National Pollutant Discharge Elimination System (NPDES) Permit Program

F A C T S H E E T

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
for the **Dresden Energy Facility**

Public Notice No.: 11-09-025
Public Notice Date: September 16, 2011
Comment Period Ends: October 16, 2011

OEPA Permit No.: **0IB00031*CD**
Application No.: **OH0127892**

Name and Address of Applicant:

AEP Generating Company
1 Riverside Plaza
Columbus, Ohio 43215

Name and Address of Facility Where Discharge Occurs:

Dresden Energy Facility
9595 McGlade School Road
Dresden, Ohio 43821
Muskingum County

Receiving Water: **Muskingum River**

Subsequent Stream Network: **Ohio River**

Introduction

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

This Fact Sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES Permit effluent limitations. The technical basis for the Fact Sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This Fact Sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act and Ohio Water Pollution Control Law (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 Permit Conditions

The limits and monitoring requirements in this draft permit are very similar to those in the current permit. Limits for residual chlorine and acute toxicity are proposed to continue from the current permit. Both of these limits are set to protect the no-rapid-lethality narrative water quality standard in OAC 3745-1-04(D).

All of the proposed monitoring requirements in the current permit are proposed to continue. As the facility is just beginning operation, there is no effluent data yet to justify changes in the current permit requirements.

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Procedures for Participation in the Formulation of Final Determinations

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

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

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be addressed to:

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

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

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

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

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

For additional information about this fact sheet or the draft permit, contact Eric Nygaard at (614) 644-2024 (email eric.nygaard@epa.ohio.gov) or Scott Foster at (740) 380-5227 (email scott.foster@epa.ohio.gov).

Location of Discharge/Receiving Water Use Classification

The Dresden Energy Facility will discharge to the Muskingum River at River Mile (RM) 89.9. The approximate location of the facility is shown in Figure 1.

This segment of the Muskingum River is described by Ohio EPA River Code: 17-001, U.S. EPA River Reach #: 05040004-119, County: Muskingum, Ecoregion: Western Allegheny Plateau. The Muskingum River is designated for the following uses under Ohio's Water Quality Standards (OAC 3745-1-24): Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Primary Contact Recreation (PCR).

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

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

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

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

Facility Description

The Dresden Energy facility will be an electric power generating facility that can provide approximately 550 Megawatts (MW) of capacity to the electrical distribution grid. The facility will utilize combustion and steam turbines in a combined cycle and burns natural gas. Low sulfur fuel oil will be provided as backup fuel when natural gas is not available. The facility will withdraw water from the Muskingum River for process and cooling use, and return treated effluent to the Muskingum River. Dresden Energy will run as a peaking or cycling facility, typically operating only during the summer and winter when demand for electricity is highest.

The plant processes will generate wastewaters that are regulated by the federal effluent guidelines listed in 40 CFR 423, Steam Electric Power Generating Point Source Category.

Description of Existing Discharge

Table 1 shows the types of wastewater, the treatment provided, and the expected average discharge flows for outfalls 001 and 601 at the Dresden Energy Facility. Outfall 601 will consist only of raw, untreated river water which is returned to the Muskingum River through outfall 001.

All of the types of wastewater listed under outfall 001 will be sent to the pretreatment plant for treatment prior to discharge. Flows to outfall 001 will be continuous when the plant is operating with the exception of the wastewater from the decant pond.

The decant pond will be a batch discharge to the pretreatment plant, occurring once every 12 to 18 months when the river is dredged. Outfall 601 will discharge only during facility startup and shutdown periods.

Table 2 presents the current permit limits for Dresden Energy.

