other than hydromodification

Comments: No nearshore Lake Erie monitoring by the Ohio EPA has occurred since 2002.

Recreation Use Assessment

Reporting Category: 5

Public Drinking Water Supply Assessment

Reporting Category: 1
Nitrate Watch List: No
Pesticide Watch List: No

Fish Tissue Assessment

Reporting Category: 5x

Figure 3. Central Basin of Lake Erie Water Quality Assessment (*Ohio EPA 2010 Integrated Report*)

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. Although the locations of the external outfalls for the Avon Lake Plant are relatively near one another, the discharges have not been modeled interactively; given the methodology which must be used to develop waste load allocations for a lake discharger, considering these outfalls to be interactive would not change the parameter assessment results. (See the section below entitled, "Waste Load Allocation".)

Parameter Selection

Effluent data for the Avon Lake Power Plant were used to determine what parameters should undergo wasteload allocation. The sources of effluent data are as follows:

Self-monitoring data (Discharge Monitoring Reports)	January 2005 - August 2010
NPDES permit renewal application	2010

The effluent data were checked for outliers and one value for copper (286 ug/l) was removed in the dataset for outfall 004. The remaining data was evaluated statistically, and Projected Effluent Quality (PEQ) values were calculated for each pollutant. PEQ_{avg} values represent the 95^{th} percentile of monthly average data, and PEQ_{max} values represent the 95^{th} percentile of all data points. The average and maximum projected effluent quality (PEQ) values are presented in Table 6. For a summary of the screening results, refer to the parameter groupings on pages 30 through 32.

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 parameter does not have the reasonable potential to cause or contribute to exceedances of WQS, and no wasteload allocation is done for that parameter. If either the PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a wasteload allocation is conducted to determine whether the parameter exhibits reasonable potential (and needs to be limited) or if monitoring is required.

Wasteload Allocation

For those parameters that require a wasteload allocation (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 (WQS - OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. Wasteload allocations for average criteria using this method are done using the following general equation for direct dischargers to Lake Erie: Discharger WLA = (11 x WQS) - (10 x background concentration).

For direct dischargers to lakes, the waste load allocations for maximum criteria (or Outside Mixing Zone Maximum, OMZM) are set equal to the Inside Mixing Zone Maximum criteria. The values for the OMZM are left blank in Table 8 to indicate that any limits based upon a maximum WLA are actually represented by the Inside Mixing Zone Maximum criteria. The wasteload allocation values in Table 9 would allow the Avon Lake Station to maintain all applicable water quality criteria. Allocations cannot exceed the Inside Mixing Zone Maximum criteria.

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

Reasonable Potential

After appropriate effluent limits are calculated by wasteload allocation, the lowest most restrictive average and maximum values are selected from Table 8 and are referred to as Preliminary Effluent Limits (PEL_{avg} and PEL_{max} respectively). The reasonable potential of the discharger to exceed the wasteload allocation (PEL values) is determined by comparing the PEQ_{avg} (Table 5) to the PEL_{avg} and the PEQ_{max} to the PEL_{max} for each parameter. Based on this comparison, each parameter is placed in a defined "group". Parameters that do not have a water quality standard (WQS) or do not require a WLA based on the initial screening are assigned to either group 1 or 2. Parameters are assigned to group 3, 4, or 5 depending on how close the PEQ value is to the allocated value or PEL. The groupings listed in Tables 9-001 and 9-003 reflect the reasonable potential hazard assessment done according to WLA procedures.

Whole Effluent Toxicity WLA

Whole effluent toxicity or "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 for flowing streams. However, in accordance with the Rule 3745-2-09 of the OAC, the AET for acute toxicity is set equal to 1.0 TU_a for lake dischargers. For the Avon Lake Power Plant, the wasteload allocations are 1.0 TU_a and 11.0 TU_c for outfalls 001, 002, and 004.

Effluent Limits/Hazard Management Decisions

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Tables 11-001, 11-002, 11-004, 11-604, 11-610, 11-611 and 11-612 show the draft NPDES permit limits and monitoring requirements for the Avon Lake Power Plant.

Federal and State laws/regulation require that dischargers meet both treatment-technology-based limits and any more stringent standards needed to comply with state WQS. Permit limits are based on the more restrictive of the two. Treatment-technology-based limits for the Avon Lake Power Plant, found in 40 CFR Part 423, Steam Electric Power Generating Point Source Category, are based on the milligrams of pollutant allowed to be discharged per liter. (See Attachment A for technology-based limits applicable to the Avon Lake Power Plant.)

The limits and monitoring requirements for each outfall are discussed in detail below and the corresponding "Final Effluent Limits" table is referenced.

Outfall 001: Table 11-001

The Ohio EPA risk assessment (Table 10-001) places total residual chlorine in Group 5, and recommends limits to protect water quality. However, the maximum daily limit of 0.038 mg/l for chlorine has not been included in the permit since the Avon Lake Power Plant restricts the use of chlorine at this outfall to less than two hours per day. (See the discussion below.)

Monitoring for water temperature, total residual oxidants, flow rate, total residual chlorine, pH, and duration of chlorination/bromination have been continued in the draft permit. Since the discharge from this outfall is non-contact cooling water, it is important to monitor the temperature of the wastewater as it enters Lake Erie. Total residual chlorine includes a limit of 0.2 milligrams per liter (mg/l), which allows chlorination at this outfall for not more than two hours each day, and is based upon the Federal Effluent Guidelines for steam-electric power plants. The limit of 0.05 mg/l for total residual oxidants, which is based upon best professional judgement regarding the relative toxicity of bromine, allows the Avon Lake Power Plant to discharge bromine, or bromine and chlorine compounds for not more than two hours per day. Limits for pH are also proposed to continue.

Figure 4 shows that the discharge temperature at outfall 001 ranges from approximately 30 °F to slightly more than 100 °F. The maximum differential between the intake and outfall temperatures is approximately 25 °F. Based upon this information, Ohio EPA believes that reasonable potential for temperature is not triggered at outfall 001 by this discharge.

