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 **Dayton Power & Light J. M. Stuart Station**

Public Notice No.: 08-11-015
Public Notice Date: November 7, 2008
Comment Period Ends: December 7, 2008

OEPA Permit No.: **0IB00049*ND**
Application No.: **OH0004316**

Name and Address of Applicant:

Dayton Power & Light J. M. Stuart Station
P.O. Box 468
Aberdeen, Ohio 45101

Name and Address of Facility Where Discharge Occurs:

Dayton Power & Light J. M. Stuart Station
State Route 52, 4 miles east of Aberdeen
Aberdeen, Ohio 45101
Adams County

Receiving Water: **Little Three Mile Creek**
Ohio River

Subsequent Stream Network: **the Ohio River**

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

A draft permit for the Dayton Power & Light Stuart Station was public noticed in August 2007. That permit was not finalized, and the draft permit proposed with this factsheet replaces the earlier draft permit. With few exceptions, the monitoring requirements and limits in this draft permit are the same as those proposed in the August 2007 draft permit. Monitoring for fathead minnows at outfall 013 has been removed from this draft permit.

This draft permit also includes a compliance schedule for the submittal of a plan to limit public access to the thermal mixing zone in Little Threemile Creek and the confluence of Little Threemile Creek with the Ohio River.

This permit renewal is proposed for a term of approximately **three and one-half years**, expiring in **July 2012**.

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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
Water Resource Management 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.

The application, fact sheet, public notice, permit including effluent limitations, special conditions, comments received and other documents are available for inspection and may be copied at a cost of 25 cents per page at the Ohio Environmental Protection Agency at the address shown above any time between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday. Copies of the Public Notice are available at no charge at the same address.

Location of Discharge/Receiving Water Use Classification

The Dayton Power & Light Stuart Station (or DP&L Stuart Station) is located in the southwest corner of Adams County, on the Ohio River four miles east of Aberdeen, Ohio. The majority of the outfalls discharge into Little Threemile Creek which empties into the Ohio River at approximately River Mile (RM) 405.7. The remaining outfalls discharge directly into the Ohio River and Buzzard's Roost Creek. (Buzzard's Roost Creek is a small tributary of the Ohio River which discharges into the Ohio River at approximately RM 403.4. This segment of the Ohio River is described by Ohio EPA River Code 25-200, U.S. EPA River Reach # 05090201-020, and the Interior Plateau (IP) Ecoregion. The Ohio River is presently designated for the following uses: Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), Public Water Supply (PWS) and Bathing Waters (BW). Figure 1 shows the location of the DP&L Stuart Station and the facility's outfalls.

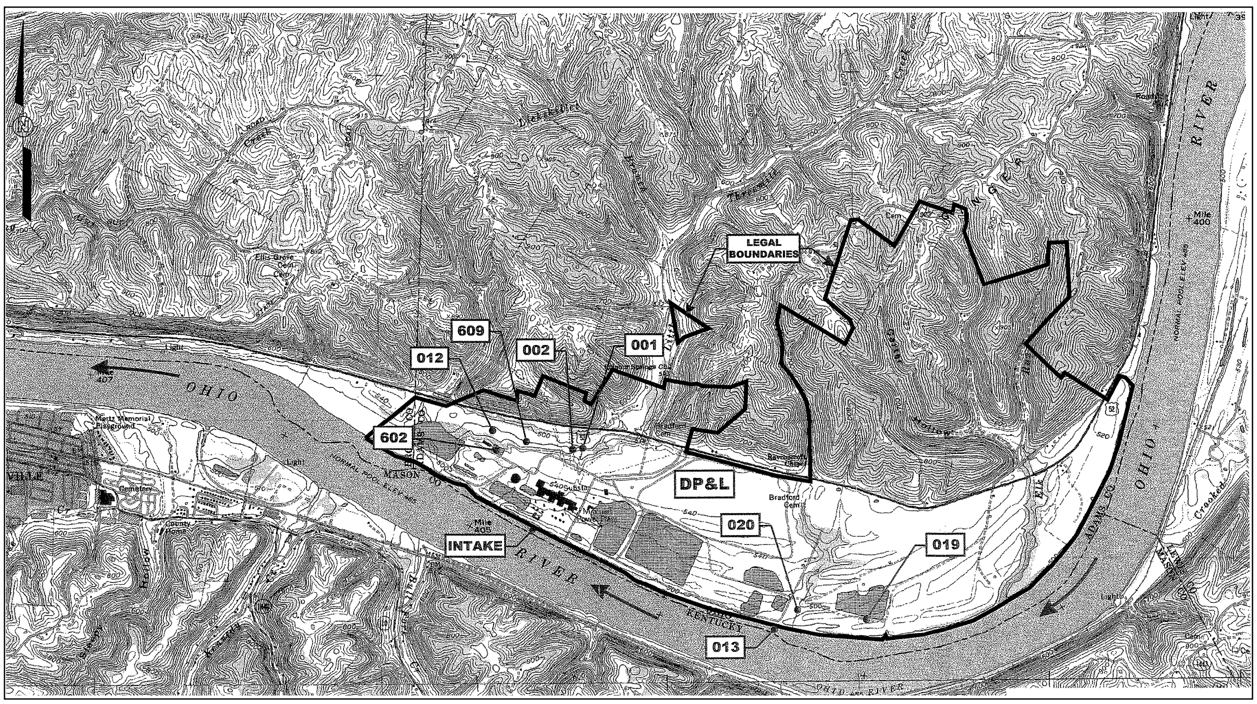

Figure 1. Location of DP&L Stuart Station

This segment of Little Threemile Creek is described by Ohio EPA River Code 10-050, U.S. EPA River Reach #05090201-020, and the Interior Plateau (IP) Ecoregion. Little Threemile Creek is presently designated for the following uses: Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), Primary Contact Recreation (PCR).

This segment of Buzzard's Roost Creek is described by Ohio EPA River Code 25-200, U.S. EPA River Reach #05090201-020, and the Interior Plateau (IP) Ecoregion. Buzzard's Roost Creek is presently designated for the following uses: Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), Primary Contact Recreation (PCR).

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 DP&L Stuart Station, which is jointly owned by the Dayton Power & Light Company, Cincinnati Gas & Electric, and Columbus Southern Electric, is a coal-fired steam-electric generating station. This facility is involved in the generation, transmission, and distribution of electric power. The total generating capacity is 2400 megawatts of electricity.

The DP&L Stuart Station's processes generate wastewaters which are regulated by the federal effluent guidelines (FEGs) listed in 40 CFR 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.

Description of Existing Discharge

The DP&L Stuart Station has a total of four non-storm water outfalls which discharge directly to Little Threemile Creek. Outfalls 001 and 002 discharge once-through cooling water from boiler units 1, 2, and 3 at locations that are approximately one mile from the mouth of Little Threemile Creek. (See Table 1.) Outfall 012 also discharges to Little Threemile Creek downstream from outfalls 001 and 002, and discharges the wastewater from the bottom ash pond, which receives bottom ash sluice, cooling tower blowdown, waste water from the oil/water separators, and some storm water. The bottom ash pond provides sedimentation, and three filters provide treatment using ground walnut hulls as a filter medium immediately prior to the discharge to Little Threemile Creek. Figure 2 on page 10 shows a schematic diagram of the wastewater flows at the Stuart Station.

Table 1. Description of Dayton Power & Light Stuart Station Outfalls

Outfall #	Type of Wastewater	Treatment System Used	Discharge Location
001	Non-contact cooling water from condensers for generating units 1 and 2	None	Little Threemile Creek
002	Non-contact cooling water from condenser for generating units 3	None	Little Threemile Creek
012	Cooling tower blowdown, bottom ash pond discharge, storm water, oil/water separator wastewater	- Sedimentation - Filtration	Little Threemile Creek
013	Fly ash pond discharge and coal pile runoff	- Sedimentation - Neutralization	Ohio River
019	Fly ash disposal facility storm water collection pond discharge to wetlands, landfill runoff	- Sedimentation	Outfall 020
020	Wetlands effluent discharge (from outfall 019)	None	Buzzard's Roost Creek
602	Chemical metal cleaning waste treatment discharge	- Rapid sand filtration - Coagulation - Neutralization	Outfall 012
609	Sanitary sewage treatment plant	- Extended aeration - Disinfection	Little Threemile Creek
003, 004, 005, 009, and 010	Storm water	None	Little Threemile Creek
016, 017, and 018	Storm water	None	Ohio River

Outfall 609 conveys treated sanitary wastewater to Little Threemile Creek between outfalls 002 and outfall 012. Storm water flow combines with the discharge from outfall 609 just before entering Little Threemile Creek. The fly ash pond discharges through outfall 013 directly to the Ohio River at approximately RM 403.5, just downstream from the confluence of Buzzard's Roost Creek. Outfall 019 discharges to a wetland which flows through outfall 020 into Buzzard's Roost Creek near its mouth, and receives storm water and landfill leachate from the fly ash landfill facility. Storm water outfalls 016, 017, and 018 discharge to the Ohio River. Outfall 009 discharges to Little Threemile Creek.

The DP&L Stuart Station operates a water intake structure located in the Ohio River at RM 404.7, approximately one mile upstream from the confluence of Little Threemile Creek.

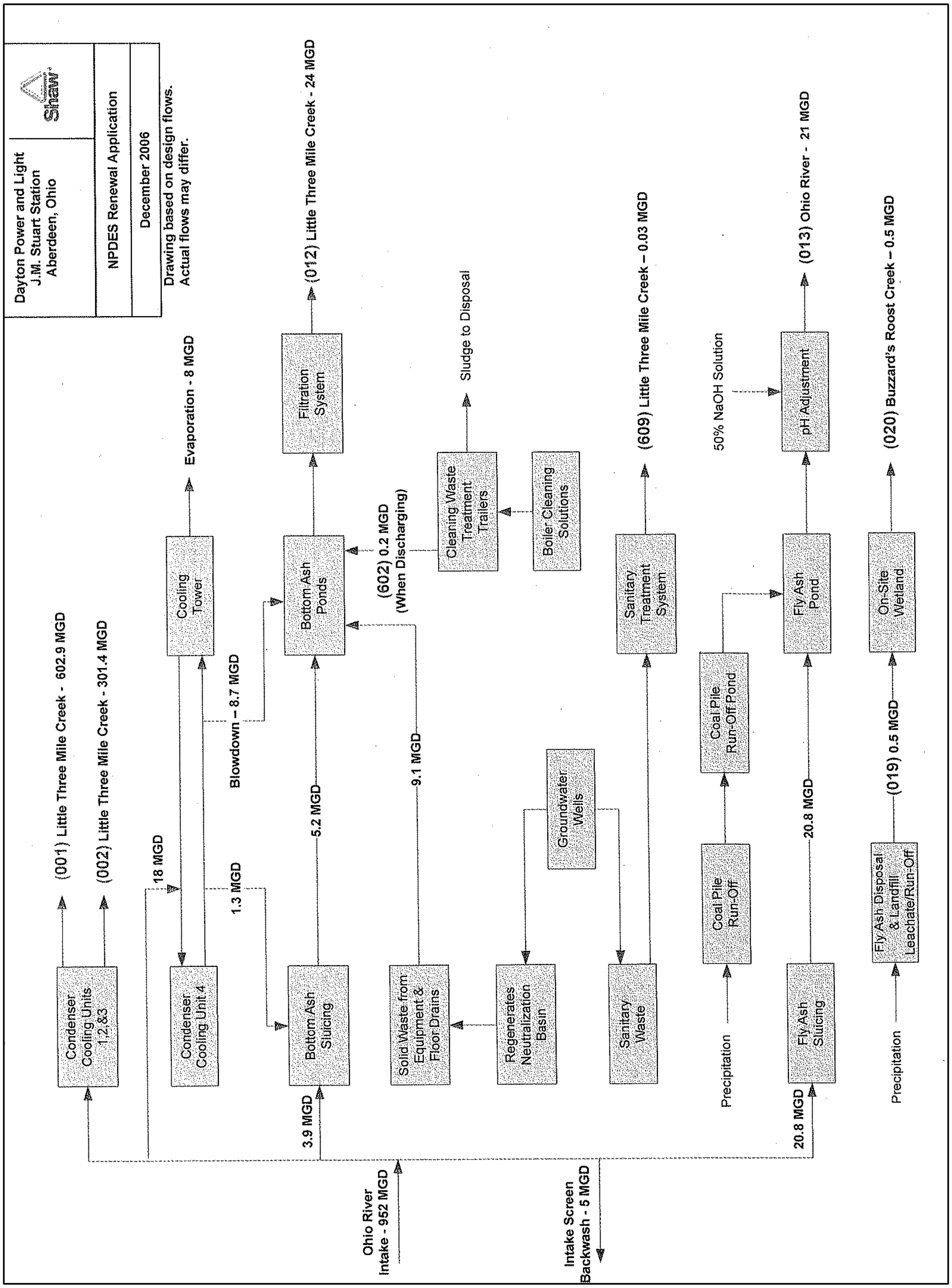

Figure 2. Wastewater Flow Diagram

Flow rates for outfalls 001, 002, 012, 013, 020, and 609 are shown in Table 2. With the exception of outfalls 013 and 020, the 50th percentile flow rates are very similar to the 95th percentile of monthly average flow rates.