Table 1. Dresden Energy Outfalls and Treatment Systems

Outfall #	Type of Wastewater	Treatment Provided	Flow Rate (in MGD)
001	Cooling tower blowdown	Dechlorination and mixing	0.894
	River water pretreatment	Sedimentation and mixing	0.029
	Plant equipment and floor drains	Flocculation (oil/water separation), sedimentation and mixing	0.043
	Reverse osmosis reject	Sedimentation and mixing	0.050
	Service water	Mixing	0.048
	Deminerlizer regenerant	Neutralization, Sedimentation and mixing	0.014
	Dredge spoils decant pond	Sedimentation and mixing	5.76
601	Intake Water	None	--

Tables 3A and 3B present the projected discharge concentrations submitted by Dominion Energy with the original application, and the projected discharge concentrations as measured by DMRs for the AEP Waterford Energy Plant, a very similar gas-fired electric plant also located on the Muskingum River.

Assessment of Impact on Receiving Waters

Ohio EPA conducted biological sampling in the Muskingum River during the summer of 2006. Sites immediately upstream and downstream of the discharge location for the Dresden Energy facility were found to be in attainment of the warmwater habitat use designation.

Development of Water-Quality-Based Effluent Limits

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

Parameter Selection Effluent data from the Dresden Energy application and data from another similar facility were used to determine what parameters should undergo wasteload allocation. The parameters discharged are identified by the data available to Ohio EPA - Discharge Monitoring Report (DMR) data submitted by a similar facility, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

NPDES Application data	2005
AEP Waterford Energy DMRs	2006-11

This data is normally evaluated statistically, and Projected Effluent Quality (PEQ) values are calculated for each pollutant. However, PEQs have not been calculated for Dresden Energy since actual effluent data from normal operations is not available. Ohio EPA evaluated the data above in comparison to the wasteload allocation to determine whether a parameter has the reasonable potential to contribute to a WQS exceedance, focusing on the Waterford Energy data with the original application data as supporting information. Ohio EPA believes that the Waterford Energy data is a better source of information than the original application because Waterford Energy is a similar gas-fired power plant, also located on the Muskingum River.

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

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

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

Allocations are developed using a percentage of stream design flow as specified in Table 5, and allocations cannot exceed the Inside Mixing Zone Maximum criteria.

The data used in the WLA are listed in Tables 4 and 5. The wasteload allocation results to maintain all applicable criteria are presented in Table 6. The projected ammonia discharges have been evaluated using the wasteload allocation procedures and are protective of water quality standards.

Temperature WLA. Ohio EPA conducted a wasteload allocation using the mass-balance WLA procedures described above and professional judgment. Allocations were performed for summer (June-September) and winter (December-March) conditions. For the Muskingum River, if temperature standards are met during these seasons, they will also be attained during spring and fall conditions.

During these seasons, Muskingum River temperature standards are expressed as monthly average and daily values. To match these time periods, seasonal 30Q10 flows were selected as the critical flow for the monthly standards, and seasonal 1Q10 flows were selected as critical flows for the maximum standards. Ohio EPA applied the site-specific mixing assumption used in wasteload allocations for other parameters (25% of critical stream flows). The specific WLA inputs and outputs are shown in the Appendix to this fact sheet. These allocations are limited by narrative standards to protect against rapid lethality within the mixing zone.

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

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

The wasteload allocation calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TU_c) and 7Q10 flow for the average and the acute toxicity unit (TU_a) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For Dresden Energy, the wasteload allocation values are 1.0 TU_a and 97 TU_c.

The chronic toxicity unit (TU_c) is defined as 100 divided by the IC_{25}:

$$TU_c = 100/IC_{25}$$

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

$$TU_c = 100/\text{geometric mean of NOEC and LOEC}$$

The acute toxicity unit (TU_a) is defined as 100 divided by the LC_{50} for the most sensitive test species:

$$TU_a = 100/LC_{50}$$

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

Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the water quality standards must be determined. Each parameter is examined for reasonable potential by comparing the projected data for the facility to the wasteload allocation.

The final effluent limits are determined by evaluating reasonable potential with other applicable rules and regulations. Table 7 presents the final effluent limits and monitoring requirements proposed for Dresden Energy outfall 0IB00031001 and the basis for their recommendation.