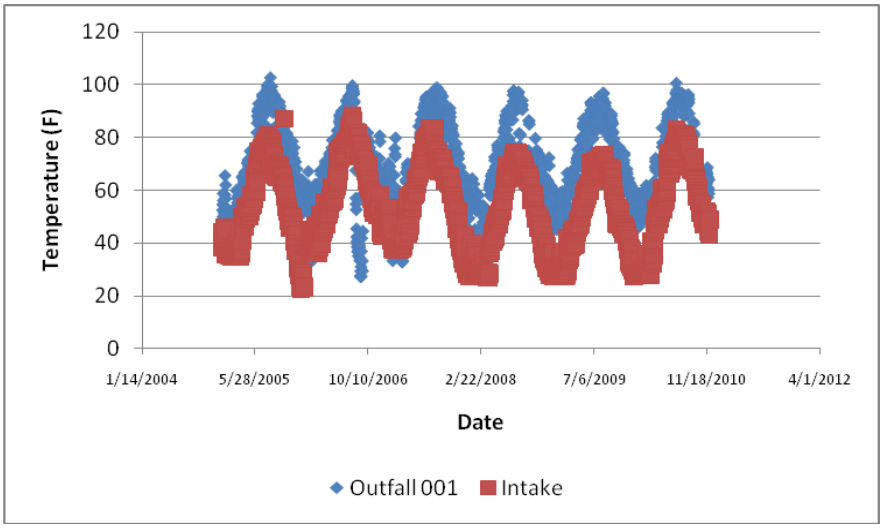

Figure 4. Temperature: Intake vs. Outfall 001 (2005 – 2010)

Several additional parameters with water quality criteria (aluminum, ammonia, barium, chromium, copper, iron, manganese, nickel, and titanium) were detected in the effluent from outfall 001, but were not allocated since the concentration of the pollutant was less than 110 percent of its concentration in the intake water.[2] This determination has been made in accordance with Rule 3745-2-06 of the Ohio Administrative Code, and has been based upon the data reported in the NPDES permit renewal application.

Outfall 002: Table 11-002

Total Residual Chlorine. The Ohio EPA risk assessment (Table 10-002) places total residual chlorine in Group 5, and recommends limits to protect water quality. However, this assessment is based upon only one sample which may not be representative of effluent quality. Based on the discretion which is

[2] A threshold of 110 percent has been used in order to allow for possible sampling and/or analytical error.

granted to the Director under rule 3745-33-07(A) of the Ohio Administrative Code, monitoring only has been proposed for this parameter.

Mercury. Mercury has also been placed in Group 5, and in anticipation of receiving a limit for this pollutant, the permittee has applied for coverage under the general mercury variance, Rule 3745-33-07(D)(10) of the Ohio Administrative Code. Based on the results of low-level mercury monitoring, the permittee has determined that its wastewater treatment plant cannot meet the 30-day average water quality-based effluent limit (WQBEL) of 1.3 nanograms per liter (ng/l). However, the permittee believes that the plant will be able to achieve an annual average mercury effluent concentration of 12 ng/l. The variance application also demonstrated to the satisfaction of Ohio EPA that there is no readily apparent means of complying with the WQBEL without constructing prohibitively expensive end-of-pipe controls for mercury. Based on these factors, the permittee is eligible for coverage under the general mercury variance.

Ohio EPA has reviewed the mercury variance application and has determined that it meets the requirements of the Ohio Administrative Code. Items K and L in Part II of the draft NPDES permit list the provisions of the mercury variance, and includes the following requirements:

- A variance-based monthly average effluent limit of 8.0 ng/l, which was developed from sampling data submitted by the permittee;
- A requirement that the permittee make reasonable progress to meet the water-quality-based effluent limit for mercury by implementing the plan of study, which has been developed as part of the Pollutant Minimization Program (PMP);
- Low-level mercury monitoring of the plant's influent and effluent;
- A requirement that the annual average mercury effluent concentration is less than or equal to 12 ng/l as specified in the plan of study;
- A summary of the elements of the plan of study;
- A requirement to submit an annual report on implementation of the PMP; and
- A requirement for submittal of a certification stating that all permit conditions related to implementing the plan of study and the PMP have been satisfied, but that compliance with the monthly average water quality-based effluent limit for mercury has not been achieved.

The permit also includes a new monitoring station (Station 601) to record the mercury concentration of the influent of the wastewater to the ash settling basin prior to any treatment. Mercury samples for station 601 must be collected one detention time prior to samples collected for outfall 002 in order to provide data which is appropriate for determining the mercury removal rate in the ash settling basin. The Avon Lake Power Plant is required to continue using EPA Method 1631 for mercury analysis due to the phase-out of the use of mixing zones for development of wasteload allocations for pollutants such as mercury. [3]

Copper. The Ohio EPA risk assessment places copper in group 4. This placement as well as the data in Tables 5 and 6 indicate that this pollutant should not pose environmental hazards and limits are not necessary to protect water quality. Monitoring for Group 4 parameters is required in accordance with the Ohio Administrative Code and has been included in the draft permit.

[3] As of November 15, 2010, the use of mixing zones to determine the waste load allocation for bioaccumulative chemicals of concern (BCCs) was no longer allowed. This means that limits for BCCs after November 2010 must meet water quality standards with no allowances for dilution. Since mercury is considered a BCC, discharges must comply with water quality standards at that time.

pH. Three new parameters have been added to the effluent table for this outfall to report exceedances of pH limits. The addition of these parameters replaces the language in Part II of the permit for reporting pH exceedances.

Total Suspended Solids and Oil & Grease. Limits for total suspended solids (TSS) and oil & grease at this outfall have been continued from the existing permit, and are based upon the Federal Effluent Guidelines for steam-electric generating stations. Loading limits are based upon a flow rate of 3.38 MGD.