Table 2. Flows Rates for DP&L Stuart Station Outfalls

Outfall #	Flow Rate (in MGD) Based Upon:		
	NPDES Permit Appl.*	Monthly Operating Data (2002-2006): 50th Percentile	Monthly Operating Data (2002-2006): 95th Percentile of Monthly Averages
001	361.	461.	458.
002	224.	237.	245.
012	13.	13.1	14.1
013	15.	16.4	19.1
020	0.3	0.41	0.81
609	0.025	0.03	0.039

* Average flow.

Table 5 presents a summary of analytical results for effluent samples taken at outfalls 001, 002, 012, 013, 019, 020, and 609 compiled from the NPDES 2C application for permit renewal. Table 5 also includes chemical results for effluent samples collected from outfall 013 in association with an Ohio EPA bioassay conducted in November 2005. Table 7 presents a summary of unaltered monthly operational report data for the period January 2002 through December 2006 for the DP&L Stuart Station, as well as current permit limits, and monthly average projected effluent quality (PEQ_{avg}) and daily maximum PEQ_{max} values.

Monitoring data reported by the DP&L Plant over the past five years shows that permit limits for several parameters have been violated. (See Table 3.) Discharges from outfall 013 have violated permit limits more than those from other outfalls, with copper being the most problematic. Both concentration and loading limits for copper have been exceeded at this outfall.

Table 3. Reported Permit Violations: January 2002 – February 2007

Outfall / Parameter	# of Violations
001	
pH	3
013	
Copper	15
pH	4
Hex chrome	3
019	
Total suspended solids	7
602	
Iron	1

FGD Waste Treatment System

In order to meet the requirements for reductions in sulfur dioxide emissions, the Stuart Station is installing a wet flue gas desulfurization (FGD) system using a limestone-based, forced oxidation process for each generating unit. The wastewater produced from this process, which will ultimately be discharged through outfall 012, is expected to increase the concentrations of total dissolved solids, total chlorides, and mercury.

Assessment of Impact of Discharge on Receiving Waters

The primary continuing concern regarding the discharges from the DP&L Plant is the impact of the effluent temperature and the quantity of heat discharged at outfalls 001 and 002. Effluent temperatures, temperatures in Little Threemile Creek, and temperatures in the Ohio River at the confluence of Little Threemile Creek routinely exceed 40°C. (104°F.) during the summer, and occasionally are greater than 50°C. (122°F.) The maximum effluent temperature reported by the Stuart Station from January 1, 2002 through December 31, 2006 was 57°C., or 135°F. Temperatures at outfall 001 exceeded 104ºF. on 611 days and exceeded 122ºF. on 41 days during this same time period. At outfall 002, the temperatures of 104ºF. and 122ºF. were exceeded 580 and 21 times, respectively. Figure 3 below shows the discharge temperatures for outfall 001 from 2002 through 2006. (The temperature pattern for outfall 002 is very similar to that shown for outfall 001.) The thermal plume from these discharges usually remains near the surface of the water, and has been observed to extend across the entire width of the Ohio River.

The average combined flow discharged from outfalls 001 and 002 is approximately 1100 cubic feet per second (cfs), which exceeds 10 percent of the Ohio River low flow, or 9800 cfs.[1] Given the high temperatures and relatively large volume of flow from the Stuart Station, the total thermal load discharged is quite significant when compared to the Ohio River low flow.

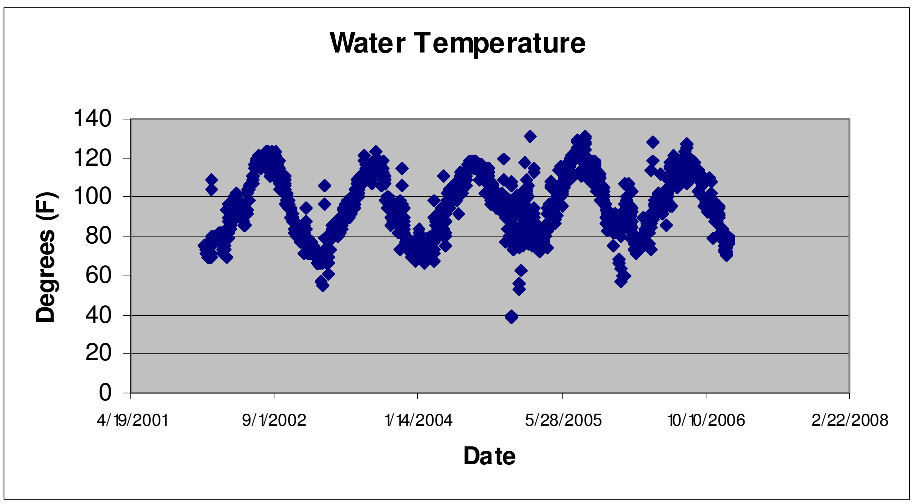

Figure 3. Water Temperature at Outfall 001

Likely due to these high temperatures and thermal load, biological sampling by the Ohio River Valley Water Sanitation Commission (ORSANCO) in this area of the Ohio River during the summers of 1999 and 2000 found much lower numbers of fish and fish species in the immediate vicinity of the Little Threemile Creek confluence compared to upstream sites. Although no biological sampling has been conducted in Little Threemile Creek, it is unlikely that fish or other indigenous aquatic life can survive in this stream during summer months when the instream temperatures are often above 98°F.[2] In contrast, fish are apparently overly abundant in Little Threemile Creek and in the Ohio River near Little Threemile Creek during winter months due to the attraction of warm water.

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[1]The low flow as used in this context is defined as the 7Q10 flow, or the lowest seven-day average flow which occurs only once every ten years.

[2] The maximum allowable temperature in Ohio's water quality standards is 98°F. for limited resource waters. Temperatures above 98°F. can be considered toxic to aquatic life.

As part of a routine sampling effort on June 28, 2007, ORSANCO encountered extremely high temperatures (107.8 F°) in the mainstem of the Ohio River immediately downstream from the Stuart Station discharge. In addition, very few fish were caught for biological sampling and dead fish were observed in the area as well. ORSANCO, in consultation with Ohio EPA, proceeded to develop a plan for more intensive sampling at sites both upstream and downstream from the discharge. Temperature and biological sampling were then conducted on three separate dates: August 9th, August 30th, and September 24th.

The results of ORSANCO's sampling show that:

- The average temperatures of upstream reference sites in the Ohio River ranged from 84.6 F° on August 9th to 76.8 F° on September 24th, while the surface temperature at the Stuart Station discharge ranged from 119.5 F° to 98.2 F° on the corresponding dates.
- On each of the three sampling dates, ORSANCO observed the thermal plume extending to the Kentucky shore, where temperatures above 95 F° and 86 F° were measured on August 9th and September 24th, respectively. (See Figure 4 for a depiction of the thermal plume measured on August 9th at the surface, and at depths of one and two below the surface.)
- The sampling conducted on August 9th suggested that the primary impact of the thermal discharge is confined to the top ten feet of the water column. In addition, downstream sampling showed that the thermal plume was fully mixed within the water column beyond two miles and four miles from the discharge, on August 9th and September 24th, respectively.
- Elevated temperatures were observed in the river and along both the Ohio and Kentucky shores at a distance of 4.5 miles downstream on August 9th and eleven miles

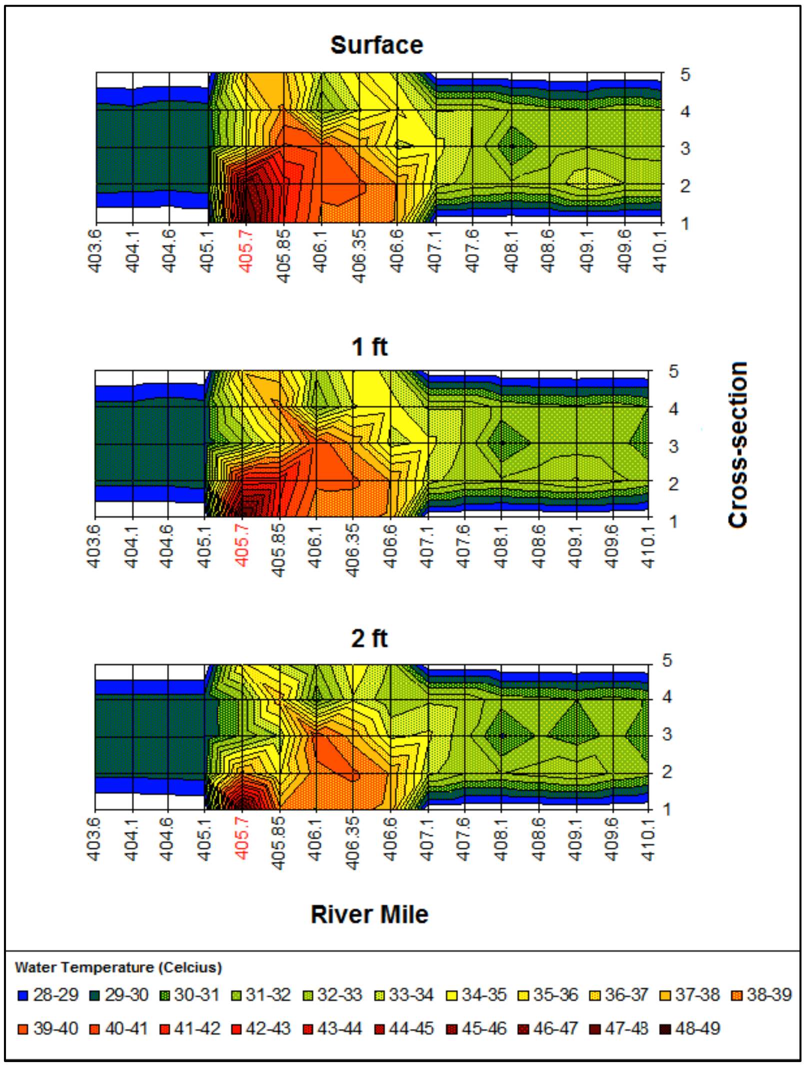

Figure 4. Temperature gradient observed on 8/09/07 in the vicinity of the J. M. Stuart discharge (ORM 405.7) at the surface, 1 ft and, 2 ft depth contours. Temperature gradients are shown in 1℃ increments (colors labeled). Cross-section refers to locations were temperature data was collect (1 = Ohio shore 5 ft contour, 3 = mid-channel, 5 = Kentucky shore 5 ft contour). Water flow is from left to right.

downstream on September 24th.

- Only one downstream site scored below the Ohio River Fish Index (ORFIn), however, all of the downstream sites scored significantly lower than the upstream reference zones.

ORSANCO's biological data indicates that the 316(a) requirements of a "…balanced, indigenous community…" of aquatic organisms is not attained in the Ohio River downstream from the Stuart Station during summer months. During summer months, fish and aquatic life avoid an area downstream of DP&L, while in winter months, the fish and other aquatic life return and are attracted to the warmer temperatures. Historical data indicates that balanced, indigenous communities have not been present during warm weather months in lower Little Threemile Creek since the Stuart Plant was built.

Finally, rule 3745-1-04 of the Ohio Administrative Code requires that all waters of the state, to every extent practicable and possible, are "free from" substances which:

- adversely affect aquatic life;
- are unsightly or cause degradation;
- create a nuisance; or
- are rapidly lethal in the mixing zone.