Treatment-Technology Limits for Total Suspended Solids and Oil&Grease. The limits for total suspended solids were identified in the Permit-to-Install for this facility as limits achievable by the plant facilities and controls. OAC 3745-33-05(E) allows the director to set limits based on the treatment standards identified in a PTI.

The remaining NSPS limits from the Steam Electric Power Generating effluent guidelines are listed in Part II of the permit. These include: (1) a requirement that cooling tower maintenance chemicals be free of priority pollutants (Part II, Item D.) and (2) the prohibition on discharges of polychlorinated biphenyl compounds (PCBs) (Part II, Item R.).

Water Quality Based Conditions and Monitoring Requirements. The draft permit contains a limit for residual chlorine that is based on the wasteload allocation to meet inside-mixing-zone maximum WQS. This is the most limiting WQBEL for this discharge, and is a more restrictive limit than the requirements of the effluent guidelines.

While the original application data projected relatively high concentrations for copper and silver with respect to WQS, the effluent data for the AEP Waterford Energy Plant show very low concentrations of these metals in the discharge. Because the Waterford Energy data is more representative, being along the same river, we have included “monitor only” conditions in the permit for copper and silver.

Because cooling towers recycle water several times before discharging, these wastewaters will concentrate total dissolved solids. To ensure that recycling does not build up dissolved solids to toxic levels, the permit contains a limit on acute toxicity and monitoring requirements for dissolved solids. The toxicity limit of 1.0 acute toxicity unit (TUa) is set to prevent rapidly lethal conditions in areas of the Muskingum River near the discharge. The acute toxicity limit is needed because Ohio has no maximum water quality standard for total dissolved solids. Acute toxicity is more limiting than chronic toxicity given the toxicity wasteload allocations of 1.0 TUa and 97 TUc.

Limits for pH are based on Ohio Water Quality Standards (OAC 3745-1-07).

Monitoring requirements, rather than limits, are included for temperature because Dresden Energy does not have the reasonable potential to contribute to exceedances of temperature standards. The wasteload allocation shown in Attachment A is much higher than the temperatures projected to be discharged by this facility. The projected discharge temperatures do not have the reasonable potential to exceed the narrative rapid lethality water quality standards.

Monitoring requirements for COD, ammonia, free cyanide, cadmium, chromium, copper, lead, mercury, silver and zinc have been carried over from the current permit. While the projected discharge concentrations of these parameters do not appear to have the reasonable potential to contribute to exceedances of WQS, they may be concentrated by recycling in the cooling tower to levels of concern. Monitoring is needed for a period to ensure that they remain within WLA values.

Other Requirements

Storm Water Compliance
Dresden Energy has submitted a no-exposure certification that declares that the facility has no industrial materials exposed to storm water. Ohio inspections show that this is accurate, and would propose to accept the certification. As a result, the permit contains no conditions related to industrial storm water.

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

Section 316(b) Compliance
The cooling water intake structure being constructed at the facility meets the requirements for minimizing impingement and entrainment, as required by U.S. EPA's Phase I 316(b) rules [40 CFR 125, Subpart I]. The cooling water intake and screens are designed to meet an intake velocity of 0.5 feet per second. Also, the system will be operated as a recirculating system with a cooling tower to minimize the need for intake water.

