



Clean Water Act Section 316(b) Final Rule at Existing Facilities

Section 316(b) of the Clean Water Act requires that National Pollutant Discharge Elimination System (NPDES) permits for existing facilities with cooling water intake structures (CWISs) ensure that the location, design, construction and capacity of the structures reflect the best technology available (BTA) to minimize harmful impacts on the environment.

Background

The rule establishes BTA standards to reduce impingement and entrainment of aquatic organisms in CWISs that withdraw from surface waters. “Impingement” means trapping any life stages of fish and shellfish on the outer part of a CWIS during periods of intake water withdrawal. “Entrainment” means any life stages of fish and shellfish in the intake water flow entering and passing through a CWIS and into a cooling water system. For purposes of the rule, it is assumed that entrainment results in 100 percent mortality.

In 1995, the United States Environmental Protection Agency (U.S. EPA) divided the rulemaking into three phases: Phase I was to address new facilities except for offshore oil and gas exploration facilities; Phase II was to address large electric-generating facilities; and Phase III was to address new offshore oil and gas exploration facilities and existing small electric-generating facilities and all manufacturing facilities.

- 2001: The new facilities rule is finalized (Phase I).
- 2004: The existing large electric generators rule (Phase II) was finalized but remanded back to U.S. EPA for reconsideration.
- 2006: New offshore oil and gas exploration facilities and all other existing facilities rule (Phase III) was finalized. However, the existing facilities rule portion was remanded back to U.S. EPA for reconsideration.
- 2014: The existing large electric generators, small electric generators and manufacturing facilities rule was finalized.
- October 14, 2014: U.S. EPA amended Part 40 of the Code of Federal Regulations (CFR), Subparts 122 and 125 in accordance with the final rule making.
 - 40 CFR 122.21(r) describes NPDES permit application requirements for existing facilities subject to this rule.
 - 40 CFR 125, Subpart J, describes the compliance requirements for existing facilities to meet BTA standards.

Definitions

All rule definitions for existing facilities can be found in 40 CFR 125.92. Definitions for terms that will be commonly used in this guidance document are presented below with the rule citation:

- 1) “Cooling water” – “water used for contact or non-contact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content.” [40 CFR 125.92(e)]
- 2) “Design intake flow” – “the value assigned during the cooling water intake structure design to the maximum instantaneous rate of flow of water the cooling water intake system is capable of withdrawing from a source waterbody.” [40 CFR 125.92(g)]
- 3) “Entrainment” – “any life stages of fish and shellfish in the intake water flow entering and passing through a CWIS and into a cooling water system, including the condenser or heat exchanger.” [40 CFR 125.92(h)]
- 4) “Impingement” – “the entrapment of any life stages of fish and shellfish on the outer part of an intake structure or against a screening device during periods of intake water withdrawal.” [40 CFR 125.92(n)]

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Implementation

This rule does not affect facilities that do not utilize any water for contact or non-contact cooling purposes, facilities that utilize only ground water for contact or non-contact cooling purposes or facilities that do not utilize contact or non-contact cooling water separately from process water. In this last case, this means a facility that utilizes water for the industrial process first and then for cooling purposes, or utilizes water for cooling purposes first and then in the industrial process.

Any existing facility that utilizes surface water for cooling purposes (contact or non-contact) may be covered by this rule.

- For affected facilities, any permit application received after Oct. 14, 2014 and prior to July 14, 2018 must include all application materials described in 40 CFR 122.21(r); facilities may request an extension for completion of application materials and an alternative schedule of compliance to submit the application materials. Facilities need to submit a letter to Ohio EPA's Division of Surface Water, Section 316(b) Coordinator, requesting an alternative schedule as soon as possible.
- For affected facilities, any permit application received on July 14, 2018 or later must include all application materials described in 40 CFR 122.21(r).
- Ohio EPA may request additional information to supplement the permit application [40 CFR 125.95(d)].

Ohio EPA will review the application materials to determine if the facility is utilizing BTA to minimize impingement and entrainment impacts. All permit application materials must be reviewed by the United States Fish and Wildlife Services (USFWS) local field office. USFWS may comment on the application materials. Ohio EPA will take USFWS's comments into consideration when making the BTA determination. U.S. EPA will also review all draft permits subject to this rule.