Ohio EPA has had concerns that conditions in Little Threemile Creek and the Ohio River resulting from the high discharge temperatures may violate all four of the "free from" criteria. Temperatures above 98°F. adversely affect aquatic life, and in fact, can be rapidly lethal to fish. The high temperatures and associated floating scum from thermophilic bacteria in Little Threemile Creek can be unsightly during the summer months. In addition, the high temperatures in the Ohio River are a nuisance and a potential health hazard. Boating in a river having a plume of water which is frequently greater than 104°F. and possibly as high as 130°F. is not desirable and is possibly unsafe to anyone who comes in contact with that water (e.g., people swimming as a result of a boating accident).

In September 2007, the ORSANCO sent a comment letter on the August 2007 draft NPDES permit for the Stuart Station stating the following:

> "…we believe that the discharge causing such temperatures may be in conflict with the Commission's 2006 Pollution Control Standards, Section V.A.2.d, which states that cooling water discharges will not result in conditions harmful to humans in the event of a temporary exposure, or Section V.I. B, which states that conditions within the mixing zone shall not be injurious to human health."

In order to address these concerns, DP&L was required to conduct a thermal discharge study under the terms and conditions of the existing NPDES permit for the Stuart Station. DP&L was required to evaluate the technical feasibility and economic reasonableness of methods other than cooling towers for reducing the temperature of the mixing zone in the Ohio River resulting from outfalls 001 and 002. A number of alternatives, each of which would improve the mixing characteristics of the discharge, were examined to determine the predicted reduction in thermal plume surface area and volume. These alternatives included:

- reducing the size of the opening for the weir from Little Threemile Creek to the Ohio River;
- increasing the flow rate from outfalls 001 and 002 above the amounts needed for cooling; and
- several diffuser options.

Scenarios which resulted in greater reductions in the size of the thermal plume were selected for further evaluation to determine the biological effects of a reduced thermal plume, and the estimated cost of each scenario. Although biological impacts are reduced substantially by some of the scenarios, the study concludes that none of the alternatives are cost effective.

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.
The available assimilative capacity was distributed between the outfalls using the CONSWLA water quality model. The study area is shown in Figure 5.

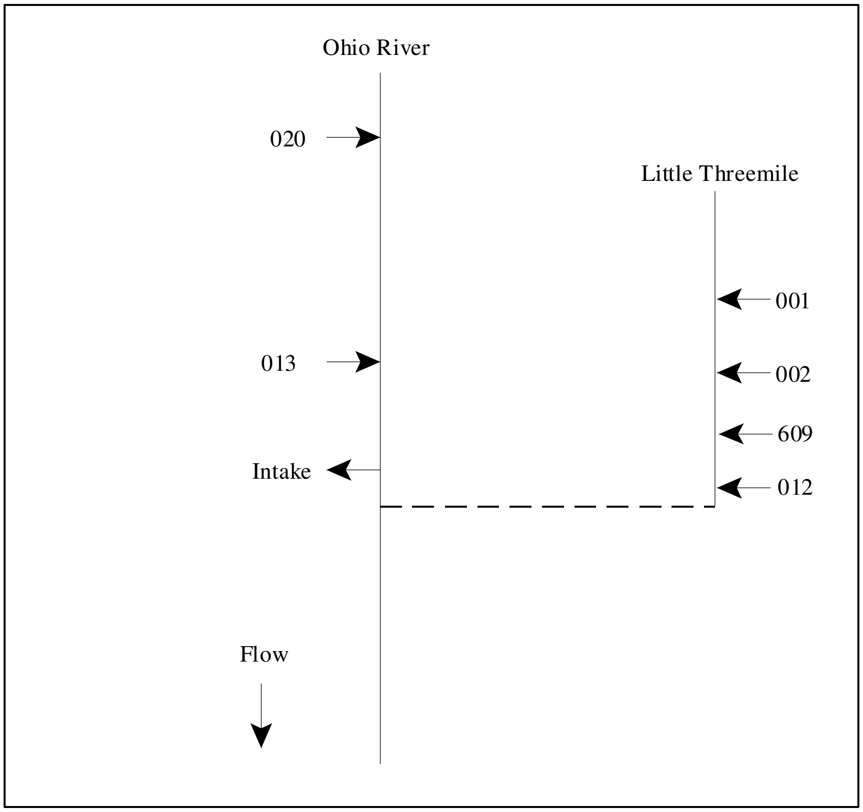

Figure 5. Ohio River Study Area

Parameter Selection

Effluent data for the Stuart Station were used to determine what parameters should undergo wasteload allocation. The sources of effluent data are as follows:

Self-monitoring data	January 2001 - December 2007
Ohio EPA data	November 2005
2c data	2007 NPDES Permit Renewal Application

The effluent data were checked for outliers and none were identified. This data is evaluated statistically, and Projected Effluent Quality (PEQ) values are calculated for each pollutant. PEQ_{avg} values represent the 95th percentile of monthly average data, and PEQ_{max} values represent the 95th percentile of all data points. The average and maximum projected effluent quality (PEQ) values are presented in Table 8. For a summary of the screening results, refer to the parameter groupings on pages 47 through 52.

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. 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	10% of annual 7Q10
	Maximum	1% of annual 7Q10
NH3-N toxicity	Average	10% of annual 7Q10
Agricultural Water Supply		10% of harmonic mean flow
Human Health (nondrinking)		10% of harmonic mean flow

Allocations are developed using a percentage of stream design flow, and allocations cannot exceed the Inside Mixing Zone Maximum criteria. The data used in the WLA are listed in Tables 10 and 11. The wasteload allocation results to maintain all applicable criteria are presented in Tables 12-012 through 12-609. For purposes of developing the waste load allocations, outfalls 001, 002, 609, and 012 were modelled as discharges to Little Threemile Creek in the backwaters of the Ohio River; therefore, these outfalls were treated as direct discharges to the Ohio River. However, under normal conditions, the flow in Little Threemile Creek upstream from outfalls 609 and 012 consists of the cooling water discharges from outfalls 001 and 002 and a small amount from the upper watershed of the creek. The water in Little Threemile Creek would not normally include backwaters of the Ohio River, especially during low flow events for the Ohio River.

Reasonable Potential

After appropriate effluent limits are calculated by wasteload allocation, the lowest most restrictive average and maximum values are selected from Tables 12-012 through 12-609 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} (Tables 8 and 9) 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 13-012 through 13-609 reflect the reasonable potential hazard assessment done according to WLA procedures.

Comparison of PEQ Data

The draft permit which was public noticed in August 2007 used January 2001 through December 2005 as the period of record for calculation of PEQs and determination of reasonable potential. Table 8 reflects this period of record. For this draft permit, PEQ values have been re-calculated using January 2003 through December 2007 as the period of record, and these results are shown in Table 9. The reasonable potential analysis has also been re-done with this draft permit, and changes from the August 2007 draft permit are noted in the parameter assessment tables – Tables 13-001, 13-002, 13-012, 13-013, 13-020, and 13-609.

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.

AET calculations are similar to aquatic life criteria wasteload allocation calculations. The AET calculations for chronic toxicity are similar to those for determining average aquatic life waste load allocations. 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 the Stuart Station, the wasteload allocations are as follows:

Outfall 020	0.3 TU_a	1683 TU_c
Outfall 013	0.3 TU_a	37 TU_c
Outfall 001	0.3 TU_a	2.54 TU_c
Outfall 002	0.3 TU_a	5.75 TU_c
Outfall 609	0.3 TU_a	43558 TU_c
Outfall 012	0.3 TU_a	101 TU_c

When the calculated acute AET is less than 1.0 TU_a, Allowable Effluent Toxicity is defined as:

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

The AET is 30 percent effects in 100 percent effluent based on the dilution ratio of 1 to 1.

Effluent Limits/Hazard Management Decisions

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Tables 14-001, 14-012, 14-013, 14-019, 14-020, 14-602, and 14-609 show the draft NPDES limits and monitoring requirements for the DP&L Stuart Station.

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 Stuart Station, 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 on page 58.)

The DP&L Stuart Station's NPDES permit application did not request an increase in loadings of currently permitted pollutants. As a result, an anti-degradation review is not required and has not been performed in association with this permit renewal. Detailed discussion of the limits and monitoring requirements for each outfall are shown below.

Outfalls 001 and 002: Table 14-001

Monitoring for water temperature, pH, total residual oxidants, flow rate, total residual chlorine, and duration of chlorination/bromination at these outfalls have been continued in the draft permit. 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 and studies which have been conducted examining the instream toxicity of chlorine. The limit of 0.05 mg/l for total residual oxidants, which is based upon best professional judgement regarding the relative toxicity of bromine, is included in the draft permit to allow the DP&L Stuart Station to discharge bromine or bromine and chlorine compounds for not more than two hours per day. The pH limits are based upon the Ohio water quality criteria.

Although Ohio EPA continues to have concerns regarding the high temperatures of the cooling water discharged from these outfalls, available data appears to show that the thermal plume does not jeopardize the "…projection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water…" [Section 316(a) of the Clean Water Act] over the long term (beyond the summer season). As a result, the Section 316(a) variance for the Stuart Station will be continued in the renewed permit, allowing water temperatures in the Ohio River mixing zone to exceed water quality standards.

The draft permit also continues the thermal load limit of 11,000 million BTU per hour in order to protect the Ohio River. The thermal load will continue to be reported individually for each cooling water discharge (outfalls 001 and 002). However, the sum of thermal loads is also reported under calculated outfall 021 which also includes the thermal load limit.

Several additional parameters with water quality criteria were detected in the effluent from outfall 001 (barium, copper, and zinc) and outfall 002 (barium, copper, nickel, and zinc) but were not allocated since the concentration of the pollutant was less than 110 percent of its concentration in the intake water.[1] 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 2C permit renewal application and supplemental sampling conducted by the Stuart Station in January through March of 2007. (See Tables 5 and 6.)

Outfall 012: Table 14-012

The Ohio EPA risk assessment places copper, mercury (after November 15, 2010), and sulfate in Group 4. This placement as well as the data in Tables 7, 8, and 9 indicates that limits are not

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

required for these parameters, however, monitoring is recommended for Group 4 parameters, and has been included. The draft permit requires DP&L to continue using EPA Method 1631 (or use Method 245.7) for analysis of mercury. The existing limit for copper has been removed, but since the PEQ value for copper is greater than 75 percent of the most stringent waste load allocation, Part II of the permit must include tracking language. This language is required by Ohio Administrative Code 3745-33-07(A)(2), and specifies that the permittee must notify Ohio EPA in writing whenever the effluent concentration of copper exceeds the most stringent waste load allocation.

The Ohio EPA risk assessment places zinc, total dissolved residue (or TDS), and total chloride in Group 3. Monitoring is optional for parameters placed in Group 3, however, the draft permit includes monitoring for zinc since this pollutant continues to be detected. Sampling for TDS and chloride is also included since the waste stream from the FGD treatment system is ultimately discharged through this outfall and is expected to have high concentrations of these pollutants.

Limits for total suspended solids, and oil and grease have been continued at this outfall from the existing permit. These limits are based upon the anti-backsliding provisions in the Ohio Administrative Code, which prevent the imposition of less stringent limits in a permit being renewed except under certain conditions. In the case of the DP&L permit, none of these conditions have been met.

Since cooling tower blowdown is discharged at outfall 012, limits for total residual chlorine and total residual oxidants are proposed to continue. The operation of the cooling tower includes the use of products which can release chlorine and/or bromine, and these pollutants may be present in the blowdown from the cooling tower.

Limits for pH are continued from the existing permit and are based upon Ohio water quality criteria. Flow rate monitoring is required in accordance with Ohio EPA guidance for determining sampling frequency for industrial discharges.

Effluent hardness has been used to determine aquatic water quality criteria for copper at this outfall. However, since Ohio EPA is not aware of any recent hardness data, monitoring for hardness has been added to this outfall in order to provide updated data for future waste load allocations.

Outfall 013: Table 14-013

The Ohio EPA risk assessment places chromium^{+6}, nickel, and copper in Group 5 and recommends limits for these parameters. These placements as well as the data in Tables 7, 8, and 9 indicate that environmental hazards exist for chromium^{+6} and copper, and limits are necessary to protect water quality. Limits are proposed to continue for these parameters. Although the wasteload allocation would result in a slightly higher limit for copper (55 ug/l vs. 53 ug/l), the anti-backsliding requirements of the Ohio Administrative Code require that the more stringent existing limit is maintained in the new permit.