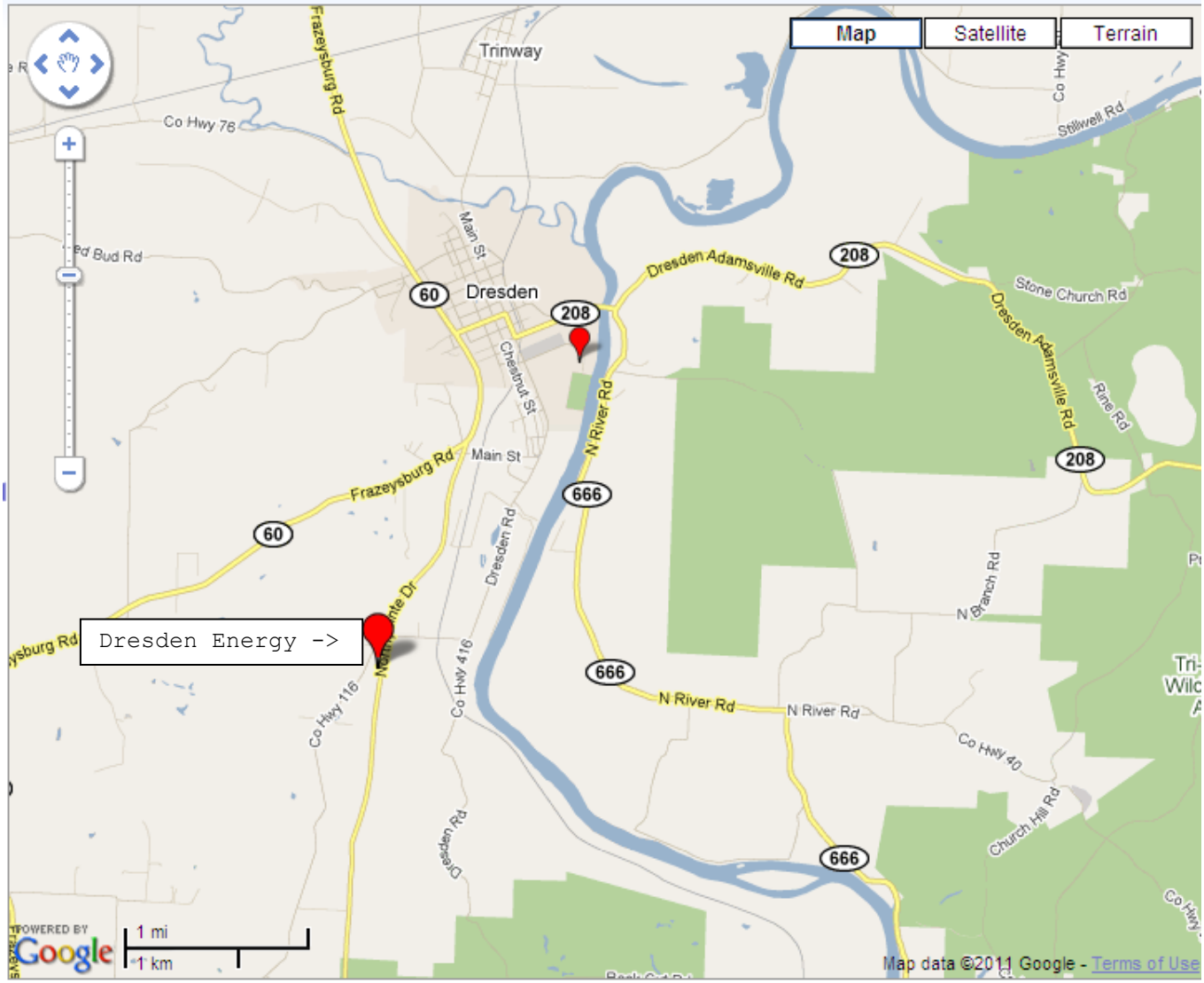

Figure 1. Approximate location of the Dresden Energy. Balloons represent NPDES permittees. Large balloons indicate major dischargers.