Outfall 004: Table 11-004

Total Residual Chlorine and Total Residual Oxidants. The Ohio EPA risk assessment places total residual chlorine in Group 5. This placement as well as the data in Tables 5 and 6 indicate that limits are necessary to protect water quality. The parameter assessment for this pollutant is based upon only one sample which would not normally result in a permit limit. However, limits for both total residual chlorine and total residual oxidants were included in the existing permit to allow the discharge of additives which contain chlorine and/or bromine, and these limits are proposed to continue in this permit.

Copper. The Ohio EPA risk assessment places copper in group 4. This placement as well as the data in Tables 5 and 6 indicate that this pollutant should not pose environmental hazards and limits are not necessary to protect water quality. Monitoring for Group 4 parameters is required in accordance with the Ohio Administrative Code and has been included in the draft permit.

Total Suspended Solids, Oil & Grease, pH, and Flow Rate. Limits for total suspended solids (TSS), oil and grease, and pH have been continued at this outfall from the existing permit, and are based upon the Federal Effluent Guidelines for steam-electric generating stations. Three new parameters have been added to the effluent table for this outfall to report exceedances of pH limits. The addition of these parameters replaces the language in Part II of the permit for reporting pH exceedances.
Loading limits for TSS and oil and grease are based upon a flow rate of 3.35 MGD. Flow rate monitoring is also required.

Outfall 604: Table 11-604

The draft permit includes limits for total suspended solids and oil and grease, and monitoring for pH at this outfall which discharges boiler blowdown. These requirements are based upon the Federal Effluent Guidelines. The requirements for this outfall are proposed to continue from the existing permit.

Outfall 610: Table 11-610

This outfall discharges wastewater from coal-pile run-off. The limits for total suspended solids and the monitoring requirements for pH are based upon the Federal Effluent Guidelines. The requirements for this outfall are proposed to continue from the existing permit.

Outfall 611: Table 11-611

This is a fictitious outfall which is used only when the coal-pile run-off treatment system is used to treat the metal cleaning wastes. The requirements for this outfall are proposed to continue from the existing

permit. However, in order to be consistent with the Federal Effluent Guidelines, limits have also been added to this table for iron and copper.

Outfall 612: Table 11-612

This outfall discharges wastewater from the heat exchanger for unit #9. Based upon best engineering judgement, the monitoring requirements for this outfall are proposed to continue from the existing permit.

Impingement/Entrainment Reductions

The permit includes a condition in Part II requiring the Avon Lake Power Plant to comply with Section 316(b) of the Clean Water Act and any rules promulgated to implement Section 316(b).

Other Requirements

Parts IV, V, and VI have been included in the permit in order for the facility to address all storm water management issues at the site. Also, a requirement for placement of signage at all outfall locations discharging into Lake Erie has been added to Part II of the permit in accordance with rule 3745-33-08(A) of the Ohio Administrative Code.

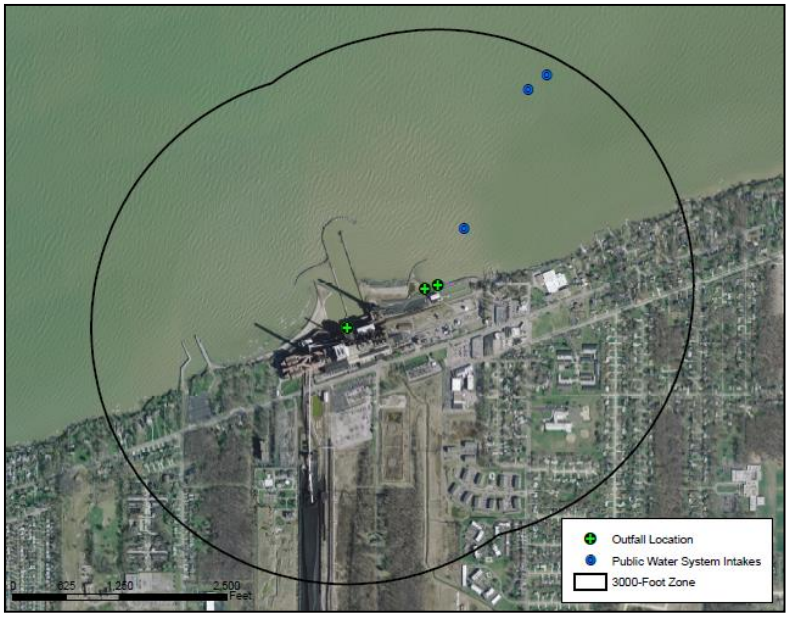

Figure 5. Avon Lake Power Plant Outfalls vs. Water Supply Intakes

An addition to rule 3745-33-08 of the Ohio Administrative Code requires that permittees discharging wastewater into a lake within 3000 feet of a public water supply intake, must develop spill (or bypass) notification procedures in conjunction with the public water supply operator. Since the City of Avon Lake operates three public water supply intakes less than 3000 feet from the power plant outfalls (see Figure , Part II, Item O of the draft permit requires the development of notification procedures within six months after the effective date of the permit.

Whole Effluent Toxicity Reasonable Potential

During the term of the existing permit, the Avon Lake Power Plant conducted 16 acute toxicity tests using the effluent from outfall 004 using *Ceriodaphnia dubia* and fathead minnows for the test species. Only one test was reported with a value above 0.2 TU_a (0.7 TU_a for fathead minnows on June 20, 2007). Since the test on June 20, 2007 may not be representative of effluent quality, Ohio EPA has determined that reasonable potential for acute toxicity does not exist at this outfall, and additional toxicity monitoring is not recommended at this time.