Nickel is a Group 5 parameter, however, this placement is based upon only one sample which may not be representative of effluent quality. In order collect sufficient data for a more thorough assessment of reasonable potential for nickel when the permit is subsequently renewed, monitoring only has been included for this parameter. In addition, a tracking requirement has been included in

Part II of the permit in accordance with Ohio Administrative Code 3745-33-07(A)(2) since the PEQ for nickel is greater than 75 percent of the most stringent waste load allocation.

The Ohio EPA risk assessment places fluoride, sulfate, and mercury (after November 15, 2010) in Group 4. This placement as well as the data in Tables 7, 8, and 9 indicate that environmental hazards do not exist for these parameters, and limits are not necessary to protect water quality. However, monitoring is recommended and has been included in the permit. A tracking requirement has been included in Part II of the permit for sulfate in accordance with Ohio Administrative Code 3745-33-07(A)(2) since the PEQ is greater than 75 percent of the most stringent waste load allocation. The Stuart Station is required to used a low-level method (EPA Method 1631 or 245.7) for mercury analysis.

The Ohio EPA risk assessment places ammonia, cadmium, selenium, and zinc, and in group 3; monitoring is optional for parameters placed in this grouping. Since these parameters have been detected frequently at outfall 013, monitoring is proposed to continue for these pollutants at a frequency of once per week for ammonia and once per quarter for selenium, zinc, and cadmium.

Concentration limits for total suspended solids (TSS) and oil and grease are continued in the draft permit, and are based upon Federal Effluent Guidelines for steam-electric generating stations discharging fly ash transport wastewater. Loading limits for TSS and oil and grease have been based upon the design flow of 20.8 MGD. Loadings limits for other parameters are based upon a flow rate of 19.1 MGD which represents the PEQ average flow reported for outfall 013 (or approximately the 95^{th} percentile of the monthly averages for the flow rate).

Biomonitoring as well as whole effluent toxicity limits have been included at this outfall based upon the results of toxicity testing during the past several years. See page 23 for further discussion of this issue.

Effluent hardness has been used to determine aquatic water quality criteria for copper at this outfall. However, since Ohio EPA is not aware of any recent hardness data, monitoring for this parameter has been added to this outfall in order to provide updated data for future waste load allocations.

Outfall 019: Table 14-019

Limits for total suspended solids have been continued at this outfall from the existing permit, and are based upon the Federal Effluent Guidelines for steam-electric generating stations.

Outfall 020: Table 14-020

Outfall 020 discharges into Buzzard's Roost Creek from a wetland. Flow rate and pH monitoring is proposed to continue at outfall 020. In addition, the Ohio EPA risk assessment places sulfate in Group 5 and recommends limits for this parameter. However, this placement is based upon only one sample which may not be representative of the effluent quality. As a result, monitoring only has been included in the permit for this parameter in order to provide an adequate dataset for reasonable potential analysis when the subsequent permit is renewed.

Outfall 602: Table 14-602

The draft permit includes limits for total suspended solids, oil and grease, copper, and iron at this outfall. These requirements are based upon best practicable control technology and best available technology economically achievable for the discharge of metal cleaning wastes. In addition, flow rate must be monitored in accordance with Ohio EPA guidance for industrial waste discharges.

Outfall 603: Table 14-603

This outfall will discharge wastewater from the FGD waste treatment system. All of the monitoring requirements at this outfall are based upon requirements at other power plants located in Ohio which have (or are installing) very similar FGD treatment systems.

Outfall 609: Table 14-609

This outfall discharges sanitary wastes from the facility into Little Threemile Creek. Limits for total suspended solids and $CBOD_5$ are proposed to continue in the draft permit, and are based upon secondary treatment standards. Limits for pH and fecal coliform are also continued from the existing permit and are based upon Ohio water quality criteria. Monitoring requirements for color, dissolved oxygen, ammonia, odor, turbidity, and flow rate are all proposed to continue in the draft permit and are based upon Ohio EPA guidance for industrial discharges.

The Ohio EPA risk assessment places nitrate+nitrite and zinc in Group 5 and recommends limits for these parameters. These placements as well as the data in Tables 7 and 8 indicate that environmental hazards exist for these pollutants, and limits are necessary to protect water quality. However, the placement of nitrate+nitrite in Group 5 is based upon only one sample which may not be representative of effluent quality. As a result, monitoring only has been included in the permit for this parameter in order to provide an adequate dataset for reasonable potential analysis when the subsequent permit is renewed.

Other Requirements

The intake structure for the Stuart Station includes screens which prevent unwanted debris and trash from entering the facility. When these screens are backwashed, much of this solid waste is deposited on the stream bank near the intake structure and some of it is discharged directly into the Ohio River. Part II of the permit requires the facility to "…use best efforts to remove any solid waste deposited on the Ohio River Stream bank…" as a result of the intake operations.

Operator certification requirements have been included in Part II, Items V and W of the permit in accordance with rules adopted in December 2006. These rules require the Stuart Station to have a Class A wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 609 when the permit is renewed or modified after December 21, 2008.

Part II of the permit also includes requirements for signs to be placed at each outfall discharging to the Ohio River, providing information about the discharge. Signage at outfalls is required pursuant to Ohio Administrative Code 3745-33-08(A).

A recent addition to rule 3745-33-08(F) of the Ohio Administrative Code requires that permittees discharging wastewater within ten miles of a downstream public water supply intake located on the same waterway, must develop spill (or bypass) notification procedures in conjunction with the downstream public water supply operator. Since the City of Maysville, Kentucky operates a public water supply intake less than ten miles downstream from the Stuart Station, Part II of the draft permit requires the development of notification procedures within six months after the effective date of the permit.

Under rules which were promulgated July 9, 2004 under Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326), the permittee was required to collect and/or compile the following information pertaining to the facility's cooling water intake structure(s):

- source water physical data [40 CFR 122.21(r)(2)];
- cooling water intake structure data [40 CFR 122.21(r)(3)];
- cooling water system data [40 CFR 122.21(r)(5)]; and
- rates of impingement and/or entrainment of fish and shellfish at the facility's cooling water intake structure(s) based upon sampling conducted at the facility.

The permit requires all of this information listed above to be submitted with the permittee's next NPDES permit renewal application unless federal rules are promulgated which require the submittal of the information at an earlier date. However, DP&L is encouraged to submit the data pertaining to Section 316(b) prior to the submittal of the next renewal application so that more time is available for evaluation.

Schedule of Compliance

In response to concerns expressed by Ohio EPA, DP&L submitted a letter dated June 6, 2008 which contained the following statements:

> "…DP&L would be willing to eliminate and/or severely restrict public access to the lower portion of Little Threemile Creek (consisting of the discharge channel and the Ohio River shoreline) on Company-owned property during the months of July – September of each year…DP&L may also be willing to post signs advising boaters and fishermen not to swim in the immediate area…"

The schedule of compliance in the draft permit requires DP&L to develop a plan for restricting public access to the mixing zone in order to address concerns with regard to human health impacts from the thermal discharge. The plan must be developed and submitted to Ohio EPA for review within three months after the effective date of the permit.

Whole Effluent Toxicity Reasonable Potential

In compliance with the existing permit, DP&L has been conducting acute toxicity tests using the effluent from outfall 013. The existing permit also required DP&L to conduct a plant performance evaluation to determine the source of the toxicity at this outfall. The company submitted a letter to Ohio EPA dated November 9, 2005 which stated that the plant performance evaluation was being discontinued based upon DP&L's belief that the testing showed no evidence of toxicity in effluent from outfall 013.

DP&L's testing from October 2004 through August 2008 showed only one result above detection for fathead minnows (0.6 TU_a on October 13, 2004). However, a total of eight samples showed evidence of acute toxicity based upon the test species *Ceriodaphnia dubia.* (See Table 4.) In addition, Ohio EPA conducted a screening bioassay test in November 2005 which showed evidence of acute toxicity for *Ceriodaphnia dubia.* The Ohio EPA composite test resulted in 20 percent mortality for fathead minnows and 65 percent mortality for *Ceriodaphnia dubia*.

Based upon these results and in accordance with rule 3745-33-07 of the Ohio Administrative Code, the discharge from outfall 013 has been placed into biomonitoring category 1 for *Ceriodaphnia dubia.* Acute toxicity limits have been proposed at outfall 013 for *Ceriodaphnia dubia.* (Monitoring has not been included for fathead minnows.) In addition, the permit requires DP&L to conduct a toxicity reduction evaluation (or TRE) to determine the source of the toxicity and minimize or eliminate its effects.

Table 4. Acute Toxicity Test Results for Ceriodaphnia Dubia

Sample Date	Toxicity Units (or TUa)
10/13/2004	1.4
2/24/2005	1.0
4/13/2005	0.2
5/18/2005	AA
6/14/2005	AA
7/13/2005	AA
7/20/2005	AA
8/2/2005	AA
8/16/2005	AA
9/7/2005	AA
9/13/2005	AA
9/27/2005	AA
11/15/2005	AA
12/17/2005	1.7
3/8/2006	1.74
6/14/2006	1.57
8/24/2006	AA
12/6/2006	AA
3/21/2007	1.17
6/6/2007	2.73
8/8/2007	AA
12/5/2007	AA
3/12/2008	2
6/11/2008	AA
8/14/2008	AA

Table 5. Effluent Concentrations Based Upon Renewal Application and Ohio EPA Data

Parameter	2007 Permit Application Renewal Form 2C			Ohio EPA Bioassay 11/2005	
	No. of Samples	Average*	Maximum	Sample 1	Sample 2
Outfall 001					
Aluminum (ug/l)	1		4180		
Barium (ug/l)	1		93.2		
Chem. Oxy. Demand (mg/l)	1		37.2		
Copper (ug/l)	1		25.5		
Fluoride (mg/l)	1		0.12		
Iron (ug/l)	1		7770		
Magnesium (mg/l)	1		10.8		
Manganese (ug/l)	1		706		
Nickel (ug/l)	1		15.5		
Nitrate+Nitrite (mg/l)	1		0.857		
Nitrogen, Total Org. (mg/l)	1		1.23		
Sulfate (mg/l)	1		49.7		
Titanium (ug/l)	1		85.3		
Total Organic Carbon (mg/l)	1		4.15		
Total Suspended Solids (mg/l)	1		179		
Zinc (ug/l)	1		95.8		
Outfall 002					
Aluminum (ug/l)	1		5160		
Barium (ug/l)	1		98.6		
Chem. Oxy. Demand (mg/l)	1		85		
Copper (ug/l)	1		30.3		
Fluoride (mg/l)	1		0.12		
Iron (ug/l)	1		8410		
Magnesium (mg/l)	1		11.2		
Manganese (ug/l)	1		679		
Nickel (ug/l)	1		17.3		
Nitrate+Nitrite (mg/l)	1		0.861		
Nitrogen, Total Org. (mg/l)	1		0.896		
Sulfate (mg/l)	1		49.6		
Titanium (ug/l)	1		150		
Total Organic Carbon (mg/l)	1		4.21		

Table 5. Effluent Concentrations Based Upon Renewal Application and Ohio EPA Data

Parameter	2007 Permit Application Renewal Form 2C			Ohio EPA Bioassay 11/2005	
	No. of Samples	Average*	Maximum	Sample 1	Sample 2
Total Suspended Solids (mg/l)	1		186		
Zinc (ug/l)	1		115		
Outfall 012					
Aluminum (ug/l)	1		604		
Barium (ug/l)	1		84.3		
Boron (ug/l)	1		84		
Chem. Oxy. Demand (mg/l)	1		11.9		
Copper (ug/l)	1		25		
Fluoride (mg/l)	1		0.36		
Iron (ug/l)	1		566		
Magnesium (mg/l)	1		11.4		
Manganese (ug/l)	1		50.2		
Mercury (ug/l)	4	0.0021	0.0043		
Nitrate+Nitrite (mg/l)	1		0.981		
Phenols (ug/l)	1		33		
Sulfate (mg/l)	1		117		
Titanium (ug/l)	1		23.2		
Total Organic Carbon (mg/l)	1		2.1		
Total Suspended Solids (mg/l)	150	6	54		
Outfall 013					
Aluminum (ug/l)	1		170.	272.	< 200.
Ammonia (mg/l)	54	0.6	1.7	0.168	0.274
Arsenic (ug/l)	1		< 100.	7.4	6.8
Barium (ug/l)	1		289.	220.	227.
Cadmium (ug/l)	1		< 30.	1.88	1.96
Calcium (mg/l)				68.	70.
Chem. Oxy. Demand (mg/l)	1		< 10.		
Chloride (mg/l)				52.6	
Fluoride (mg/l)	1		0.47		
Hardness (mg/l)				240.	245.