Table 2. Current NPDES Permit Limits for Dresden Energy

	Concentration Limits		Loading Limits (kg/day)	
Parameter	Monthly	Maximum	Monthly	Daily
Temperature ^{o}F	Monitor		--	--
Chemical Oxygen Demand mg/l	Monitor		--	--
pH S.U.	6.5 to 9.0		--	--
Dissolved Solids, T. mg/l	Monitor			
Suspended Solids, T. mg/l	30	50	110	180
Oil & Grease mg/l	15	20	--	--
Ammonia-Nitrogen mg/l	Monitor		--	--
Cyanide, free mg/l	Monitor		--	--
Selenium, TR ug/l	Monitor		--	--
Silver, TR ug/l	Monitor		--	--
Zinc, TR ug/l	Monitor		--	--
Cadmium, TR ug/l	Monitor		--	--
Lead, TR ug/l	Monitor		--	--
Chromium, TR ug/l	Monitor		--	--
Copper, TR ug/l	Monitor		--	--
Flow MGD	Monitor		--	--
Chlorine, T Residual mg/l	--	0.038	--	--
Mercury, T ng/l	Monitor		--	--
Acute Toxicity TUa	--	1.0	--	--

Table 3A. Expected Discharge Concentrations. Data is from the original Dominion Energy application.

Parameter		Concentration	
	Units	Average	Maximum
Aluminum	ug/l	3470	3580
Ammonia	mg/l	0.50	0.60
Arsenic	ug/l	10	10
Barium	ug/l	420	430
Biochemical Oxygen Demand	mg/l	13	13
Cadmium	ug/l	10	10
Chemical Oxygen Demand	mg/l	96	99
Chromium	ug/l	150	160
Copper	ug/l	80	80
Fluoride	mg/l	2.19	2.24
Chlorine, Free	mg/l	0.20	0.20
Iron	ug/l	8920	9140
Lead	ug/l	30	40
Manganese	ug/l	1650	1690
MBAS	mg/l	0.40	0.45
Mercury	ng/l	10	10
Nickel	ug/l	240	250
Nitrate/Nitrite-N	mg/l	8	8
Oil&grease	mg/l	44	45
Ortho Phosphate	mg/l	42	44
Phenols	ug/l	60	60
Selenium	ug/l	240	250
Silver	ug/l	130	130
Kjeldahl – N	mg/l	3	3
Total Dissolved Solids	mg/l	2518	2543
Total Organic Carbon	mg/l	31	31
Total Suspended Solids	mg/l	30	60
Zinc	ug/l	100	110

Table 3B. Expected Discharge Concentrations. Data is from DMRs submitted by AEP Waterford Energy Plant for January 2006 – April 2011

Parameter		PEQ Concentration	
	Units	Average	Maximum
Ammonia (sum)	mg/l	0.46	0.62
Ammonia (win)	mg/l	0.43	0.60
Dissolved Solids, T.	mg/l	941	1321
Suspended Solids, T	mg/l	4.5	6.2
Oil&Grease	mg/l	<MDL	<MDL
Chemical Oxygen Demand	mg/l	26	39
Chlorine, T. Res.	mg/l	0.013	0.018
Chromium	ug/l	20	27
Copper	ug/l	<MDL*	<MDL*
Lead	ug/l	<MDL	<MDL
Mercury	ng/l	2.7	3.75
Nitrate/Nitrite-N	mg/l	5.5	9.5
Kjeldahl N	mg/l	2.0	3.5
Phosphorus	mg/l	3.79	5.19
Zinc	ug/l	19	29

Table 4. **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: Aquatic Life	Outside Mixing Zone Criteria: Maximum Aquatic Life	Inside Mixing Zone Maximum
Aluminum	ug/l	--	--	--	--	--
Ammonia-S	mg/l	--	--	1.1	--	--
Ammonia-W	mg/l	--	--	2.3	--	--
Arsenic - TR	ug/l	--	100	150	340	680
Barium	ug/l	--	--	220	2000	4000
Cadmium - TR	ug/l	--	50	4.9	12	24
Chlorine - TRes	mg/l	--	--	0.011	0.019	0.038
Chromium - TR	ug/l	--	100	180	3700	7300
Copper - TR	ug/l	1300	500	20	32	63
Dissolved solids	mg/l	--	--	1500	--	--
Fluoride	mg/l	--	2	--	--	--
Iron - TR	ug/l	--	5000	--	--	--
Lead - TR	ug/l	--	100	19	370	740
Manganese - TR	ug/l	--	--	--	--	--
MBAS (foaming agents)	mg/l	--	--	--	0.5	--
Mercury - TR	ng/l	12	10000	910	1700	3400
Nickel - TR	ug/l	4600	200	110	980	2000
Nitrate-N + Nitrite-N	mg/l	--	100	--	--	--
Phenol (wwh,ewh,mwh)	ug/l	4600000	--	400	4700	9400
Phosphorus	mg/l	--	--	--	--	--
Selenium - TR	ug/l	11000	50	5	--	--
Silver (wwh,ewh,mwh)	ug/l	--	--	1.3	7.1	14
TKN	mg/l	--	--	--	--	--
Zinc - TR	ug/l	69000	25000	250	250	500