Exemptions

- 1) The facility does not have an NPDES permit [40 CFR 125.91(a)(1)].
- 2) The facility purchases water from a public water supplier [40 CFR 125.91(c)] for contact or non-contact cooling water purposes.
- 3) The facility purchases treated wastewater effluent from another facility [40 CFR 125.91(c)] for contact or non-contact cooling water purposes.
- 4) The facility purchases reclaimed water from a wastewater treatment facility [40 CFR 125.91(c)] for contact or non-contact cooling water purposes.

Third-Party Suppliers

Per 40 CFR 125.91(b), an owner or operator of an existing facility may not circumvent the requirements of the rule by creating arrangements to receive water for cooling purposes from a facility that is not itself a facility subject to 40 CFR Subparts I or J. Therefore, even if a permittee does not own or operate the CWIS, the permittee is responsible for complying with the applicable 316(b) rules.

- If there are multiple recipients of cooling water from a third-party supplier, only the first recipient permittee must show compliance.
- Subsequent recipient permittees only need to reference the first recipient's NPDES permit number to be considered in compliance.
- If the third-party supplier's CWIS is not brought into compliance with the 316(b), permittees cannot continue to purchase water from the third-party supplier until such time as the CWIS is brought into compliance.

Ohio EPA has taken the position that in such cases as above, it is best for affected permittees to share the cost of meeting the compliance requirements. Ohio EPA will work with all affected permittees and the third-party supplier to arrange a schedule of compliance that is fair to all permittees. This may include:

- Modifying permits to incorporate 316(b) requirements.
- Aligning the expiration date of affected permits, even if this results in a permit term of less than five years.

Arrangements to meet compliance will be made on a case-by-case basis.

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[Applicability Thresholds](#)

The requirements to comply with the rules are based on the design intake flow rate and on the percentage of water withdrawn that is used **exclusively for cooling purposes**. Water that is used in manufacturing as process water either before or after it is used for cooling is not considered cooling water for the purposes of calculating the percentage of a facility's intake flow that is used for cooling purposes [per 40 CFR 125.92(2)(e)].

Tier 1 – Facilities that utilize less than 25 percent of total intake water for cooling purposes or have a design intake flow rate of 2 MGD or less.

There are no specific criteria for application materials required to make a BTA determination for impingement and entrainment for these facilities. Per 40 CFR 125.90(b), CWISs not subject to the requirements of 40 CFR 125.94 through 125.99 or subparts I or N of this part must meet requirements under Section 316(b) established by the Agency on a case-by-case, Best Professional Judgment (BPJ) basis. Examples of criteria for a BTA determination are:

- Percent of stream flow withdrawn;
- Aquatic life use attainment status;
- Water recycling; and
- Impingement or entrainment controls already in place.

Tier 2 – Facilities that utilize more than 25 percent of total intake water for cooling purposes and have a design intake flow rate greater than 2 MGD but less than 125 MGD.

Facilities that meet these criteria are subject to the BTA standards for impingement mortality under 40 CFR 125.94(c) and entrainment under 40 CFR 125.94(d). Facilities that meet these criteria must submit permit application information described in 40 CFR 122.21(r)(2) through (r)(8). This information is specifically required to make an impingement BTA determination. Under 40 CFR 125.94(d), facilities in this tier must also submit permit application information so Ohio EPA can make an entrainment BTA determination. Ohio EPA will review the information submitted under 40 CFR 122.21(r)(7) as part of the entrainment BTA determination. If this information indicates there are potential entrainment issues, Ohio EPA may request additional information on relevant factors specified in 40 CFR 125.98.

Tier 3 – Facilities that utilize more than 25 percent of total intake water for cooling purposes and have a design intake flow rate greater than 125 MGD.

Facilities that meet these criteria must submit information described in 40 CFR 122.21(r)(2) through (r)(8) in order for the Agency to make an impingement BTA determination. In addition, facilities must submit specific information detailed in 40 CFR 122.21(r)(9) through (r)(13) in order for the Agency to make an entrainment BTA determination.

[Application Requirements](#)

Affected facilities are required to submit information with the NPDES permit application. Ohio EPA will utilize this information to determine if a facility meets the BTA standards for impingement and entrainment, and therefore is compliant with the rules.