Table 5. Effluent Concentrations Based Upon Renewal Application and Ohio EPA Data

Parameter	2007 Permit Application Renewal Form 2C			Ohio EPA Bioassay 11/2005	
	No. of Samples	Average*	Maximum	Sample 1	Sample 2
Iron (ug/l)	1		< 100.	98.	< 50.
Magnesium (mg/l)	1		13.3	17.	17.
Manganese (ug/l)	1		163.	55.	58.
Mercury (ug/l)	4	0.0033	0.007		
Nickel (ug/l)	1		29.8		
Nitrate+Nitrite (mg/l)	1		0.865	1.56	1.78
Nitrogen, Total Org. (mg/l)	1		0.8		
Oil & Grease (mg/l)	104	0.1	9.		2.3
Phosphorus (mg/l)	1		< 0.1	< 0.010	0.011
Potassium (mg/l)				10.	10.
Selenium (ug/l)	1		< 100.	48.5	49.5
Silver (ug/l)	1		< 40.		
Sodium (mg/l)				42.	43.
Strontium (ug/l)				586.	601.
Sulfate (mg/l)	1		180.		
Thallium (ug/l)	1		< 100.		
TKN (mg/l)				0.36	0.28
Total Dissolved Solids (mg/l)				456.	452.
Total Organic Carbon (mg/l)	1		1.1		
Total Suspended Solids (mg/l)	104	5	18.		
Zinc (ug/l)	1		102.	87.	86.
Outfall 019					
Aluminum (ug/l)	1		1140.		
Barium (ug/l)	1		128.		
Boron (ug/l)	1		2270.		
Chem. Oxy. Demand (mg/l)	1		24.8		
Chlorine, Total Res. (mg/l)	1		0.2		
Fluoride (mg/l)	1		0.52		
Iron (ug/l)	1		1060.		
Magnesium (mg/l)	1		33.9		
Manganese (ug/l)	1		306.		
Molybdenum (ug/l)	1		229.		
Nitrogen, Total Org. (mg/l)	1		0.848		

Table 5. Effluent Concentrations Based Upon Renewal Application and Ohio EPA Data

Parameter	2007 Permit Application Renewal Form 2C			Ohio EPA Bioassay 11/2005	
	No. of Samples	Average*	Maximum	Sample 1	Sample 2
Sulfate (mg/l)	1		314.		
Titanium (ug/l)	1		47.		
Total Organic Carbon (mg/l)	1		5.9		
Total Suspended Solids (mg/l)	27	25	59		
Outfall 020					
Aluminum (ug/l)	1		938.		
Barium (ug/l)	1		132.		
Boron (ug/l)	1		2440.		
Chem. Oxy. Demand (mg/l)	1		20.5		
Chlorine, Total Res. (mg/l)	1		0.2		
Fluoride (mg/l)	1		0.5		
Iron (ug/l)	1		1160.		
Magnesium (mg/l)	1		36.		
Manganese (ug/l)	1		354.		
Molybdenum (ug/l)	1		234.		
Sulfate (mg/l)	1		314.		
Titanium (ug/l)	1		28.4		
Total Organic Carbon (mg/l)	1		5.4		
Total Suspended Solids (mg/l)	1		20.		
Outfall 609					
Ammonia (mg/l)	13	0.1	0.1		
Barium (ug/l)	1		28.1		
Boron (ug/l)	1		147.		
Chem. Oxy. Demand (mg/l)	1		20.5		
Fluoride (mg/l)	1		0.2		
Iron (ug/l)					
Magnesium (mg/l)	1		17.5		
Manganese (ug/l)	1		11.7		
Nitrate+Nitrite (mg/l)	1		34.6		
Nitrogen, Total Org. (mg/l)	1		2.52		
Phosphorus (mg/l)	1		8.69		

Table 5. Effluent Concentrations Based Upon Renewal Application and Ohio EPA Data

Parameter	2007 Permit Application Renewal Form 2C			Ohio EPA Bioassay 11/2005	
	No. of Samples	Average*	Maximum	Sample 1	Sample 2
Sulfate (mg/l)	1		71.2		
Total Organic Carbon (mg/l)	1		5.4		
Total Suspended Solids (mg/l)	13	4	14		
Zinc (ug/l)	1		136.		

Table 6. Supplemental Sampling Data: January – March 2007 (in ug/l)

Station	Parameter	January	February							March			
		31st	1st	3rd	5th	7th	8th	9th	13th	15th	16th	17th	19th
River Intake													
	Barium	45.3	46.8	44.2	48.4	40.9	43.4	41.2	39.5	49.2	49.6	60	94.3
	Copper[1]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	27	ND
	Iron	1460	1360	842	907	510	713	454	399	2190	2320	3830	7480
	Nickel[2]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.7
	Zinc[3]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	94.1
Outfall 001													
	Barium	45.4	47.2	46.8	49.7	44.8	45.9	40.7	42.1	48.2	51.6	61.3	102
	Copper[1]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Iron	1300	1240	961	923	739	646	686	585	2470	2650	3760	10400
	Nickel[2]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	16.5
	Zinc[3]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	77.4
Outfall 002													
	Barium	42.8	48.8	44.8	50.5	46.2	45.8	40.6	51.6	47.7	48.3	62.5	94.2
	Copper[1]	ND	ND	ND	ND	ND	ND	ND	22.6	ND	ND	ND	ND
	Iron	1300	1360	1120	888	730	674	541	860	2480	2770	3970	6990
	Nickel[2]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.9
	Zinc[3]	ND	ND	ND	ND	ND	ND	ND	1690	ND	ND	ND	70.5
Outfall 020													
	Barium	81.4	80.3	88.2	96.8	84.8	82	85	83.6	80.2	78.9	77.1	69.8
	Boron	1830	1970	2110	2190	1980	1920	2180	2200	1380	1350	1320	1330
Outfall 609													
	Zinc	87.4	91.7	114	54.9	113	84.1	73.2	142	181	171	208	149

[1] - Detection limit is 20 µg/l [2] - Detection limit is 10 µg/l [3] - Detection limit is 50 µg/l

Table 7. Effluent Characterization and Decision Criteria: 2002-2006

Summary of analytical results for Outfalls 001, 002, 012, 013, 019, 020, 602, and 609. 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											
Water Temperature	Annual	C	--	--	863	33	49	13-51			
Water Temperature	Annual	F	--	--	914	92	121	25-131			
Thermal Discharge	Annual	Million BTU/Hr			863	5830	6130	1550-8400			
Thermal Discharge	Annual	Million BTU/Day	--	--	914	5740	6140	1800-6380			
pH	Annual	S.U.	6.5 <= pH <= 9.0		260	7.8	8.2	6.7-8.5			
Oxidants, Total Residual	Annual	mg/l	--	0.05	115	0	0	0-0			
Oxidants, Total Residual	Annual	kg/day			115	0	0	0-0			
Flow Rate	Summer	MGD			895	477	555	132-671			
Flow Rate	Winter	MGD			882	390	544	93.2-666			
Flow Rate	Annual	MGD	--	--	1777	461	551	93.2-671			
Chlorine, Total Residual	Annual	mg/l	--	0.2	168	0	0	0-0			
Chlorine, Total Residual	Annual	kg/day			168	0	0	0-0			
Chlorination/Bromination Duration	Annual	Minutes	Not more than 120		133	120	120	120-120			
Outfall 002											
Water Temperature	Annual	C			760	33	49	12-57			
Water Temperature	Annual	F	--	--	869	83	120	12-126			
Thermal Discharge	Annual	Million BTU/Hr			760	2970	3080	662-3270			
Thermal Discharge	Annual	Million BTU/Day	--	--	802	2900	3070	538-3160			

Table 7. Effluent Characterization and Decision Criteria: 2002-2006

Summary of analytical results for Outfalls 001, 002, 012, 013, 019, 020, 602, and 609. 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}
pH	Annual	S.U.	6.5 <= pH <= 9.0		237	7.9	8.2	7.2-8.5			
Oxidants, Total Residual	Annual	mg/l	--	0.05	109	0	0	0-0			
Oxidants, Total Residual	Annual	kg/day			109	0	0	0-0			
Flow Rate	Summer	MGD			810	240	261	67.7-319			
Flow Rate	Winter	MGD			751	233	265	83.1-468			
Flow Rate	Annual	MGD	--	--	1561	237	264	67.7-468			
Chlorine, Total Residual	Annual	mg/l	--	0.2	149	0	0	0-0			
Chlorine, Total Residual	Annual	kg/day			149	0	0	0-0			
Chlorination/Bromination Duration	Annual	Minutes	Not more than 120		121	120	120	120-120			
Outfall 012											
pH	Annual	S.U.	6.5 <= pH <= 9.0		768	7.4	8.07	6.1-8.9			
Residue, Total Dissolved	Annual	mg/l			17	314	431	220-463			
Residue, Total Dissolved	Annual	kg/day			17	13800	19400	8660-21600			
Total Suspended Solids	Annual	mg/l	25	75	765	5	22	0-69			
Total Suspended Solids	Annual	kg/day	2176	6529	765	217	1320	0-3990			
Oil and Grease, Total	Annual	mg/l			130	0	2	0-4			
Oil and Grease, Total	Annual	kg/day			130	0	104	0-220			
Oil and Grease, Hexane Extr Method	Annual	mg/l	10	15	130	0	0	0-5			
Oil and Grease, Hexane Extr Method	Annual	kg/day	871	1306	130	0	0	0-248			
Chloride, Total	Annual	mg/l			17	30	55.2	20-56			
Chloride, Total	Annual	kg/day			17	1500	2490	787-2610			
Zinc, Total Recoverable	Annual	ug/l	--	--	20	0	81.6	0-93			
Zinc, Total Recoverable	Annual	kg/day	--	--	20	0	4.32	0-5.49			

Table 7. Effluent Characterization and Decision Criteria: 2002-2006

Summary of analytical results for Outfalls 001, 002, 012, 013, 019, 020, 602, and 609. 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}
Lead, Total Recoverable	Annual	ug/l	--	--	11	0	1.6	0-1.9			
Lead, Total Recoverable	Annual	kg/day	--	--	11	0	0.0861	0-0.112			
Copper, Total Recoverable	Annual	ug/l	--	45.0	136	0	0	0-48			
Copper, Total Recoverable	Annual	kg/day	--	2.64	136	0	0	0-2.23			
Oxidants, Total Residual	Annual	mg/l	--	0.01	392	0	0	0-0			
Oxidants, Total Residual	Annual	kg/day			392	0	0	0-0			
Flow Rate	Summer	MGD			920	12.6	17.4	0.2-22			
Flow Rate	Winter	MGD			906	13.8	19.4	0.1-23			
Flow Rate	Annual	MGD	--	--	1826	13.1	18.6	0.1-23			
Chlorine, Total Residual	Annual	mg/l	--	0.038	392	0	0	0-0			
Chlorine, Total Residual	Annual	kg/day			392	0	0	0-0			
Chlorine, Free Available	Annual	mg/l			378	0	0	0-0			
Chlorine, Free Available	Annual	kg/day			378	0	0	0-0			
Mercury, Total (Low Level)	Annual	ng/l	--	--	11	2.88	4.86	0-5.41			
Mercury, Total (Low Level)	Annual	kg/day	--	--	11	9.54E-05	0.000229	0-0.000266			
Lead, Total Recoverable	Annual	ug/l			9	0	2	0-2			
Lead, Total Recoverable	Annual	kg/day			9	0	0.114	0-0.116			
Copper, Total Recoverable	Annual	ug/l			129	0	29.6	0-87			
Copper, Total Recoverable	Annual	kg/day			129	0	1.82	0-4.15			
Mercury, Total Recoverable	Annual	ug/l			9	0	0.12	0-0.2			
Mercury, Total Recoverable	Annual	kg/day			9	0	0.00731	0-0.0122			
Outfall 013											
pH, Maximum	Annual	S.U.			872	7.4	7.8	6.7-10.2			
pH, Minimum	Annual	S.U.			872	7.2	7.5	6.5-9.9			