Table 5. **Instream Conditions and Discharger Flow**

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	550	USGS 03144500
7Q10	cfs	annual	576	USGS 03144500
30Q10	cfs	summer	635	USGS 03144500
		winter	1150	USGS 03144500
Harmonic Mean	cfs	annual	2500	USGS 03144500
Mixing Assumption	%	average	25	
	%	maximum	25	
Hardness	mg/l	annual	238	STORET 2006, N=6
pH	S.U.	summer	8	BWQR; Muskingum Basin, N=540
		winter	8.2	BWQR; Muskingum Basin, N=46
Temperature	C	summer	23	BWQR; Muskingum Basin, N-712
		winter	4.5	BWQR: Muskingum Basin, N=57
AEP Dresden flow	cfs	annual	1.5	Design flow

Background Water Quality

Aluminum	ug/l	784	STORET; 2006; n=5; 1<MDL; mean value
Ammonia-S	mg/l	0.048	STORET; 2006; n=5; 3<MDL; mean value
Ammonia-W	mg/l	0.25	BWQR; 1978-88; n=45; 16<MDL; median value
Arsenic - TR	ug/l	2.96	STORET; 2006; n=5; 0<MDL; mean value
Barium	ug/l	58.8	STORET; 2006; n=5; 0<MDL; mean value
Cadmium - TR	ug/l	0	STORET; 2006; n=5; 5<MDL; all values <MDL
Chlorine - TRes	mg/l	0	No representative data available.
Chromium - TR	ug/l	0	STORET; 2006; n=5; 5<MDL; all values <MDL
Copper - TR	ug/l	0	STORET; 2006; n=5; 5<MDL; all values <MDL
Dissolved solids	mg/l	374	STORET; 2006; n=5; 0<MDL; mean value
Fluoride	mg/l	0	No representative data available.
Iron - TR	ug/l	2005	STORET; 2006; n=5; 0<MDL; mean value
Lead - TR	ug/l	2.1	STORET; 2006; n=5; 3<MDL; mean value
Manganese - TR	ug/l	257	STORET; 2006; n=5; 0<MDL; mean value
MBAS (foaming agents)	mg/l	0	No representative data available.
Mercury - TR	ng/l	0	No representative data available.
Nickel - TR	ug/l	0	STORET; 2006; n=5; 5<MDL; all values <MDL
Nitrate-N + Nitrite-N	mg/l	1.89	STORET; 2006; n=5; 0<MDL; mean value
Phenol (wwh,ewh,mwh)	ug/l	0	No representative data available.
Phosphorus	mg/l	0.21	STORET; 2006; n=5; 0<MDL; mean value
Selenium - TR	ug/l	0	STORET; 2006; n=5; 5<MDL; all values <MDL
Silver (wwh,ewh,mwh)	ug/l	0	No representative data available.
TKN	mg/l	0.41	STORET; 2006; n=5; 1<MDL; mean value
Zinc - TR	ug/l	11.2	STORET; 2006; n=5; 3<MDL; mean value