[Tier 1 Application Requirements](#)

There are no specific impingement or entrainment application requirements listed in 40 CFR 122.21(r) for facilities in this tier. Facilities must submit at least the maximum intake flow rate and actual average intake flow rate for the Ohio EPA to make a BTA determination. It is anticipated for most facilities that the basic information above should be sufficient, combined with information Ohio EPA already has on the intake waterbody, for making a BTA determination. However, Ohio EPA may request more information on a case-by-case basis.

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Tier 2 Application Requirements

Impingement – The impingement application requirements for facilities that meet these criteria are detailed in 40 CFR 122.21(r)(2) through (r)(8). A brief description of these requirements follows:

Section	Name	Summary of Contents
(r)(2)	Source water physical data	Waterbody description, hydrology, chemistry, area of influence of the CWIS.
(r)(3)	Cooling water intake structure data	Configuration of intake, flows, water balance diagram, typical operations.
(r)(4)	Source water baseline biological characterization data	Species present, susceptibility to impingement and entrainment, spawning periods, seasonal patterns; threatened and endangered species documentation.
(r)(5)	Cooling water system data	Configuration of cooling water system, water reuse.
(r)(6)	Intended method of compliance with impingement mortality standard	Select impingement mortality compliance path, option-specific info (for example, monitoring plan for BTA, documentation of velocity); Impingement Technology Performance Optimization Study.
(r)(7)	Existing entrainment performance studies	Previous studies on technology efficacy, studies from other facilities, other entrainment studies.
(r)(8)	Operational status	Age, utilization, past upgrades.

More information on the intended method of compliance with the impingement mortality standard [40 CFR 122.21(r)(6)] is described under the “Compliance Requirements” section of this guidance document. Please note that the descriptions in the table above are summaries of the rule requirements; more details are in the actual rule.

In general, Ohio EPA expects most permittees to have easy access to the information required in 40 CFR 122.21(r)(3), (5), and (8).

Entrainment - There are no specific entrainment application requirements listed in 40 CFR 122.21(r) for facilities in this tier, however, facilities must submit basic information for the Ohio EPA to make a BTA determination. This includes:

- Biological characterization of the intake water in the vicinity of the facility.
- Type and count of threatened and endangered species.

In general, Ohio EPA expects that the information submitted in the source water baseline biological characterization data [40 CFR 122.21(r)(4)] and existing entrainment performance studies [40 CFR 122.21(r)(7)] will include the information above and be sufficient to make a BTA determination for entrainment for most facilities. Ohio EPA anticipates that most permittees will be able to collect biological characterization and species information from existing sources and studies (for example, Ohio EPA’s Integrated Reports or Total Maximum Daily Limit Reports). However, Ohio EPA may request more information on relevant factors specified in 40 CFR 125.98 on a case-by-case basis.

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Tier 3 Application Requirements

Impingement – The impingement application requirements for facilities that meet these criteria are detailed in 40 CFR 122.21(r)(2) through (r)(8). More information on the intended method of compliance with the impingement mortality standard [40 CFR 122.21(r)(6)] is described under the “Compliance Requirements” section of this guidance document.

Entrainment – The entrainment application requirements for facilities that meet these criteria are detailed in 40 CFR 122.21(r)(9) through (r)(13). A brief description of these requirements follows:

Section	Name	Summary of Contents
(r)(9)	Entrainment characterization study	Entrainment data collection plan and data collection.
(r)(10)	Comprehensive technical feasibility and cost evaluation study	Evaluate feasibility of all technologies (this must include the option of installing cooling towers), engineering/social cost estimates.
(r)(11)	Benefits valuation study	Monetized losses from impingement and entrainment, other benefit categories
(r)(12)	Non-water quality and other environmental impacts study	Energy penalty, air emissions, safety, reliability, etc.
(r)(13)	Peer Review of (r)(10), (11), and (12)	External peer review of Feasibility, Costs, Benefits, and Environmental Impacts Studies; must notify Ohio EPA of reviewers; Ohio EPA may disapprove and/or require additional reviewers.