Table 7. **Effluent Characterization and Decision Criteria: 2002-2006**

Summary of analytical results for Outfalls 001, 002, 012, 013, 019, 020, 602, and 609. 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}
Total Suspended Solids	Annual	mg/l	30	100	524	5	11.9	1-21			
Total Suspended Solids	Annual	kg/day	2362	7873	524	310	807	23.8-1560			
Oil and Grease, Total	Annual	mg/l			249	0	2	0-7			
Oil and Grease, Total	Annual	kg/day			249	0	118	0-472			
Oil and Grease, Hexane Extr Method	Annual	mg/l	15	20	266	0	0	0-12			
Oil and Grease, Hexane Extr Method	Annual	kg/day	1181	1575	266	0	0	0-1040			
Nitrogen, Ammonia (NH3)	Summer	mg/l	--	--	302	0	1.3	0-2.5			
Nitrogen, Ammonia (NH3)	Winter	mg/l	--	--	338	0	0.117	0-0.3			
Nitrogen, Ammonia (NH3)	Summer	kg/day	--	--	302	0	85.6	0-177			
Nitrogen, Ammonia (NH3)	Winter	kg/day	--	--	338	0	7.24	0-17.7			
Selenium, Total Recoverable	Annual	ug/l	--	--	259	49	111	0-149			
Selenium, Total Recoverable	Annual	kg/day	--	--	259	3.31	7.97	0-11.7			
Cadmium, Total (Cd)	Annual	ug/l			9	2	3.56	0-4			
Cadmium, Total (Cd)	Annual	kg/day			9	0.118	0.21	0-0.236			
Zinc, Total Recoverable	Annual	ug/l	--	--	19	50	84.6	0-90			
Zinc, Total Recoverable	Annual	kg/day	--	--	19	2.18	5.02	0-5.59			
Cadmium, Total Recoverable	Annual	ug/l	--	--	10	2.3	3	0-3			
Cadmium, Total Recoverable	Annual	kg/day	--	--	10	0.136	0.192	0-0.197			
Copper, Total Recoverable	Annual	ug/l	--	53	137	0	50.6	0-70			
Copper, Total Recoverable	Annual	kg/day	--	4.17	137	0	3.1	0-5.04			
Chromium, Dissolved Hexavalent	Annual	ug/l	--	31	263	0	28.9	0-112			
Chromium, Dissolved Hexavalent	Annual	kg/day	--	2.44	263	0	2.12	0-11.2			
Flow Rate	Summer	MGD			838	16.4	23	3.8-23			
Flow Rate	Winter	MGD			820	16.4	20.8	2.1-26.4			
Flow Rate	Annual	MGD	--	--	1658	16.4	20.8	2.1-26.4			
Mercury, Total (Low Level)	Annual	ng/l	--	--	10	2.3	6.01	0.7-7			

Table 7. Effluent Characterization and Decision Criteria: 2002-2006

Summary of analytical results for Outfalls 001, 002, 012, 013, 019, 020, 602, and 609. 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		50^{th}	95^{th}		# Obs.	PEQ_{ave}	PEQ_{max}
Mercury, Total (Low Level)	Annual	kg/day	--	--	10	0.000116	0.000427	0.0000217-0.000435			
Acute Toxicity, Ceriodaphnia dubia	Annual	TUa	--	--	14	0	1.71	0-1.74			
Acute Toxicity, Pimephales promelas	Annual	TUa	--	--	14	0	0.21	0-0.6			
pH, Maximum	Annual	S.U.	Not more than 9.0		921	7.4	8.2	6.9-9			
pH, Minimum	Annual	S.U.	Not less than 6.5		922	7.3	7.89	6.3-8.5			
Lead, Total Recoverable	Annual	ug/l			9	0	0	0-0			
Lead, Total Recoverable	Annual	kg/day			9	0	0	0-0			
Copper, Total Recoverable	Annual	ug/l			127	0	56.7	0-79			
Copper, Total Recoverable	Annual	kg/day			127	0	4.18	0-6.22			
Outfall 019											
Total Suspended Solids	Annual	mg/l	30	100	180	20	44	3.6-67.5			
Outfall 020											
pH	Annual	S.U.			112	7.9	8.55	7.2-8.9			
Flow Rate	Summer	MGD			99	0.405	1.08	0.005-1.38			
Flow Rate	Winter	MGD			116	0.405	1.08	0.029-1.4			
Flow Rate	Annual	MGD	--	--	215	0.405	1.08	0.005-1.4			
pH, Maximum	Annual	S.U.	Not more than 9.0		111	7.9	8.6	7.2-8.8			
pH, Minimum	Annual	S.U.	Not less than 6.5		111	7.9	8.6	7.2-8.8			

Table 7. Effluent Characterization and Decision Criteria: 2002-2006

Summary of analytical results for Outfalls 001, 002, 012, 013, 019, 020, 602, and 609. 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 021											
Thermal Discharge	Annual	Million BTU/Hr	--	11000	944	7820	9130	887-9490			
Outfall 602											
pH	Annual	S.U.	--	--	54	11.8	12.5	9.7-12.7			
Total Suspended Solids	Annual	mg/l	30	100	18	1	18.5	1-36.7			
Oil and Grease, Total	Annual	mg/l	15	20	15	0	3.16	0-4			
Copper, Total (Cu)	Annual	ug/l	1000	1000	54	0	0	0-0			
Iron, Total (Fe)	Annual	ug/l	1000	1000	54	55	290	0-2090			
Flow Rate	Summer	MGD			11	0.05	0.088	0.014-0.088			
Flow Rate	Winter	MGD			46	0.0595	0.0728	0.01-0.083			
Flow Rate	Annual	MGD	--	--	57	0.059	0.0758	0.01-0.088			
Outfall 609											
Color, Severity	Annual	Units	--	--	1436	1	2	1-4			
Dissolved Oxygen	Summer	mg/l	--	--	30	1.4	2.06	0.65-2.2			
Dissolved Oxygen	Winter	mg/l	--	--	31	1.9	4.5	0.2-6.58			
pH	Annual	S.U.	6.5 <= pH <= 9.0		60	7.1	7.31	6.5-7.4			
Total Suspended Solids	Annual	mg/l	30	45	60	2	10.2	0-16			
Nitrogen, Ammonia (NH3)	Summer	mg/l	--	--	29	0	0	0-0.1			

Table 7. **Effluent Characterization and Decision Criteria: 2002-2006**

Summary of analytical results for Outfalls 001, 002, 012, 013, 019, 020, 602, and 609. 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}
Nitrogen, Ammonia (NH3)	Winter	mg/l	--	--	31	0	1.05	0-2			
Odor, Severity	Annual	Units	--	--	1436	1	1	1-4			
Turbidity, Severity	Annual	Units	--	--	1436	1	2	1-4			
Fecal Coliform	Annual	#/100 ml	1000	2000	28	19.5	137	0-300			
Flow Rate	Summer	MGD			578	0.029	0.0692	0.006-0.131			
Flow Rate	Winter	MGD			559	0.032	0.063	0.004-1.3			
Flow Rate	Annual	MGD	--	--	1137	0.03	0.0662	0.004-1.3			
CBOD 5 day	Summer	mg/l	25	40	29	0	0	0-8			
CBOD 5 day	Winter	mg/l	25	40	30	0	5.55	0-7			

Table 8. Effluent Data for DP&L Stuart Station

Parameter	Units	# of Samples	# > MDL	Average PEQ	Maximum PEQ
Outfall 012					
Self-Monitoring Data					
Chloride	mg/l	5	5	94.	129.
Copper	μg/l	266	33	21.	32.
Lead	μg/l	20	6	1.8	2.5
Mercury	μg/l	7	6	0.006	0.009
TDS	mg/l	5	5	777.4	1065.
Chlorine, total res.	mg/l	244	0	--	–
Chlorine, free available	mg/l	531	0	--	--
Zinc	μg/l	20	4	96.	132.
2c Data					
Aluminum	μg/l	1	1	2734.	3745.
Barium	μg/l	1	1	382.	523.
Boron	μg/l	1	1	380.	521.
Fluoride	mg/l	1	1	1.6	2.2
Iron	μg/l	1	1	2562.	3509.
Magnesium	mg/l	1	1	52.	71.
Manganese	μg/l	1	1	227.	311.
NO_2+NO_3	mg/l	1	1	4.4	6.1
Phenols	μg/l	1	1	149.	205.
Sulfate	mg/l	1	1	530.	725.
Titanium	μg/l	1	1	105.	144.
Outfall 013					
Self-Monitoring Data					
Ammonia (summer)	mg/l	243	37	1.28	1.75
Ammonia (winter)	mg/l	203	35	0.08	0.15
Cadmium	μg/l	17	13	3.	4.2
Chromium^{+6}, diss.	μg/l	265	131	23.	33.
Copper	μg/l	262	64	35.	52.
Mercury	μg/l	6	6	0.007	0.010
Selenium	μg/l	261	257	105.	148.
Zinc	μg/l	18	7	72.	101.

Table 8. Effluent Data for DP&L Stuart Station (continued)

Parameter	Units	# of Samples	# > MDL	Average PEQ	Maximum PEQ
Outfall 013 (continued)					
2c Data and Ohio EPA Data					
Aluminum	μg/l	3	2	596.	816.
Arsenic	μg/l	3	2	21.	28.
Barium	μg/l	3	1	633.	867.
Chloride	mg/l	1	1	238.	326.
Fluoride	mg/l	1	1	2.1	2.9
Iron	μg/l	3	1	219.	300.
Magnesium	mg/l	3	3	37.	51.
Manganese	μg/l	3	3	357.	489.
Nickel	ug/l	1	1	135.	185.
NO_2+NO_3	mg/l	3	3	3.9	5.3
Phosphorus	mg/l	3	1	0.031	0.042
Potassium	mg/l	2	2	28.	38.
Strontium	ug/l	2	2	1667.	2284.
Sulfate	mg/l	1	1	815.	1116.
TDS	mg/l	2	2	1265.	1733.
Sodium	mg/l	2	2	119.	163.
Outfall 001					
Self-Monitoring Data					
Chlorine, total res.	mg/l	149	1	0.03	0.04
2c Data & Supplemental Data					
Aluminum	μg/l	1	1	18919.	25916.
Barium	μg/l	13	13	119.	163.
Copper	μg/l	13	1	29.8	40.8.
Fluoride	mg/l	1	1	0.54	0.74
Iron	μg/l	13	13	8487.	16174.
Magnesium	mg/l	1	1	49.	67.
Manganese	μg/l	1	1	3195.	4377.
Nickel	ug/l	13	2	19.3	26.4
NO_2+NO_3	mg/l	1	1	3.4	5.3
Sulfate	mg/l	1	1	225.	308.
Titanium	μg/l	1	1	386.	529.
Zinc	μg/l	13	2	112.	153.

Table 8. Effluent Data for DP&L Stuart Station (continued)

Parameter	Units	# of Samples	# > MDL	Average PEQ	Maximum PEQ
Outfall 002					
Self-Monitoring Data					
Chlorine, total res.	mg/l	135	0	--	--
2c Data & Supplemental Data					
Aluminum	μg/l	1	1	23354.	31992.
Barium	μg/l	13	13	115.	158.
Copper	μg/l	13	2	35.4	48.5
Fluoride	mg/l	1	1	0.54	0.74
Iron	μg/l	13	13	9823.	13456.
Magnesium	mg/l	1	1	51.	69.
Manganese	μg/l	1	1	3073.	4210.
Nickel	ug/l	13	2	20.2	27.7
NO_2+NO_3	mg/l	1	1	3.9	5.34
Sulfate	mg/l	1	1	224.	308.
Titanium	μg/l	1	1	679.	930.
Zinc	μg/l	3	3	370.	5070.
Outfall 020					
2c Data & Supplemental Data					
Aluminum	μg/l	1	1	4245.	5816.
Barium	μg/l	13	13	154.	211.
Boron	μg/l	13	13	2850.	3904.
Chlorine, total res.	mg/l	1	1	0.91	1.24
Fluoride	mg/l	1	1	2.26	3.10
Iron	μg/l	1	1	5250.	7192.
Magnesium	mg/l	1	1	163.	223.
Manganese	μg/l	1	1	1602.	2195.
Molybdenum	μg/l	1	1	1059.	1451.
Sulfate	mg/l	1	1	1421.	1947.
Titanium	μg/l	1	1	128.	176.