Table 4. Effluent Characterization Based Upon Permit Renewal Application

Parameter	No. of Samples	Concentration
Outfall 001		
Aluminum (ug/l)	1	423.
Ammonia (mg/l)	1	0.119
Barium (ug/l)	1	23.2
Biochemical Oxygen Demand (mg/l)	1	1.0
Boron (ug/l)	1	64.3
Bromide (mg/l)	1	0.017
Chemical Oxygen Demand (mg/l)	1	11.5
Chlorine, Total Residual (mg/l)	1	0.09
Chromium (ug/l)	1	1.1
Copper (ug/l)	1	7.2
Fluoride (mg/l)	1	< 0.003
Iron (ug/l)	1	614
Magnesium (mg/l)	1	8.8
Manganese (ug/l)	1	20.
Methylene Chloride (ug/l)	1	1.67
Molybdenum (ug/l)	1	< 2.44
Nickel (ug/l)	1	2.35
Nitrate-Nitrite as N (mg/l)	1	0.132
Nitrogen, Total Organic as N (mg/l)	1	0.7
Phosphorus (mg/l)	1	0.042
Sulfate (mg/l)	1	42.6
Thallium (ug/l)	1	2.5
Titanium (mg/l)	1	5.85
Total Orgainc Carbon (mg/l)	1	3.63
Total Suspended Solids (mg/l)	1	18.
Zinc (ug/l)	1	15.5
Outfall 002		
Aluminum (ug/l)	1	327.
Ammonia (mg/l)	1	0.18
Arsenic (ug/l)	1	3.35
Barium (ug/l)	1	78.8
Biochemical Oxygen Demand (mg/l)	1	8.
Boron (ug/l)	1	104.
Bromide (mg/l)		
Chemical Oxygen Demand (mg/l)	1	20.8
Chlorine, Total Residual (mg/l)	1	0.33
Chromium (ug/l)	1	1.2
Copper (ug/l)	1	1.8
Dimethyl Phthalate (ug/l)	1	11.6
Fluoride (mg/l)	1	0.256
Iron (ug/l)	1	278.

Table 4. Effluent Characterization Based Upon Permit Renewal Application

Parameter	No. of Samples	Concentration
Magnesium (mg/l)	1	9.58
Manganese (ug/l)	1	7.5
Molybdenum (ug/l)	1	4.4
Nickel (ug/l)	1	1.55
Nitrate-Nitrite as N (mg/l)	1	2.27
Nitrogen, Total Organic as N (mg/l)	1	2.74
Phosphorus (mg/l)	1	0.076
Sulfate (mg/l)	1	40.
Titanium (mg/l)	1	6.45
Total Organic Carbon (mg/l)	1	4.04
Total Suspended Solids (mg/l)	1	4.
Outfall 004		
Aluminum (ug/l)	1	213.
Barium (ug/l)	1	23.2
Biochemical Oxygen Demand (mg/l)	1	1.
Boron (ug/l)	1	26.4
Chemical Oxygen Demand (mg/l)	1	20.2
Chlorine, Total Residual (mg/l)	1	0.03
Copper (ug/l)	1	2.25
Dimethyl Phthalate (ug/l)	1	11.8
Fluoride (mg/l)	1	0.364
Iron (ug/l)	1	293.
Magnesium (mg/l)	1	9.28
Manganese (ug/l)	1	6.35
Methyl Chloride (ug/l)	1	1.71
Molybdenum (ug/l)	1	2.6
Nickel (ug/l)	1	1.7
Nitrate-Nitrite as N (mg/l)	1	1.44
Nitrogen, Total Organic as N (mg/l)	1	0.61
Phosphorus (mg/l)	1	0.025
Sulfate (mg/l)	1	32.5
Titanium (mg/l)	1	3.3
Total Organic Carbon (mg/l)	1	3.26
Intake Station 800		
Aluminum (ug/l)	1	650.
Ammonia (mg/l)	1	0.16
Arsenic (ug/l)	1	2.1
Barium (ug/l)	1	23.9
Biochemical Oxygen Demand (mg/l)	1	1.
Boron (ug/l)	1	24.4

Table 4. Effluent Characterization Based Upon Permit Renewal Application

Parameter	No. of Samples	Concentration
Chemical Oxygen Demand (mg/l)	1	21.8
Chlorine, Total Residual (mg/l)	1	0.08
Chromium (ug/l)	1	1.15
Copper (ug/l)	1	7.9
Dimethyl Phthalate (ug/l)	1	11.7
Fluoride (mg/l)	1	0.195
Iron (ug/l)	1	1020.
Lead (ug/l)	1	2.45
Magnesium (mg/l)	1	8.36
Manganese (ug/l)	1	38.6
Nickel (ug/l)	1	2.15
Nitrate-Nitrite as N (mg/l)	1	0.808
Nitrogen, Total Organic as N (mg/l)	1	0.3
Phosphorus (mg/l)	1	0.021
Sulfate (mg/l)	1	23.5
Titanium (mg/l)	1	9.8
Total Organic Carbon (mg/l)	1	3.33
Total Suspended Solids (mg/l)	1	35.
Zinc (ug/l)	1	10.8

Table 5. Effluent Characterization and Decision Criteria: January 2005 – August 2010

Summary of analytical results for Outfalls 001, 002, and 004, and Intake Station 800. All values are in µg/l unless otherwise indicated. ND = below detection (detection limit); NA = not analyzed. Decision Criteria: PEQ_{avg} = monthly averages; PEQ_{max} = daily maximum analytical results.

