

**Standard Operating Procedure (SOP)<sup>1</sup> for Clean Water Program  
Establishing Best Technology Available (BTA) Using Best Professional Judgement (BPJ) for  
Cooling Water Intake Structures at Existing NPDES Facilities  
SOP No. BCW-PMT-038  
Final, December 7, 2021  
Version 1.0**

The Federal Clean Water Act (CWA) requires that the location, design, construction, and capacity of cooling water intake structures (CWIS) associated with NPDES facilities reflect the best technology available (BTA) for minimizing adverse environmental impact (33 U.S.C. § 1326(b)). This standard is incorporated into Pennsylvania's regulations at 25 Pa. Code § 92a.34(b) (relating to cooling water intake structures). U.S. Environmental Protection Agency (EPA) regulations at 40 CFR § 125.90(b) require that cooling water intake structures not subject to requirements under sections 125.94 through 125.99 or subparts I (relating to new facilities) or N (relating to new offshore oil and gas extraction facilities) of Part 125 must meet requirements under section 316(b) of the CWA on a case by case, best professional judgment (BPJ) basis.

This SOP describes the procedures that the Department of Environmental Protection (DEP) will use to establish BPJ determinations of BTA in NPDES permits for existing CWIS pursuant to 40 CFR § 125.90(b). This determination can be made on an intake by intake basis, or, if circumstances warrant, on a cumulative basis provided all intakes are in the same waterbody.

## **I. Permit Application Review**

- A. Application managers should review the Cooling Water Intake Structure Section of the Application for Individual Permit to Discharge Industrial Wastewater (3800-PM-BCW0008b) to determine if 40 CFR §§ 125.94 through 125.99 apply to the facility. If a CWIS exists at the facility but it does not meet the applicability requirements at §§ 125.91(a)(1) through (3), the application manager will follow this SOP to make a BTA determination.
- B. Application managers will create a Cooling Water Intake Structure subfacility in eFACTS for each CWIS (unless already created).
- C. If the application manager determines that there is insufficient information in the application to determine whether a facility meets the applicability requirements of 40 CFR § 125.91(a) or if the information in the application is incomplete (e.g., if the design intake flow (DIF) or percent of water used for cooling is not provided), the application manager should request the information from the permit applicant in accordance with the procedures outlined in the SOP for Management of Late, Incomplete, and Deficient Permit Renewal Applications (BNPMSM-ENF-001).

## **II. BPJ Determination**

- A. Facilities subject to this SOP that meet at least one of the following impingement compliance options may be considered to have BTA for impingement mortality unless there is evidence that the permittee's operation of its CWIS is causing adverse environmental impacts due to impingement, as determined by DEP biologists. The application manager or DEP biologists may

---

<sup>1</sup> **DISCLAIMER:** The process and procedures outlined in this SOP are intended to supplement existing requirements. Nothing in the SOP shall affect regulatory requirements. The process, procedures and interpretations herein are not an adjudication or a regulation. There is no intent on the part of DEP to give the rules in this SOP that weight or deference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.

**SOP – Establishing BTA Using BPJ for Cooling Water Intake Structures**  
**Final, December 7, 2021**

coordinate with the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS)<sup>2</sup> The impingement compliance options include, but are not limited to:

1. Closed-cycle recirculating system.
2. 0.5 foot per second (fps) through-screen design velocity.
3. 0.5 fps through-screen actual velocity.

**NOTE 1:** If the 0.5 fps through-screen actual velocity option is chosen, a monitoring requirement for through-screen velocity should be included in the permit.

4. Modified Traveling Screens with a fish handling and return system with sufficient water flow to return the fish directly to the source water in a manner that does not promote re-impingement of the fish or require a large vertical drop.

**NOTE 2:** If the modified traveling screens option is chosen, a requirement to demonstrate that the technology is or will be optimized to minimize impingement mortality of non-fragile species should be included in the permit.

The application manager should document the determinations made in this section in accordance with Section II.G of this SOP. Application managers should refer to Sections II.D or II.E for facilities that do not employ any of the technologies listed.