Table 8. Effluent Data for DP&L Stuart Station (continued)

Parameter	Units	# of Samples	# > MDL	Average PEQ	Maximum PEQ
Outfall 609					
<u>Self-Monitoring Data</u>					
Ammonia (summer)	mg/l	20	0	--	--
Ammonia (winter)	mg/l	15	4	1.2	1.6
<u>2c Data & Supplemental Data</u>					
Barium	μg/l	1	1	127.	174.
Boron	μg/l	1	1	665.	911.
Fluoride	mg/l	1	1	0.91	1.24
Magnesium	mg/l	1	1	79.	109.
Manganese	μg/l	1	1	53.	73.
NO_2+NO_3	mg/l	1	1	157.	214.
Phosphorus	mg/l	1	1	39.	54.
Sulfate	mg/l	1	1	322.	441.
Zinc	μg/l	13	13	243.	333.

Table 9. Effluent Data for Stuart Station: 2003 – 2007

Parameter	Units	# of Samples	# > MDL	PEQ Average	PEQ Maximum
Outfall 012					
Chloride, Total	mg/l	29	29	56.458	81.756
Chlorine, Total Residual	mg/l	538	0	--	--
Copper, T.R.	ug/l	265	34	19.241	28.622
Lead, T.R.	ug/l	20	8	2.3637	3.6837
Mercury	ng/l	15	14	7.4885	13.405
Oxidants, Total Residual	mg/l	538	0	--	--
Solids, Total Dissolved	mg/l	29	28	434.56	545.57
Zinc, T.R.	ug/l	19	6	95.05	130.2
Outfall 013					
Ammonia - Summer	mg/l	141	71	1.2639	2.1943
Ammonia - Winter	mg/l	125	27	0.10709	0.19048
Cadmium, T.R.	ug/l	19	17	3.1332	4.1569
Chromium^{+6} (Hexchrome) [1]	ug/l	293	109	24.294	36.211
Copper, T.R. [1]	ug/l	223	92	42.957	62.366
Lead, T.R.	ug/l	5	0	--	--
Mercury	ng/l	14	14	6.9024	12.334
Selenium, T.R.	ug/l	258	258	68.608	91.306
Zinc, T.R.	ug/l	19	12	81.636	111.18
Outfall 609					
Ammonia - Summer	ug/l	19	2	0.1267	0.1736
Ammonia - Winter	ug/l	15	3	0.657	0.9

[1] The period of record used for this parameter in calculating PEQs for this table was 1/1/2003 through 8/2008.

Table 10. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria: Average: Human Health	Outside Mixing Zone Criteria: Average: Agri-culture	Outside Mixing Zone Criteria: Average: Aquatic Life	Outside Mixing Zone Criteria: Maximum: Aquatic Life	Inside Mixing Zone Maximum
Ammonia (summer)	mg/l	–	–	1.2	–	–
Ammonia (winter)	mg/l	–	–	6.6	–	–
Arsenic	µg/l	50.	100.	150.	340.	680.
Barium	µg/l	--	--	220.	2000.	4000.
Boron	µg/l	--	--	950.	8500.	17000.
Cadmium	µg/l	--	50.	3.0	6.1	12.
Chloride	mg/l	250.	--	--	--	--
Chlorine, total residual	mg/l	–	–	0.011	0.019	0.038
Chromium^{+6}, diss.	µg/l	–	–	11.	16.	31.
Copper [A]	µg/l	1300.	500.	12.	18.	45.
Copper [B]	µg/l	1300.	500.	12.	18.	55.
Fluoride	mg/l	1.0	2.0	--	--	--
Iron	µg/l	–	5000.	–	–	–
Lead	µg/l	–	100.	9.1	170.	350.
Molybdenum	µg/l	–	–	20000.	190000.	370000.
Mercury [C]	µg/l	0.012	10.	0.91	1.7	3.4
Nickel	µg/l	610.	200.	66.	590.	1200.
NO_2+NO_3	mg/l	10.	100.	–	–	–
Phenols	µg/l	21000.	--	400.	4700.	9400.
Selenium	µg/l	170.	50.	5.0	–	–
Strontium	µg/l	--	--	21000.	40000.	81000.
Sulfate	mg/l	250.	–	–	–	–
TDS	mg/l	--	--	1500.	--	--
Zinc	µg/l	9100.	25000.	150.	150.	300.

[A] Based on instream hardness of 131 mg/l, and effluent hardness of 166 mg/l for outfall 012
[B] Based on instream hardness of 131 mg/l, and effluent hardness of 204 mg/l for outfall 013
[C] Bioaccumulative Chemical of Concern (BCC)

Table 11. Background Water Quality and Discharger Flow

Parameter	Units	Season	Value	Basis
Flows for Ohio River				
7Q10	cfs	annual	10600.	ORSANCO
Harmonic Mean Flow	cfs	annual	42100.	ORSANCO
Instream hardness	mg/l	annual	131.	ORSANCO
Instream temperature	^{o}C	summer	26.6	ORSANCO, 23 obs, 0<MDL, 2000-05
		winter	5.6	ORSANCO, 6 obs, 0<MDL, 2000-05
Instream pH	S.U.	summer	7.8	ORSANCO, 17 obs, 0<MDL, 2000-05
		winter	7.6	ORSANCO, 4 obs, 0<MDL, 2000-05
DP&L Stuart flows	cfs			
020			0.63	DSW
013			29.6	DSW
001			708.6	DSW
002			379.	DSW
609			0.05	DSW
012			21.8	DSW
Intake			1207	DSW
Background Water Quality for Ohio River				
Ammonia (summer)	mg/l		0.05	STORET, 29 obs, 12<MDL, 2000-06
Ammonia (winter)	mg/l		0.08	STORET, 10 obs, 0<MDL, 2000-06
Arsenic	μg/l		0.	No representative data available.
Barium	μg/l		43.2	STORET, 32 obs, 1<MDL, 2000-06
Boron	μg/l		0.	No representative data available.
Cadmium	μg/l		0.2	STORET, 32 obs, 1<MDL, 2000-06
Chloride	mg/l		26	STORET, 50 obs, 0<MDL, 2000-06
Chlorine, tot. res.	mg/l		0.	No representative data available.
$Chromium^{+6}$, diss.	μg/l		0.	STORET, 8 obs, 8<MDL, 2000-02
Copper	μg/l		2.38	STORET, 38 obs, 13<MDL, 2000-06
Fluoride	mg/l		0.	No representative data available.
Iron	μg/l		550.	STORET, 38 obs, 0<MDL, 2000-06
Mercury	μg/l		0.	No representative data available.
Nickel	μg/l		3.24	STORET, 32 obs, 6<MDL, 2000-06
NO_2+NO_3	mg/l		0.9	STORET, 14 obs, 2<MDL, 2000-05
Phenols	μg/l		2.5	STORET, 46 obs, 45<MDL, 2000-06
Selenium	μg/l		0.72	STORET, 32 obs, 13<MDL, 2000-06
Strontium	μg/l		0.	No representative data available.
Sulfate	mg/l		70.	STORET, 51 obs, 0<MDL, 2000-06
TDS	mg/l		382.	BWQR; 3755 obs, 0<MDL, to 1988
Zinc	μg/l		7.21	STORET, 38 obs, 12<MDL, 2000-06

BWQR - Background Water Quality Report

Table 12-012. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria: Outfall 012

Parameter	Units	------------------ Average ---------------- Human Health	Agri Supply	Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Barium	μg/l	--	--	9020.[A]	99400.[A]	4000.
Boron	μg/l	--	--	92960.[A]	471000.[A]	17000.
Chloride	mg/l	23340.	--	--	--	--
Copper	μg/l	135100.[A]	51790.[A]	492.[A]	797.[A]	45.
Fluoride	μg/l	4694.	9388.	--	--	--
Iron	μg/l	--	22010.	--	--	--
Mercury [B]	μg/l	1.2	1041[A]	46.[A]	87.[A]	3.4
NO_2+NO_3	mg/l	44.	466.	--	--	--
Phenols	μg/l	5153000.[A]	--	40110.[A]	268400.[A]	9400.
Sulfate	mg/l	915.	--	--	--	--
TDS	mg/l	--	--	57280.	--	--
Zinc	μg/l	945500.[A]	2599000.[A]	7257.[A]	7257.[A]	300.

Table 12-013. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria: Outfall 013

Parameter	Units	------------------ Average ---------------- Human Health	Agri Supply	Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Ammonia (summer)	mg/l	–	–	3.5	– --	
Ammonia (winter)	mg/l	–	–	19.6	–	–
Arsenic	μg/l	7163.[A]	14330.[A]	5525.[A]	1565.[A]	680.
Barium	μg/l	--	--	6419.[A]	8861.[A]	4000.
Cadmium	μg/l	–	7134.[A]	103.[A]	27.[A]	12.
Chloride	mg/l	23340.	--	--	--	--
Chromium^{+6}, diss.	μg/l	–	–	405.[A]	74.[A]	31.
Copper	μg/l	135100.[A]	51790.[A]	357.[A]	74.[A]	55.
Fluoride	μg/l	4694.	9388.	--	--	--
Mercury [B]	μg/l	1.2	1041.[A]	34.[A]	7.8[A]	3.4
Nickel	μg/l	4071.[A]	1322.[A]	156.	675.	1200.
NO_2+NO_3	mg/l	44.	466.	--	--	--
Selenium	μg/l	24250.	7060.	158.	--	--
Strontium	μg/l	--	--	773027.[A]	183243.[A]	81000.
Sulfate	mg/l	915.	--	--	--	--
TDS	mg/l	--	--	41560.	--	--
Zinc	μg/l	945500.[A]	2599000.[A]	5266.[A]	664.[A]	300.

[A] Allocation must not exceed the Inside Mixing Zone Maximum.
[B] Bioaccumulative Chemical of Concern (BCC); no mixing zone allowed after 11/15/2010, WQS must be met at end-of-pipe, unless the requirements for an exception are met as listed in 3745-2-08(L).

Table 12-001. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria: Outfall 001

Parameter	Units	Average Human Health	Average Agri Supply	Average Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Chlorine, tot. res.	µg/l	--	--	28.	23.	38.
Fluoride	µg/l	4694.	9388.	--	--	--
Iron	µg/l	--	22010.	--	--	--
Nickel	µg/l	4071.[A]	1322.[A]	156.	675.	1200.
NO_2+NO_3	mg/l	44.	466.	--	--	--
Strontium	µg/l	--	--	52414.	45984.	81000.
Sulfate	mg/l	915.	--	--	--	--

Table 12-002. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria: Outfall 002

Parameter	Units	Average Human Health	Average Agri Supply	Average Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Fluoride	µg/l	4694.	9388.	--	--	--
Iron	µg/l	--	22010.	--	--	--
NO_2+NO_3	mg/l	44.	466.	--	--	--
Sulfate	mg/l	915.	--	--	--	--

Table 12-020. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria: Outfall 020

Parameter	Units	Average Human Health	Average Agri Supply	Average Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Barium	µg/l	--	--	6419.[A]	8861.[A]	4000.
Boron	µg/l	--	--	92960.[A]	471000.[A]	17000.
Chlorine, tot. res.	µg/l	--	--	28.	23.	38.
Fluoride	µg/l	4694.	9388.	--	--	--
Iron	µg/l	–	22010.	--	--	--
Sulfate	mg/l	915.	--	--	--	--

[A] Allocation must not exceed the Inside Mixing Zone Maximum.

Table 12-609. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria: Outfall 609

		Average		Maximum		Inside
Parameter	Units	Human Health	Agri Supply	Aquatic Life	Aquatic Life	Mixing Zone Maximum
Barium	μg/l	--	--	9020.[A]	99400.[A]	4000.
Boron	μg/l	--	--	92690.[A]	471000.[A]	17000.
Fluoride	μg/l	4694.	9388.	--	--	--
NO_2+NO_3	mg/l	44.	466.	--	--	--
Sulfate	mg/l	915.	--	--	--	--
Zinc	μg/l	945500.[A]	2599000.[A]	7257.[A]	7257.[A]	300.

[A] Allocation must not exceed the Inside Mixing Zone Maximum.

Table 13-012. Parameter Assessment for Outfall 012

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

Aluminum	Magnesium	Manganese
Titanium		

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

No parameters have been placed in this assessment group.

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

Barium	Boron	Chloride
Fluoride	Iron	Lead *
Mercury **	NO_2+NO_3	Phenols
TDS	Zinc	

Group 4: PEQ_{max} ≥ 50% but <100% of the maximum PEL or PEQ_{avg} ≥ 50% but < 100% of the average PEL. Monitoring is appropriate.

Copper (>75%)	Mercury ***	Sulfate

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

Limits to Protect Numeric Water Quality Criteria

		Applicable	Recommended Effluent Limits	
Parameter	Units	Period	Average	Maximum

No parameters fit the criteria of this group.