			Current Permit Limits			Percentiles			Decision Criteria		
Parameter	Season	Units	30 day	Daily	# Obs.	50th	95th	Data Range	# Obs.	PEQ_{ave}	PEQ_{max}
Outfall 001											
Water Temperature	Annual	F	Monitor only		2069	68.1	95.1	27.3-200			
pH	Annual	S.U.	6.0 <= pH <= 9.0		68	7.87	8.2	7.48-8.49			
Selenium, Total Recoverable	Annual	ug/l			19	0	0	0-0	19	--	--
Selenium, Total Recoverable	Annual	kg/day			19	0	0	0-0			
Thallium, Total Recoverable	Annual	ug/l	Monitor only		68	0	0	0-0	68	--	--
Thallium, Total Recoverable	Annual	kg/day			68	0	0	0-0			
Copper, Total Recoverable	Annual	ug/l			19	0	0.00139	0-0.0139	10	0.01725	0.02363
Copper, Total Recoverable	Annual	kg/day			19	0	0.00199	0-0.0199			
Flow Rate	Summer	MGD			1043	475	599	0-599			
Flow Rate	Winter	MGD			1026	379	440	3.42-599			
Flow Rate	Annual	MGD	Monitor only		2069	379	599	0-599			
Outfall 002											
Total Suspended Solids	Annual	mg/l	30	100	826	5	28	0-139	826	14.018	28.779
Total Suspended Solids	Annual	kg/day	384	1279	824	14.8	106	0-332			
Oil and Grease, Total	Annual	mg/l	15	20	275	0	0	0-3.22	37	2.586	3.542
Oil and Grease, Total	Annual	kg/day	192	256	275	0	0	0-12.9			
Copper, Total Recoverable	Annual	ug/l	Monitor only		69	0	0	0-31.2	69	22.78	31.2
Copper, Total Recoverable	Annual	kg/day			69	0	0	0-0.1			
Flow Rate	Summer	MGD			1043	0.85	1.34	0.08-6.7			
Flow Rate	Winter	MGD			1022	0.95	1.52	0.09-9.88			
Flow Rate	Annual	MGD	Monitor only		2065	0.89	1.4	0.08-9.88			

Table 5. Effluent Characterization and Decision Criteria: January 2005 – August 2010

Summary of analytical results for Outfalls 001, 002, and 004, and Intake Station 800. All values are in µg/l unless otherwise indicated. ND = below detection (detection limit); NA = not analyzed. Decision Criteria: PEQ_{avg} = monthly averages; PEQ_{max} = daily maximum analytical results.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily		50th	95th		# Obs.	PEQ_{ave}	PEQ_{max}
Outfall 001											
Mercury, Total (Low Level)	Annual	ng/l	Monitor only		24	0.967	6.3	0-15.2	24	8.0029	13.16
Mercury, Total (Low Level)	Annual	kg/day			24	3.84E-06	1.28E-05	0-0.0000575			
pH, Maximum	Annual	S.U.	Not more than 9.0		2057	8	8.48	7.34-11.8			
pH, Minimum	Annual	S.U.	Not less than 6.0		2056	7.5	7.5	3-7.98			
Outfall 004											
Total Suspended Solids	Annual	mg/l	30	100	549	4	28.2	0-86	549	18.262	31.455
Total Suspended Solids	Annual	kg/day	380	1268	549	16.4	120	0-376			
Oil and Grease, Total	Annual	mg/l	15	20	546	0	0	0-13.3	546	1.4273	2.011
Oil and Grease, Total	Annual	kg/day	190	254	546	0	0	0-99.2			
Selenium, Total Recoverable	Annual	ug/l	Monitor only		68	0	0	0-1.34	11	1.663	2.278
Selenium, Total Recoverable	Annual	kg/day			68	0	0	0-0.0108			
Copper, Total Recoverable	Annual	ug/l	Monitor only		274	0	16.7	0-286	273	20.318	26.317
Copper, Total Recoverable	Annual	kg/day			274	0	0.0683	0-0.671			
Flow Rate	Summer	MGD			1043	1.16	2.14	0.04-2.76			
Flow Rate	Winter	MGD			1026	1	1.54	0.01-1.86			
Flow Rate	Annual	MGD	Monitor only		2069	1.07	1.9	0.01-2.76			
Acute Toxicity, Ceriodaphnia dubia	Annual	TUa		1.0	16	0	0.05	0-0.2			
Acute Toxicity, Pimephales promelas	Annual	TUa		1.0	16	0	0.325	0-0.7			
pH, Maximum	Annual	S.U.	Not more than 9.0		2062	7.74	8.39	7.45-12			
pH, Minimum	Annual	S.U.	Not less than 6.0		2055	7.34	7.5	3-7.5			

Table 5. Effluent Characterization and Decision Criteria: January 2005 – August 2010

Summary of analytical results for Outfalls 001, 002, and 004, and Intake Station 800. All values are in µg/l unless otherwise indicated. ND = below detection (detection limit); NA = not analyzed. Decision Criteria: PEQ_{avg} = monthly averages; PEQ_{max} = daily maximum analytical results.

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range	Decision Criteria		
			30 day	Daily		50th	95th		# Obs.	PEQ_{ave}	PEQ_{max}
Outfall 001											
Outfall 800											
Water Temperature	Annual	F			2047	52.6	79.2	22.5-88.1			
Total Suspended Solids	Annual	mg/l			298	9	85.4	0-222			