Please note that the descriptions in the table above are summaries of the rule requirements; more details are in the actual rule. For facilities in this tier that utilize a closed-cycle recirculating system as defined in 40 CFR 125.92(c), Ohio EPA may waive some of the entrainment application requirements. That evaluation will be performed on a case-by-case basis.

Application Submission Guidelines

General - Ohio EPA may request more information on a case-by-case basis. In general, all information submitted should follow these guidelines:

- 1) Data should not be more than 10 years old unless the permittee can demonstrate that it is still relevant to the waterbody and CWIS (for example, site operations have not changed, the CWIS has not changed, etc.).
- 2) The permittee may submit data collected for another, similar facility, but the permittee must show that data is applicable (for example, by comparing design intake flow rates, species present, typical operations, etc.).
- 3) The permittee may submit data collected by another entity if it is relevant (for example, a permittee that intakes water from the Ohio River may submit biological characterization data collected by the Ohio River Valley Sanitation Commission).
- 4) Information on threatened or endangered species should include amphibians and shellfish as well as fish.

Impingement – In addition to the above, information submitted for the impingement application requirements [40 CFR 122.21(r)(2) through (r)(8)] should follow these guidelines

- 1) The permittee may supplement the data required in the source water baseline biological characterization submittal [40 CFR 122.21(r)(4)] with newly conducted field studies. If the permittee chooses to do this, supporting documentation must include information listed in 40 CFR 122.21(r)(4)(viii).

Entrainment – In addition to the above, information submitted for the entrainment application requirements [40 CFR 122.21(r)(9) through (r)(13)] should follow these guidelines:

- 1) By rule, the entrainment characterization study [40 CFR 122.21(r)(9)] does *not* need to be peer reviewed or submitted as part of the application materials. However, Ohio EPA highly recommends permittees submit the entrainment characterization study plan for Agency review prior to implementing the plan. Since the entrainment characterization study is the foundation for many of the other application requirements, it would benefit the permittees to ensure the study plans will produce sufficient data for the final entrainment BTA determination.

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- 2) Each study that must be peer reviewed [per 40 CFR 122.21(r)(13)] should have at least two different peer reviewers. These reviewers can review more than one study.
- 3) Ohio EPA must approve the peer reviewers. Peer reviewers should have qualifications relevant to the study they will be reviewing, and should not have any conflicts of interest with the permittee. For more information, please see this U.S. EPA website on conducting peer reviews – www.epa.gov/peerreview/
- 4) The comprehensive technical feasibility and cost evaluation study [40 CFR 122.21(r)(10)] should include the option of installing cooling towers.

Compliance Determination

Based on the information received in the permittee’s NPDES permit application, Ohio EPA will determine if the facility meets BTA standards for impingement and entrainment and therefore is compliant with the rules. Ohio EPA may include conditions in the renewed NPDES permit to ensure a facility remains in compliance.

Tier 1 Compliance

Ohio EPA expects that the low intake amount and/or low intake rate will result in low impingement and entrainment impacts for the majority of facilities in this tier.

Tier 2 Compliance

Impingement – Facilities in this tier have seven options [40 CFR 125.94(c)] to comply with the impingement standards of the rule. These options include:

Section	Compliance Option	Description
(c)(1)	Closed-cycle recirculating system.	Wet, dry or hybrid cooling towers, a system of impoundments that are not waters of the United States, or any combination thereof.
(c)(2)	0.5 feet/second Through-Screen Design Velocity	The maximum design intake velocity as water passes through the structural components of a screen measured perpendicular to the screen mesh does not exceed 0.5 feet/second under all intake water conditions.
(c)(3)	0.5 feet/second Through-Screen Actual Velocity	The maximum actual operating intake velocity as water passes through the structural components of a screen measured perpendicular to the screen mesh does not exceed 0.5 feet/second under all intake water conditions.
(c)(4)	Existing offshore velocity cap	An existing offshore velocity cap as defined at 40 CFR 125.92(v) that was installed on or before Oct. 14, 2014.
(c)(5)	Modified traveling screens	A modified traveling screen as defined in 40 CFR 125.92(s).
(c)(6)	Systems of technologies	Combination of technologies, management practices and operational measures that reduce impingement.
(c)(7)	Impingement mortality performance standard	A 12-month impingement mortality performance standard of all life stages of fish and shellfish of no more than 24 percent mortality, including latent mortality.