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* Lead becomes a Group 3 parameter based upon using the January 2003 through December 2007 period of record.
** Mercury, which is a bioaccumulative chemical of concern (BCC), has been placed in assessment Group 3 prior to the phaseout of the use of mixing zones for the development of wasteload allocations for BCCs.
*** Mercury has been placed in assessment Group 4 after the phaseout of the use of mixing zones for the development of wasteload allocations for BCCs.

Table 13-013. Parameter Assessment for Outfall 013

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

Aluminum	Manganese	Magnesium
Phosphorus	Potassium	

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

Iron	Strontium

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

Ammonia (summer)	Ammonia (winter)	Arsenic
Barium	Cadmium	Chloride
Mercury [a]	NO_2+NO_3	Selenium [b]
TDS	Zinc	

Group 4: PEQ_{max} ≥ 50% but <100% of the maximum PEL or PEQ_{avg} ≥ 50% but < 100% of the average PEL. Monitoring is appropriate.

Fluoride	Mercury [c]	Sulfate (>75%)

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

Limits to Protect Numeric Water Quality Criteria

Parameter	Units	Applicable Period	Recommended Effluent Limits Average	Maximum
Chromium^{+6}, diss.	μg/l	annual	--	31.
Copper	μg/l	annual	--	55.
Nickel [d]	μg/l	annual	156.	675.

[a] Mercury, which is a bioaccumulative chemical of concern (BCC), has been placed in assessment Group 3 prior to the phaseout of the use of mixing zones for the development of wasteload allocations for BCCs.
[b] Selenium becomes a Group 3 parameter based upon using the January 2003 through December 2007 period of record.
[c] Mercury has been placed in assessment Group 4 after the phaseout of the use of mixing zones for the development of wasteload allocations for BCCs.
[d] Nickel becomes a Group 5 parameter based upon the loading test [OAC 3745-2-06(B)].

Table 13-001. Parameter Assessment for Outfall 001

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

Aluminum	Manganese	Magnesium
Titanium		

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

No parameters fit the criteria of this group.

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

Fluoride	Iron	Nickel
NO_2+NO_3	Sulfate	

Group 4: $PEQ_{max} \geq$ 50% but <100% of the maximum PEL or $PEQ_{avg} \geq$ 50% but < 100% of the average PEL. Monitoring is appropriate.

No parameters fit the criteria of this group.

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

Limits to Protect Numeric Water Quality Criteria

		Applicable	Recommended Effluent Limits	
Parameter	Units	Period	Average	Maximum
Chlorine, tot. res.	μg/l	annual	--	23.

Table 13-002. Parameter Assessment for Outfall 002

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

Aluminum	Manganese	Magnesium
Titanium		

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

No parameters fit the criteria of this group.

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

Fluoride	Iron	NO_2+NO_3
Sulfate		

Group 4: PEQ_{max} ≥ 50% but <100% of the maximum PEL or PEQ_{avg} ≥ 50% but < 100% of the average PEL. Monitoring is appropriate.

No parameters fit the criteria of this group.

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

No parameters fit the criteria of this group.

Table 13-020. Parameter Assessment for Outfall 020

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

Aluminum	Magnesium	Manganese
Titanium		

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

Molybdenum

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

Barium	Boron	Chlorine, tot. res.
Fluoride	Iron	

Group 4: PEQ_{max} ≥ 50% but <100% of the maximum PEL or PEQ_{avg} ≥ 50% but < 100% of the average PEL. Monitoring is appropriate.

No parameters fit the criteria of this group.

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

Limits to Protect Numeric Water Quality Criteria

		Applicable	Recommended Effluent Limits	
Parameter	Units	Period	Average	Maximum
Sulfate	mg/l	annual	915.	--

Table 13-609. Parameter Assessment for Outfall 609

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

Manganese	Magnesium	Phosphorus

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

Ammonia (winter)

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

Barium	Boron	Fluoride
Sulfate		

Group 4: $PEQ_{max} \geq 50\%$ but <100% of the maximum PEL or $PEQ_{avg} \geq 50\%$ but < 100% of the average PEL. Monitoring is appropriate.

No parameters fit the criteria of this group.

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

Limits to Protect Numeric Water Quality Criteria

Parameter	Units	Applicable Period	Recommended Effluent Limits Average	Maximum
NO_2+NO_3	mg/l	annual	44.	--
Zinc	μg/l	annual	--	300.

Table 14-001. Final Effluent Limits and Monitoring Requirements for Outfalls 001 and 002

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Water Temperature	°F	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] / EP
Thermal Discharge	MBTU/Hr.[d]	--	--	--	--	M[c] /BPJ
pH	S.U.	- - - - - - - - - - - 6.5 to 9.0 - - - - - - - - - - - - - - -				EP/WQS
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 57 for definition of terms and explanation of monitoring requirements.
[d] Million BTU per hour

Table 14-012. Final Effluent Limits and Monitoring Requirements for Outfall 012

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Residue, Total Diss.	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP/BPJ
Suspended Solids	mg/l	25	75	2176	6529	EP/BPJ
Oil and Grease	mg/l	10	15	871	1306	EP/BPJ
Sulfate	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP/WLA
Chloride, Total	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP/BPJ
Hardness	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				BPJ
pH	S.U.	- - - - - - - - - - - 6.5 to 9.0 - - - - - - - - - - - - - -				EP/WQS
Copper	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP
Flow rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /EP
Zinc	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				BPJ
Oxidants, Total Res.	mg/l	–	0.01	-	-	BPJ
Chlorine, Total Residual	mg/l	--	0.038	-	-	WQS/BPJ
Mercury	ng/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				EP/RP

[a] Loadings for total suspended solids and oil & grease are based upon a flow rate of 23.0 MGD.
[b,c] See page 57 for definition of terms and explanation of monitoring requirements.

Table 14-013. Final Effluent Limits and Monitoring Requirements for Outfall 013

		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	2362	7873	EP/BPT
Oil and Grease	mg/l	15	20	1181	1575	EP/BPT
Ammonia	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				BPJ
Sulfate	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP
Fluoride	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP
Selenium	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP/WLA
Hardness	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				BPJ
Nickel	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP/WLA
Zinc	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP/WLA
Cadmium	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP/WLA
Copper	µg/l	--	53	--	3.83	RP/WLA
Chromium^{+6}	µg/l	--	31	--	2.24	RP/WLA
Flow rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /EP
Mercury	ng/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				BPJ
Acute Toxicity	TUa					
Ceriodaphnia dubia	--	1.0	--	--	WET	
Fathead minnows		--	--	--	--	WET
pH	S.U.	- - - - - - - - - - - 6.5 to 9.0 - - - - - - - - - - - - - -				EP/WQS

[a] Loadings for chromium^{+6} and copper are based upon a flow rate of 19.1 MGD; loadings for other parameters are based upon a flow rate of 20.8 MGD.
[b,c] See page 57 for definition of terms and explanation of monitoring requirements.

Table 14-019. Final Effluent Limits and Monitoring Requirements for Outfall 019

		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	--	--	EP/BPT

[b,c] See page 57 for definition of terms and explanation of monitoring requirements.

Table 14-020. Final Effluent Limits and Monitoring Requirements for Outfall 020

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
pH	S.U.	- - - - - - - - - - - 6.0 to 9.0 - - - - - - - - - - - - - -				EP/WQS
Sulfate	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				RP/WLA
Flow rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /EP

[b,c] See page 57 for definition of terms and explanation of monitoring requirements.

Table 14-021. Final Effluent Limits and Monitoring Requirements for Outfall 021

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Thermal Discharge	MBTU/Hr.[d]	--	11000	--	--	M[c]

[b,c] See page 57 for definition of terms and explanation of monitoring requirements.
[d] Million BTUs per hour

Table 14-602. Final Effluent Limits and Monitoring Requirements for Outfall 602

		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	--	--	EP/BPT
Oil & Grease	mg/l	15	20	--	--	EP/BPT
Copper	µg/l	1000	1000	--	--	EP/BAT
Iron	µg/l	1000	1000	--	--	EP/BAT
Flow rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				EP/M
pH	S.U.	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				EP

[b,c] See page 57 for definition of terms and explanation of monitoring requirements.

Table 14-603. Final Effluent Limits and Monitoring Requirements for Outfall 603

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Water Temperature	°C	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Specific Conductance at 25 °C	Umho	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Alkalinity, Total	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Residue, Total Diss.	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Suspended Solids	mg/l	30	100	49	163	M[c] /BPJ
Chloride, Total	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Sulfate	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Fluoride, Total	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Arsenic, Tot. Rec.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Iron, Tot. Rec.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Barium, Tot. Rec.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Boron, Total	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Manganese, Total	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Zinc, Tot. Rec.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Cadmium, Tot. Rec.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Lead, Tot. Rec.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Chromium, Tot. Rec.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Copper, Tot. Rec.	µg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Flow rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
Mercury, Total	ng/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /BPJ
pH	S.U.	- - - - - - - - 6.0 to 9.0 S.U. - - - - - - - - - - - - - - -				M[c] /BPJ

[a] Loadings are based upon a flow rate of 0.43 MGD.

[b,c] See page 57 for definition of terms and explanation of monitoring requirements.

Table 14-609. Final Effluent Limits and Monitoring Requirements for Outfall 609

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Color, Severity	Units	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /EP
Dissolved Oxygen	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /EP
Suspended Solids	mg/l	30	45	2.5	3.7	EP/STS
Nitrogen, Ammonia	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /EP
Odor, Severity	Units	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /EP
Turbidity, Severity	Units	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /EP
Nitrate+Nitrite	mg/l	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				WLA
Zinc, Tot. Rec.	µg/l	--	300	--	0.025	WLA
Fecal Coliform	#/100 ml					
Summer		1000	2000	--	--	EP/WQS
Flow rate	MGD	- - - - - - - - - - - - Monitor - - - - - - - - - - - - - - -				M[c] /EP
$CBOD_5$	mg/l	25	40	2.1	3.3	EP/STS
pH	S.U.	- - - - - - - - 6.5 to 9.0 S.U. - - - - - - - - - - - - - -				EP/WQS

[a] Loadings are based upon a flow rate of 0.022 MGD.
[b,c] See below for definition of terms and explanation of monitoring requirements.

[b] Definitions:

ABS = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l));
AD = Antidegradation (OAC 3745-1-05);
BPJ = Best Professional Judgment;
EP = Existing Permit for the DP&L Stuart Station;
FEG-BAT = Best Available Control Technology Currently Available, 40 CFR Part 423.13(e);
FEG-BPT = Best Practicable Waste Treatment Technology, 40 CFR Part 423.12(b)(3) and (b)(4);
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;
PD = Plant Design Criteria;
RP = Reasonable Potential Procedures (OAC 3745-33-07);
STS = Secondary Treatment Standards, 40 CFR Part 133;
316(a) = Water Quality Variance demonstration
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 DP&L Stuart Station

40 CFR 423.12(b)(3) Steam Electric Power Generating Point Source Category
Best Practicable Control Technology Available (BPT)
for Low Volume Wastes

	------------------- (mg/l)	------------------------
Parameter	Daily Maximum	30-Day Average
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0

40 CFR 423.12(b)(4) Steam Electric Power Generating Point Source Category
Best Practicable Control Technology Available (BPT)
for Fly Ash and Bottom Ash Transport Water

	------------------- (mg/l)	------------------------
Parameter	Daily Maximum	30-Day Average
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0

40 CFR 423.12(b)(4) Steam Electric Power Generating Point Source Category
Best Practicable Control Technology Available (BPT)
for Metal-Cleaning Wastes

	------------------- (mg/l)	------------------------
Parameter	Daily Maximum	30-Day Average
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0
Copper, total	1.0	1.0
Iron, total	1.0	1.0

40 CFR 423.12(b)(4) Steam Electric Power Generating Point Source Category
Best Practicable Control Technology Available (BPT)
for Coal Pile Run-off

	------------------- (mg/l)	------------------------
Parameter	Daily Maximum	30-Day Average
Total Suspended Solids	50.0	---

Attachment A. Federal Effluent Guidelines Applicable to the DP&L Stuart Station (continued)

40 CFR 423.13(b) Steam Electric Power Generating Point Source Category

Best Available Technology Economically Achievable (BAT)

Parameter	------------------- (mg/l) ------------------------ Daily Maximum	30-Day Average
Total Residual Chlorine	0.20	--