Table 6. Effluent Data for the Avon Lake Power Plant

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Outfall 001					
Boron *	ug/l	1	1	291.0218	398.66
Bromide *	mg/l	1	1	0.076942	0.1054
Copper – TR	ug/l	10	1	0.0172499	0.02363
Chlorine – Tres *	mg/l	1	1	0.40734	0.558
Magnesium *	mg/l	1	1	39.8288	54.56
Methylene chloride *	ug/l	1	1	7.55842	10.354
Selenium - TR	ug/l	19	0	--	--
Sulfates *	mg/l	1	1	192.8076	264.12
Thallium *	ug/l	1	1	11.315	15.5
Zinc – TR *	ug/l	1	1	70.153	96.1
Outfall 002					
Aluminum *	ug/l	1	1	1480.002	2027.4
Ammonia-S *	mg/l	1	1	0.81468	1.116
Arsenic – TR *	ug/l	1	1	15.1621	20.77
Barium *	ug/l	1	1	356.6488	488.56
Boron *	ug/l	1	1	470.704	644.8
Chlorine – Tres *	mg/l	1	1	1.49358	2.046
Copper – TR	ug/l	69	2	22.776	31.2
Dimethyl phthalate *	ug/l	1	1	52.5016	71.92
Fluoride *	mg/l	1	1	1.158656	1.5872
Magnesium *	mg/l	1	1	43.35908	59.396
Manganese – TR *	ug/l	1	1	33.945	46.5
Mercury - TR	ng/l	24	15	8.0029	13.16
Molybdenum *	ug/l	1	1	19.9144	27.28
Nickel – TR *	ug/l	1	1	7.0153	9.61
Nitrate-N + Nitrite-N *	mg/l	1	1	10.27402	14.074
Sulfates *	mg/l	1	1	181.04	248
Outfall 004					
Aluminum *	ug/l	1	1	964.038	1320.6
Barium *	ug/l	1	1	105.0032	143.84
Boron *	ug/l	1	1	119.4864	163.68
Chlorine – Tres *	mg/l	1	1	0.13578	0.186
Copper – TR	ug/l	273	60	20.318	26.317
Dimethyl phthalate *	ug/l	1	1	53.4068	73.16

Table 6. Effluent Data for the Avon Lake Power Plant

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Fluoride *	mg/l	1	1	1.647464	2.2568
Iron – TR *	ug/l	1	1	1326.118	1816.6
Magnesium *	mg/l	1	1	42.00128	57.536
Manganese – TR *	ug/l	1	1	28.7401	39.37
Methyl chloride *	ug/l	1	1	7.73946	10.602
Molybdenum *	ug/l	1	1	11.7676	16.12
Nickel – TR *	ug/l	1	1	7.6942	10.54
Nitrate-N + Nitrite-N *	mg/l	1	1	6.51744	8.928
Selenium - TR	ug/l	11	1	1.66294	2.278
Sulfates *	mg/l	1	1	147.095	201.5

* The dataset for this parameter is based upon the NPDES permit renewal application.

Table 7. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria Average				Maximum Aquatic Life	Inside Mixing Zone Maximum
		Wildlife	Human Health	Agri-culture	Aquatic Life		
Aluminum	ug/l	--	4500	--	--	--	--
Ammonia-S	mg/l	--	--	--	--	--	--
Ammonia-W	mg/l	--	--	--	--	--	--
Arsenic - TR	ug/l	--	580	100	150	340	680
Barium	ug/l	--	160000	--	220	2000	4000
Boron	ug/l	--	200000	--	3900	33000	65000
Bromide	mg/l	--	--	--	--	--	--
Chlorine - TRes	mg/l	--	--	--	0.011	0.019	0.038
Copper - TR	ug/l	--	64000	500	12	19	38
Dimethyl phthalate	ug/l	--	--	--	1100	3200	6400
Fluoride	mg/l	--	--	2	--	--	--
Iron - TR	ug/l	--	--	5000	--	--	--
Lead - TR	ug/l	--	--	100	9.9	190	380
Magnesium	mg/l	--	--	--	--	--	--
Manganese - TR	ug/l	--	61000	--	--	--	--
Mercury - TR	ng/l	1.3	3.1	10000	910	1700	3400
Methyl chloride	ug/l	--	7300[c]	--	--	--	--
Methylene chloride	ug/l	--	2600[c]	--	1900	11000	22000
Molybdenum	ug/l	--	10000	--	20000	190000	370000
Nickel - TR	ug/l	--	43000	200	69	620	1200
Nitrate-N + Nitrite-N	mg/l	--	--	100	--	--	--
Selenium - TR	ug/l	--	3100	50	5	--	--
Sulfates	mg/l	--	--	--	--	--	--
Thallium	ug/l	--	--	--	17	79	160
Zinc - TR	ug/l	--	35000	25000	160	160	320

[c] This criterion is based upon a carcinogenic endpoint.

Table 8. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Hardness	mg/l	annual	140	Background Water Quality Report
Avon Lake Power Plant flow				
Outfall 001	cfs	annual	612	Previous WLA
Outfall 002	cfs	annual	5.23	Previous WLA
Outfall 004	cfs	annual	5.18	Previous WLA
Background Water Quality				
Aluminum	ug/l		330	n=640; 146<MDL *
Ammonia-S	mg/l		0.05	n=3172; 1307<MDL *
Ammonia-W	mg/l		0.025	n=740; 336<MDL *
Arsenic - TR	ug/l		0	No representative data available.
Barium	ug/l		67	**
Boron	ug/l		0	No representative data available.
Bromide	mg/l		0	No representative data available.
Chlorine - TRes	mg/l		0	No representative data available.
Copper - TR	ug/l		5	n=2867; 1597<MDL *
Dimethyl phthalate	ug/l		0	No representative data available.
Fluoride	mg/l		0	No representative data available.
Iron - TR	ug/l		650	n=3018; 15<MDL *
Lead - TR	ug/l		2	n=2814; 1458<MDL *
Magnesium	mg/l		22.5	n=2604; 3<MDL *
Manganese - TR	ug/l		0	No representative data available.
Mercury - TR	ng/l		0	No representative data available.
Methyl chloride	ug/l		0	No representative data available.
Methylene chloride	ug/l		0	No representative data available.
Molybdenum	ug/l		0	No representative data available.
Nickel - TR	ug/l		20	n=1259; 1105<MDL *
Nitrate-N + Nitrite-N	mg/l		0.73	n=5852; 515<MDL *
Selenium - TR	ug/l		0	No representative data available.
Sulfates	mg/l		0	No representative data available.
Thallium	ug/l		0	No representative data available.
Zinc - TR	ug/l		15	n=2284; 1117<MDL *

* Source of data is the 50th percentile of statewide values from the "Background Water Quality Report." Samples were collected through February 1988.

** Source of data is the 50th percentile of Erie-Ontario Ecoregion reference sites sampled from 1999 through 2001. The 50th percentile value is based upon 348 observations.