The information listed below must be submitted with the NPDES permit application [40 CFR 122.21(r)(6)]:

Required information for BTA determination:

- 1) Closed-cycle recirculating system –
 - a. Daily intake flow rate or daily cycles of concentration monitoring.
 - b. Daily blow-down rate
 - c. Daily amount of make-up water utilized

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- 2) Maximum design intake velocity of 0.5 feet/second – this is based on pump capacity.
 - a. Number of pumps.
 - b. Pump capacity.
 - c. Pump usage (average and maximum).
- 3) Actual design intake velocity of 0.5 feet/second –
 - a. Through-screen velocity monitoring measured or calculated using water flow, depth, and open screen area.
 - b. Number of pumps.
 - c. Pump capacity.
 - d. Pump usage (average and maximum).
- 4) Offshore velocity cap -
 - a. Documentation confirming installation was prior to 10/14/14.
 - b. Documentation showing the presence of bar screens or equivalent technology.
 - c. Documentation confirming the cap is 800 feet or more from shore.
- 5) Modified traveling screen – generally includes modified Ristroph Screens, Hydrolox Screens, Dual Flow Screens, Rotary Screens.
 - a. Impingement technology performance optimization study as detailed in 40 CFR 122.21(r)(6)(i). This must include:
 - i. Two years of data collected at least monthly.
 - ii. Biological data collection representative of the impingement and impingement mortality.
 - iii. A taxonomic identification to the lowest taxon possible.
 - iv. The method in which naturally moribund organisms are identified and taken into account.
 - v. The method in which mortality due to holding times is taken into account.
 - vi. A count of entrapment as defined at 40 CFR 125.92(j), if applicable.
 - vii. The percent impingement mortality reflecting optimized operation of the modified traveling screen and all supporting calculations.
- 6) Systems of technology - may include flow reductions, seasonal operation, unit closures and behavioral deterrent systems.
 - a. Impingement technology performance optimization study as detailed in 40 CFR 122.21(r)(6)(ii). This must include:
 - i. Rate of impingement.
 - ii. Impingement mortality.
 - iii. Flow reduction.
 - iv. Total system performance.
- 7) Impingement mortality standard - a 12-month impingement mortality performance standard of all life stages of fish and shellfish of no more than 24 percent mortality, including latent mortality, for all non-fragile species together that are collected or retained in a sieve with maximum opening dimension of 0.56 inches and kept for a holding period of 18 to 96 hours.
 - a. Documentation of biological monitoring conducted at least once per month.
 - b. Calculations showing the 12-month survival percentage and 12-month mortality rate.
 - c. Documentation for either the entire facility, or for each individual CWIS for which this is the chosen compliance option.

Due to the complexity of the requirements for meeting options 5, 6 and 7, Ohio EPA strongly recommends any facilities selecting these options contact Ohio EPA's Division of Surface Water, Section 316(b) Coordinator for more detailed guidance and submit study plans for Ohio EPA comment and review prior to starting any data collection.

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Entrainment - There are no specific entrainment application requirements listed in 40 CFR 122.21(r) for facilities in this tier, however, facilities must submit basic information for Ohio EPA to make a BTA determination. The BTA determination will take into consideration the following factors:

- 1) Number and type of organisms affected: Specifically, Federally-listed, threatened and endangered species, and State-listed, threatened and endangered species.
- 2) Changes in air emissions associated with entrainment minimization technology.
- 3) The availability of land to install entrainment minimization technology.
- 4) The remaining useful facility life.
- 5) Social costs and benefits of available entrainment minimization technology.

In general, Ohio EPA expects that the information submitted in the application materials [40 CFR 122.21(r)(2)-(8)] will include the information above and be sufficient to make a BTA determination for entrainment for most facilities. Once the determination has been made, permittees may be required to take the following steps to comply with the entrainment standards:

- Install new technology at the CWIS specifically to reduce total entrainment.
- Install new technology at the CWIS specifically to reduce entrainment of fragile species.
- Optimize existing technology at the CWIS to reduce entrainment (for example, upgrading pumps or pump motors).
- Modify facility operations to reduce entrainment (such as reducing intake during spawning seasons).