Table 6. Summary of Effluent Limits to Maintain Applicable WQ Criteria

		Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Aluminum	ug/l	--	--	--	--	--
Ammonia-S	mg/l	--	--	--	--	--
Ammonia-W	mg/l	--	--	--	--	--
Arsenic - TR	ug/l	--	40533	14266	31235	680
Barium	ug/l	--	--	15695	179943	4000
Cadmium - TR	ug/l	--	20883	475	1112	24
Chlorine - TRes	mg/l	--	--	1.1	1.8	0.038
Chromium - TR	ug/l	--	41767	17460	342867	7300
Copper - TR	ug/l	542967	208833	1940	2965	63
Dissolved solids	mg/l	--	--	109596	--	--
Fluoride	mg/l	--	835	--	--	--
Iron - TR	ug/l	--	1252917	--	--	--
Lead - TR	ug/l	--	40892	1641	34094	740
Manganese - TR	ug/l	--	--	--	--	--
MBAS (foaming agents)	mg/l	--	--	--	46	--
Mercury - TR	ng/l	12	10000	910	1700	3400
Nickel - TR	ug/l	1921267	83533	10670	90813	2000
Nitrate-N + Nitrite-N	mg/l	--	40979	--	--	--
Phenol (wwh,ewh,mwh)	ug/l	1921266667	--	38800	435533	9400
Phosphorus	mg/l	--	--	--	--	--
Selenium - TR	ug/l	4594333	20883	485	--	--
Silver (wwh,ewh,mwh)	ug/l	--	--	126	658	14
TKN	mg/l	--	--	--	--	--
Zinc - TR	ug/l	28814333	10437000	23175	22140	500

Table 7. Final effluent limits and monitoring requirements for Dresden Energy outfall 0IB00031001 and the basis for their recommendation.

		Effluent Limits				
		Concentration		Loading (kg/day)[a]		
Parameter	Units	30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	Basis[b]
Flow	MGD	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Temperature	°F	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
COD	mg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Dissolved Solids	mg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Suspended Solids	mg/l	30	50	110	180	BPT/PD
Oil and Grease	mg/l	15	20	--	--	BPT
pH	S.U.	- - - - - - - - - - - -	6.5 to 9.0	- - - - - - - - - - - - - - -		WQS
Ammonia-N	mg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Chlorine, T. Res.	mg/l	--	0.038	--	--	WLA/IMZM
Cyanide, Free	mg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Cadmium, T. R.	µg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Chromium, T. R.	µg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Copper, T. R.	µg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Lead, T. R.	µg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Mercury, T.	ng/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Selenium, T. R.	µg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Silver, T. R.	µg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Zinc, T. R.	µg/l	- - - - - - - - - - - -	Monitor	- - - - - - - - - - - - - - -		M[c]
Whole Effluent Toxicity						
Acute	TUa	--	1.0	--	--	WET

[a] Effluent loadings based on average design discharge flow of 0.97 MGD.

[b] Definitions: BPT = Best Practicable Control Technology Currently Achievable, 40 CFR Part 423; M = Monitoring; PD = Plant Design Criteria; 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.

Appendix

Temperature WLA for Dresden Energy

Inputs	**avg.**	**max.**	
Temp. WQS (s)	85	89	Muskingum R. WQS (June-Sept.)
Temp. WQS (w)	53	58	Muskingum R. WQS (Dec. - Mar.)
Ust. Temp. (s)	74	74	75th %ile Muskingum River
Ust. Temp. (w)	41	41	75th %ile Muskingum River
1Q10 (s)		548	
1Q10 (w)		812	
30Q10 (s)	635		
30Q10 (w)	1150		
Dresden Energy flow		1.5	
Mixing Assumption		0.25	
Temperature WLA (s)	1249*	1459*	
Temperature WLA (w)	2353*	2359*	

All Temperatures are Fahrenheit.
All flows are cubic feet /second

*All temperature allocations would be limited by narrative water quality standards prohibiting rapidly lethal conditions within mixing zones.