Table 9. Summary of Effluent Limits to Maintain Applicable WQ Criteria

		Outside Mixing Zone Criteria					Inside Mixing
				Average		Maximum	
Parameter	Units	Wildlife	Human Health	Agri-culture	Aquatic Life	Aquatic Life	Zone Maximum
Outfall 001							
Boron	ug/l	--	2200000	--	42900	--	65000
Bromide	mg/l	--	--	--	--	--	--
Chlorine - TRes	mg/l	--	--	--	0.12	--	0.038
Magnesium	mg/l	--	--	--	--	--	--
Methylene chloride	ug/l	--	28600	--	20900	--	22000
Selenium - TR	ug/l	--	34100	550	55	--	--
Sulfates	mg/l	--	--	--	--	--	--
Thallium	ug/l	--	--	--	187	--	160
Zinc - TR	ug/l	--	384850	274850	1610	--	320
Outfall 002							
Aluminum	ug/l	--	46200	--	--	--	--
Ammonia-S	mg/l	--	--	--	--	--	--
Ammonia-W	mg/l	--	--	--	--	--	--
Arsenic - TR	ug/l	--	6380	1100	1650	--	680
Barium	ug/l	--	1759330	--	1750	--	4000
Boron	ug/l	--	2200000	--	42900	--	65000
Chlorine - TRes	mg/l	--	--	--	0.12	--	0.038
Copper - TR	ug/l	--	703950	5450	82	--	38
Dimethyl phthalate	ug/l	--	--	--	12100	--	6400
Fluoride	mg/l	--	--	22	--	--	--
Lead - TR	ug/l	--	--	1080	89	--	380
Magnesium	mg/l	--	--	--	--	--	--
Manganese - TR	ug/l	--	671000	--	--	--	--
Mercury - TR [1]	ng/l	14	34	110000	10010	--	3400
Mercury - TR [2]	ng/l	1.3	3.1	10000	910	--	3400
Molybdenum	ug/l	--	110000	--	220000	--	370000
Nickel - TR	ug/l	--	472800	2000	559	--	1200
Nitrate-N + Nitrite-N	mg/l	--	--	1093	--	--	--
Sulfates	mg/l	--	--	--	--	--	--
Zinc - TR	ug/l	--	384850	274850	1610	--	320
Outfall 004							
Aluminum	ug/l	--	46200	--	--	--	--
Barium	ug/l	--	1759330	--	1750	--	4000
Boron	ug/l	--	2200000	--	42900	--	65000
Chlorine - TRes	mg/l	--	--	--	0.12	--	0.038
Copper - TR	ug/l	--	703950	5450	82	--	38
Dimethyl phthalate	ug/l	--	--	--	12100	--	6400

Table 9. Summary of Effluent Limits to Maintain Applicable WQ Criteria

		Outside Mixing Zone Criteria					Inside Mixing
				Average		Maximum	
Parameter	Units	Wildlife	Human Health	Agri-culture	Aquatic Life	Aquatic Life	Zone Maximum
Fluoride	mg/l	--	--	22	--	--	--
Iron - TR	ug/l	--	--	48500	--	--	--
Magnesium	mg/l	--	--	--	--	--	--
Manganese - TR	ug/l	--	671000	--	--	--	--
Methyl chloride	ug/l	--	80300	--	--	--	--
Molybdenum	ug/l	--	110000	--	220000	--	370000
Nickel - TR	ug/l	--	472800	2000	559	--	1200
Nitrate-N + Nitrite-N	mg/l	--	--	1093	--	--	--
Selenium - TR	ug/l	--	34100	550	55	--	--
Sulfates	mg/l	--	--	--	--	--	--

[1] These wasteload allocations are in effect until November 1, 2010, when mixing zones can no longer be used for developing wasteload allocations for bioaccumulative chemicals of concern such as mercury.
[2] These wasteload allocations are in effect after November 1, 2010, when mixing zones can no longer be used for developing wasteload allocations for bioaccumulative chemicals of concern such as mercury.

Table 10-001. Parameter Assessment for Outfall 001

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

Bromide	Magnesium	Sulfates

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

Boron	Copper - TR	Selenium - TR
Methylene chloride (Dichloromethane)		

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

Thallium	Zinc - TR

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.

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	Period	Average	Maximum
Chlorine - TRes	mg/l		--	0.038

Table 10-002. Parameter Assessment for Outfall 002

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

Magnesium	Sulfates	

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

Arsenic - TR	Boron	Lead - TR
Molybdenum	Nitrate-N + Nitrite-N	Zinc - TR
Dimethyl phthalate	Manganese - TR	Nickel - TR

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

Barium	Fluoride	Aluminum

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.

Copper - TR	Mercury - TR [1]

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	Period	Average	Maximum
Chlorine - TRes	mg/l		--	0.038
Mercury - TR [2]	ng/l		1.3	3400

[1] This grouping was in effect until November 1, 2010, when mixing zones were no longer be used for developing wasteload allocations for bioaccumulative chemicals of concern such as mercury.
[2] This grouping is in effect after November 1, 2010, when mixing zones can no longer be used for developing wasteload allocations for bioaccumulative chemicals of concern such as mercury.

Table 10-004. Parameter Assessment for Outfall 004

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

Magnesium	Sulfates	

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

Methyl chloride	Molybdenum	Nitrate-N + Nitrite-N
Aluminum	Boron	Dimethyl phthalate
Manganese - TR	Nickel - TR	

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

Fluoride	Selenium - TR	Barium
Iron - TR		

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.