- B. Facilities subject to this SOP that meet at least one of the following entrainment compliance options may be considered to have BTA for entrainment unless there is evidence that the permittee's operation of its CWIS is causing adverse environmental impacts due to entrainment or that site-specific factors show more stringent technologies are needed. The 316(b) Entrainment BTA Worksheet may be used to aid in this determination. The application manager should coordinate with DEP biologists, and either the application manager or the DEP biologists may coordinate with the FWS or the NMFS. The entrainment compliance options include, but are not limited to:

1. Closed-cycle recirculating system.
2. The actual intake flow (AIF) is minimal compared to the mean annual flow of the river. For cases where this option is being used, cumulative withdrawals from nearby facilities should be considered. The application manager may contact the Bureau of Clean Water to determine if this option is applicable.

**NOTE 3:** If this option is chosen, a monitoring requirement for intake flow should be included in the permit.

3. Seasonal flow reductions - If a facility can reduce flows to mimic closed cycle cooling during spawning and biologically important time periods.

**NOTE 4:** If this option is chosen, a monitoring requirement for intake flow should be included in the permit.

The application manager should document the determinations made in this section in accordance with Section II.G of this SOP. Application managers should refer to Sections II.D or II.E for facilities that do not employ any of the technologies listed.

---

<sup>2</sup> The regulation at 40 CFR § 125.90 does not authorize take, as defined by the Endangered Species Act, 16 U.S.C. 1532 (19). The FWS and NMFS have determined that any impingement (including entrapment) or entrainment of Federally-listed species constitutes take.

**SOP – Establishing BTA Using BPJ for Cooling Water Intake Structures**  
**Final, December 7, 2021**

- C. BTA at hydroelectric generating facilities may be determined using “EPA’s [Framework for Considering Existing Hydroelectric Facility Technologies in Establishing Case-by-Case, BPJ §316\(b\) NPDES Permit Conditions.](#)”

The application manager should document the determinations made in this section in accordance with Section II.G of this SOP.

- D. If a permittee's facility does not employ any of the technologies or processes listed in Sections II.A and II.B but has conducted impingement or entrainment studies within the last 10 years, those studies may be analyzed to determine if the CWIS meets BTA, provided there have been no major changes to facility operations or the water body since the studies were performed. The 316(b) Entrainment BTA Worksheet may be used to aid in this analysis. The application manager should document determinations made in this section, in accordance with Section II.G of this SOP.
1. Reviews of studies should be coordinated with DEP biologists to determine the adequacy of the studies and whether the facility is having an adverse environmental impact.
  2. If the studies indicate that the permittee's operation of its CWIS is not having an adverse environmental impact, the application manager should make a determination that BTA for impingement, entrainment or both has been satisfied. The application manager will select the appropriate Part C conditions presented in **Attachment A** to be established in the permit that identifies BTA and requires ongoing operation and maintenance of the BTA technologies or practices.
  3. If the studies indicate that the permittee's operation of its CWIS is having an adverse environmental impact from either impingement or entrainment the application manager should do one of the following:
    - a. Determine a BTA compliance option in accordance with Section II.F of this SOP.
    - b. If a determination cannot be made, select the appropriate Part C permit conditions presented in Attachment A to require completion of Impingement or Entrainment Reduction Studies or both, as necessary, for the Department to determine the appropriate BTA at the facility.
- E. If a permittee's facility does not employ any of the technologies or processes listed in Sections II.A and II.B above, and no impingement or entrainment studies have been completed within the last 10 years, the application manager will do one of the following:
1. Incorporate the appropriate Part C conditions presented in Attachment A into the permit to require the submission of additional information to determine the appropriate BTA at the facility. The application manager may need to coordinate any biology-related study plan requirements with the DEP biologists. Additional information that may be required includes:
    - a. Source water baseline biological characterization in support of developing the permittee's selection and justification for impingement and entrainment compliance. If submitted, a study plan may be reviewed by DEP, if no existing or surrogate information is available.
    - b. A report detailing facility and cooling water intake structure data, including but not limited to source water physical data, cooling water intake structure data, cooling water system data, and operational status. This report will be used to evaluate the permittee's selection and justification for BPJ BTA impingement and entrainment compliance options.
    - c. A report detailing the facility's selection and justification for BPJ BTA impingement and

**SOP – Establishing BTA Using BPJ for Cooling Water Intake Structures**  
**Final, December 7, 2021**

entrainment compliance options.

The application manager should document the BPJ determinations made in this section, in the Fact Sheet in accordance with Section II.G of this SOP.