The list above is not exhaustive of all options. These depend on the specifics of the site. Ohio EPA may determine that the current technology does represent BTA for entrainment and no further steps are required.

Tier 3 Compliance

Impingement - Facilities in this tier must comply with one of the seven options listed for Tier 2.

Entrainment - The BTA determination will take into consideration the following factors:

- 1) Number and type of organisms affected: Specifically, Federally-listed, threatened and endangered species, and State-listed, threatened and endangered species.
- 2) Changes in air emissions associated with entrainment minimization technology.
- 3) The availability of land to install entrainment minimization technology.
- 4) The remaining useful facility life.
- 5) Social costs and benefits of available entrainment minimization technology.

This information should be supplied in the permit application information submitted per 40 CFR 122.21(r)(9)-(13). Ohio EPA will review this information and determine if the technology present at the facility represents BTA for entrainment. If the existing technology does not meet BTA standards, Ohio EPA will require the facility comply with the rule by utilizing one of the alternative technologies evaluated as part of 40 CFR 122.21(r)(9)-(13).

Permit Conditions

Ohio EPA may include conditions in the renewed NPDES permit to ensure a facility remains in compliance.

Tier 1 Permit Conditions

Permit conditions that may be included (but are not limited to) for this tier are:

- Intake flow rate monitoring.
- Percentage of cooling water usage.
- Intake flow rate limit.

Tier 2 Permit Conditions

Impingement - Depending on the chosen impingement compliance method, the renewed permit may have several conditions to ensure compliance. Permit conditions related to impingement compliance that may be included (but are not limited to) for this tier are:

- 1) Closed-cycle recirculating system – no further permit conditions.
- 2) Maximum design intake velocity of 0.5 feet/second – no further permit conditions.

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- 3) Maximum actual intake velocity of 0.5 feet/second –
 - a. Limit on intake velocity.
 - b. Daily intake flow monitoring.
- 4) Offshore velocity cap – daily intake flow monitoring.
- 5) Modified traveling screen – documentation that the screens are being operated according to the parameters determined to optimize impingement reduction.
- 6) Systems of technology – documentation that the selected system of technology is being operated according to the parameters determined to optimize impingement reduction.
- 7) Impingement mortality performance standard – monthly impingement sampling.

Entrainment – The BTA determination for entrainment is site-specific and as such any compliance conditions in the renewed permit will depend on the determination. Some examples of permit conditions that may be included (but are not limited to) are:

- Monitoring of specific organisms of concern. This condition would necessitate the development of a sampling and monitoring plan to be approved by Ohio EPA.
- General monitoring of the biology in the CWIS.
- Documentation that any entrainment minimization technology is being operated according to the parameters determined to optimize entrainment reduction.
- A compliance schedule to install entrainment reduction technology.

Tier 3 Permit Conditions

Possible permit conditions for facilities in this tier are the same as in Tier 2.

Suggested Resources

More information on the Section 316(b) rules can be found here:

- The electronic Code of Federal Regulations – <http://www.ecfr.gov/cgi-bin/ECFR?page=browse>
- U.S. EPA overview - water.epa.gov/lawsregs/lawsguidance/cwa/316b/
- USFWS Biological Opinion - www.nmfs.noaa.gov/pr/consultation/opinions/biop_epa_cwa316b_2014.pdf
- Federal Register Vol. 79, No. 158 - gpo.gov/fdsys/pkg/FR-2014-08-15/pdf/2014-12164.pdf

There are several resources for permittees to utilize to collect the required application information. Some of these are:

- Ohio EPA's Integrated report – epa.ohio.gov/dsw/tmdl/OhioIntegratedReport.aspx
- Ohio EPA's Total Maximum Daily Load program – epa.ohio.gov/dsw/tmdl/index.aspx
- Ohio EPA's Biological and Water Quality Reports - epa.ohio.gov/dsw/document_index/psdindx.aspx
- Ohio EPA's Lake Erie Programs - epa.ohio.gov/dsw/lakeerie/index.aspx
- The Ohio River Valley Water Sanitation Commission – orsanco.org
- U.S. EPA's Total Maximum Daily Load program - epa.gov/tmdl

Contact

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