Copper - TR

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	Period	Average	Maximum
Chlorine - TRes	mg/l		--	0.038

Table 11-001. Final Effluent Limits and Monitoring Requirements for Outfall 001

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Water Temperature	EF	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
pH	S.U.	- - - - - - - - - - - -	6.0 to 9.0	- - - - - - - - - - - - - - -		EP/BPT
Oxidants, Total Res.	mg/l	–	0.05	-	-	EP/BPJ
Flow	MGD	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Chlorine, Total Residual	mg/l	--	0.2	-	-	EP/BAT
Chlorination/Bromination Duration	minutes	–	120	–	–	EP/BAT

[b,c] See page 35 for definition of terms and explanation of monitoring requirements.

Table 11-002. Final Effluent Limits and Monitoring Requirements for Outfall 002

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Suspended Solids	mg/l	30	100	384	1279	EP/BPT
Oil and Grease	mg/l	15	20	192	256	EP/BPT
Copper	µg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c] /RP/BAT
Flow rate	MGD	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c] /EP
Chlorine, Total Res.	mg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		
Mercury	ng/l	8.0	3400	0.00010	0.043	MVAR
pH [d]	S.U.	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		EP/BPT
pH Range Excursions, Maximum Duration	Minutes	--	60	--	--	BEJ
pH Range Excursions, > 60 min.	#/Day	--	0	--	--	BEJ
pH Range Excursions, Monthly Total Duration	Minutes	--	446	--	--	BEJ

[a] Loadings are based upon a flow rate of 3.38 MGD.
[b,c] See page 35 for definition of terms and explanation of monitoring requirements.
[d] pH must be greater than or equal to 6.0 and less than or equal to 9.0 S.U.

Table 11-004. Final Effluent Limits and Monitoring Requirements for Outfall 004

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Suspended Solids	mg/l	30	100	380	1268	EP/BPT
Oil and Grease	mg/l	15	20	190	254	EP/BPT
Copper	µg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c] / WLA
Oxidants, Total Res.	mg/l	--	0.01	--	--	EP/BPJ
Flow rate	MGD	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c] /EP
Chlorine, Total Res.	mg/l	--	0.038	--	--	EP/WQS
pH[d]	S.U.	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		EP/BPT
Chlorination/Bromination Duration	minutes	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
pH Range Excursions, Maximum Duration	Minutes	--	60	--	--	BEJ
pH Range Excursions, > 60 min.	#/Day	--	0	--	--	BEJ
pH Range Excursions, Monthly Total Duration	Minutes	--	446	--	--	BEJ

[a] Loadings are based upon a flow rate of 3.35 MGD.
[b,c] See page 35 for definition of terms and explanation of monitoring requirements.
[d] pH must be greater than or equal to 6.0 and less than or equal to 9.0 S.U.

Table 11-604. Final Effluent Limits and Monitoring Requirements for Outfall 604

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
pH	S.U.	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		EP/BPT
Suspended Solids	mg/l	30	100	--	--	EP/BPT
Oil and Grease	mg/l	15	20	--	--	EP/BPT
Flow rate	MGD	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c] /EP

[b,c] See page 35 for definition of terms and explanation of monitoring requirements.

Table 11-610. Final Effluent Limits and Monitoring Requirements for Outfall 610

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
pH	S.U.	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		EP/BPT
Suspended Solids	mg/l	50	50	--	--	EP/BPT
Flow rate	MGD	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c] /EP

[b,c] See page 35 for definition of terms and explanation of monitoring requirements.

Table 11-611. Final Effluent Limits and Monitoring Requirements for Outfall 611

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
pH	S.U.	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		EP/BPT
Suspended Solids	mg/l	30	100	--	--	EP/BPT
Oil and Grease	mg/l	15	20	--	--	EP/BPT
Iron	µg/l	1000	1000	--	--	M[c] /BPT
Copper	µg/l	1000	1000	--	--	M[c] /BPT
Flow rate	MGD	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c] /EP

[b,c] See page 3 for definition of terms and explanation of monitoring requirements.

Table 11-612. Final Effluent Limits and Monitoring Requirements for Outfall 612

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Oil and Grease	mg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c] /EP/BPT
Flow rate	MGD	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c] /EP

[b,c] See below for definition of terms and explanation of monitoring requirements.

[a] Loadings based upon an effluent flow rate of 2.3 MGD.

[b] Definitions:

ABS = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l));
AD = Antidegradation (OAC 3745-1-05);
BAT = Best Available Technology economically achievable, Federal Effluent Guidelines, 40 CFR Part 423;
BPJ = Best Professional Judgment;
BPT = Best Practicable control Technology currently available, Federal Effluent Guidelines, 40 CFR, Part 423;
EP = Existing Permit;
M = Division of Surface Water Guidance #2, "National Pollutant Discharge Elimination System: Determination of Sampling Frequency Formula for Industrial Waste Discharges" recommends monitoring for this parameter;
MVAR = Mercury Variance-based limit [OAC 3745-33-07(D)(10)];
PD = Plant Design Criteria;
RP = Reasonable Potential for exceeding water quality standards, and requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A));
WET = Whole Effluent Toxicity (OAC 3745-33-07(B)) ;
WLA = Wasteload Allocation procedures (OAC 3745-2);
WLA/IMZM = Wasteload Allocation limited by Inside Mixing Zone Maximum;
WQS = Ohio Water Quality Standards (OAC 3745-1).

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

Attachment A. Federal Effluent Guidelines Applicable to the Avon Lake Generating Station

40 CFR, Part 423 Steam Electric Power Generating Point Source Category

Section 423.12(b)(3) Low Volume Waste Sources

	Best Practicable Control Technology Available (BPT) ---------- (mg/l) ----------	
Parameter	Daily Maximum	30-Day Average
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0

Section 423.12(b)(4) Fly Ash and Bottom Ash Transport Water

	Best Practicable Control Technology Available (BPT) ---------- (mg/l) ----------	
Parameter	Daily Maximum	30-Day Average
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0

Section 423.13(b) Once-through Cooling Water

	Best Available Technology Economically Achievable (BPT) ---------- (mg/l) ----------	
Parameter	Daily Maximum	30-Day Average
Total Residual Chlorine	0.20	--