2. Determine a BTA compliance option in accordance with Section II.F of this SOP.
  - F. If the permittee's facility does not employ any impingement or entrainment reduction technologies, but the permittee proposes in the application to install technology identified in Section II.A and/or II.B of the SOP or provides appropriate justification that is determined to be acceptable as BPJ BTA, the application manager will establish this BTA in the permit using the appropriate Part C conditions presented in Attachment A and, where warranted, include a compliance schedule for implementation of BTA. Determinations made in this section should be documented in accordance with Section II.G of this SOP.
  - G. Application managers will document all BPJ BTA determinations, associated justifications used to make the BTA determinations, and any additional requirements (e.g., studies, data needs, or monitoring) required by the permittee to support the BPJ BTA. Application managers will document this information in the Fact Sheet and establish requirements in the permit with the appropriate Part C conditions presented in Attachment A. The application manager will complete the information for each CWIS in eFACTS.

ATTACHMENT A

PART C CONDITIONS FOR COOLING WATER INTAKE STRUCTURES FOR FACILITIES SUBJECT TO  
40 CFR § 125.90(b)

*Select the appropriate language below based on the site-specific BPJ determination. Add additional site-specific details as necessary, but do not modify the language below without consulting the Bureau of Clean Water.*

**I. COOLING WATER INTAKE STRUCTURES**

- A. Nothing in this permit authorizes a take of endangered or threatened species under the Endangered Species Act.
- B. Technology and operational measures employed at the cooling water intake structures must be operated in a way that minimizes impingement mortality and entrainment to the smallest amount, extent, or degree reasonably possible.
- C. The location, design, construction or capacity of the intake structure(s) may not be altered without prior approval of DEP.
- D. The permittee must notify DEP before changing its source of cooling water.
- E. The permittee shall retain data and other records for any information developed pursuant to Section 316(b) of the Clean Water Act for a minimum of ten (10) years.

**(SELECT IF ONE OR MORE IMPINGEMENT COMPLIANCE OPTIONS MET)**

- F. Throughout the permit term, the permittee shall continue to operate and maintain the following technologies or BMPs that constitute Best Technology Available (BTA) for reducing impingement:

**(SELECT ONE OR MORE:)**

- Closed-cycle recirculating cooling system.
- 0.5 foot per second (fps) through-screen design velocity.
- 0.5 foot per second (fps) through-screen actual velocity. The permittee shall monitor the through-screen actual velocity once per week. In lieu of velocity monitoring, the permittee may calculate the through-screen velocity using water flow, water depth, and the screen open areas. The data shall be submitted on the Cooling Water Intake Monitoring Supplemental Report (3800-FM-BCW0010) as an attachment to monthly Discharge Monitoring Reports (DMRs).
- Modified traveling screens with a fish handling and return system with sufficient water flow to return the fish directly to the source water in a manner that does not promote re-impingement of the fish or require a large vertical drop. Within 18 months of the permit effective date, the permittee shall submit a report demonstrating that the technology is currently, optimized to minimize impingement mortality of non-fragile species, or will be optimized by the permit expiration date.
- Other (application manager to describe BTA technology or technologies).

**(SELECT IF DEP DETERMINES THERE IS ADVERSE ENVIRONMENTAL IMPACT DUE TO IMPINGEMENT)**

- G. The permittee shall submit the following information:
  - 1. Within 18 months of the permit effective date, the permittee shall submit a source water baseline

**SOP – Establishing BTA Using BPJ for Cooling Water Intake Structures**  
**Final, December 7, 2021**

biological characterization in support of developing an Impingement Reduction Study Report. The permittee may use existing or surrogate data where appropriate data exists, or collect sampling data to support the report. The permittee may optionally submit a study plan for DEP approval prior to collecting data.

2. Within 24 months of DEP's approval of the source water baseline biological characterization, the permittee will submit an Impingement Reduction Study Report. The permittee shall investigate the feasibility of implementing alternatives to present operations to reduce impingement resulting from operation of cooling water intake structures. A minimum of three alternatives must be evaluated in the report. The report should also include details of the source water physical data, cooling water intake structure data, cooling water system data, and operational status. For all alternatives that are evaluated, the report shall include an assessment of the estimated reductions in impingement in the surface waters in which withdrawals are made and a schedule for implementation. The permittee shall select and justify their choice of alternative.
3. Upon written approval from DEP, the permittee will implement technologies or BMPs that constitute Best Technology Available (BTA) for impingement within the shortest, reasonable period of time.
4. The permittee shall submit a progress report by the anniversary of the effective date of the permit each year detailing the status of activities being conducted until BTA for impingement is implemented.

**(SELECT IF ONE OR MORE ENTRAINMENT COMPLIANCE OPTIONS MET)**

- H. Throughout the permit term, the permittee shall continue to operate and maintain the following technologies or BMPs that constitute Best Technology Available (BTA) for reducing entrainment:

**(SELECT ONE OR MORE:)**

- Closed-cycle recirculating cooling system.
- Maintenance of actual intake flow of        % or less of the mean annual flow of the surface waters. The permittee shall monitor intake flows daily. The data shall be submitted on the Cooling Water Intake Monitoring Supplemental Report (3800-FM-BCW0010) as an attachment to monthly Discharge Monitoring Reports (DMRs).
- Reduction of intake flows to mimic closed-cycle cooling during spawning and other biologically important time periods. The permittee shall monitor intake flows daily. The data shall be submitted on the Cooling Water Intake Monitoring Supplemental Report (3800-FM-BCW0010) as an attachment to monthly Discharge Monitoring Reports (DMRs).
- Other (application manager to describe BTA technology or technologies).

**(SELECT IF DEP DETERMINES THERE IS ADVERSE ENVIRONMENTAL IMPACT DUE TO ENTRAINMENT)**

- I. The permittee shall submit the following information:
1. Within 18 months of the permit effective date, the permittee shall submit a source water baseline biological characterization in support of developing an Entrainment Reduction Study Report. The permittee may use existing or surrogate data where appropriate data exists or collect sampling data to support the report. The permittee may optionally submit a study plan for DEP approval prior to collecting data.
  2. Within 24 months of DEP's approval of the source water baseline biological characterization, the permittee will submit an Entrainment Reduction Study Report. The permittee shall investigate the feasibility of implementing alternatives to reduce entrainment resulting from

**SOP – Establishing BTA Using BPJ for Cooling Water Intake Structures**  
**Final, December 7, 2021**

operation of cooling water intake structures. A minimum of three alternatives must be evaluated in the report. The report should also include details of the source water physical data, cooling water intake structure data, cooling water system data, and operational status. For all alternatives that are evaluated, the report shall include an assessment of the estimated reductions in entrainment in the surface waters in which withdrawals are made and a schedule for implementation. The permittee shall select and justify their choice of alternative.

3. Upon written approval from DEP, the permittee will implement technologies or BMPs that constitute BTA for entrainment within the shortest, reasonable period of time.
4. The permittee shall submit a progress report by the anniversary of the effective date of the permit each year detailing the status of activities being conducted until BTA for entrainment is implemented.

**(SELECT THE APPLICABLE INFORMATION BEING REQUESTED IF THERE IS NO IMPINGEMENT/ENTRAINMENT DATA AND COMPLIANCE OPTIONS NOT MET)**

J. The permittee shall submit the following information:

1. Within 18 months of the permit effective date, the permittee shall submit a source water baseline biological characterization in support of developing the permittee's selection and justification for impingement and entrainment compliance. The permittee may use surrogate data where appropriate data exists or collect sampling data to support the report. The permittee may optionally submit a study plan for DEP approval prior to collecting data.
2. Within 24 months of DEP's approval of the source water baseline biological characterization, the permittee will submit a facility and cooling water intake structure report in support of the permittee's selection and justification for impingement and entrainment compliance. This report should include an analysis of a minimum of three options to meet Best Technology Available (BTA) for both impingement and entrainment. The report should also include details of the source water physical data, cooling water intake structure data, cooling water system data, and operational status. The permittee may optionally conduct impingement and entrainment sampling to determine if current operations meet BTA.
3. Upon written approval from DEP, the permittee will implement technologies or BMPs that constitute BTA for impingement and entrainment within the shortest, reasonable period of time.
4. The permittee shall submit a progress report by the anniversary of the effective date of the permit each year detailing the status of activities being conducted until BTA for impingement and entrainment is implemented.

**SOP – Establishing BTA Using BPJ for Cooling Water Intake Structures**  
**Final, December 7, 2021**

**Version History**

<b>Date</b>	<b>Version</b>	<b>Revision Reason</b>
12/7/2021	1.0	Original