# CP-#52 / Best Technology Available (BTA) for Cooling Water Intake Structures

New York State Department of Environmental Conservation

# DEC Policy

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| **Issuing Authority: Joe Martens, Commissioner** | |
| **Date Issued: July 10, 2011** | **Latest Date Revised:** |

## I. Summary:

This policy outlines the reductions in impingement mortality and entrainment required to minimize the adverse environmental impact caused by industrial facilities having a cooling water intake structure (CWIS) in connection with a point source thermal discharge. Water withdrawals from surface waterbodies through a CWIS cause injury and mortality to fish and shellfish through impingement at the intake and/or entrainment through the cooling system. Through this policy, the Department identifies closed-cycle cooling or the equivalent as the performance goal for the best technology available (BTA) to minimize adverse environmental impacts pursuant to Section 704.5 of 6 NYCRR and Section 316(b) of the federal Clean Water Act in State Pollutant Discharge Elimination System (SPDES) permits issued by the Department in accordance with ECL Article 17, Title 8, and Part 750 of 6 NYCRR.

## II. Applicability:

This policy applies to all existing and proposed industrial facilities designed to withdraw twenty (20) million gallons per day (MGD) or more of water from the waters of New York State, where at least twenty five (25) percent is used for contact or non-contact cooling, and that are subject to the requirements of Section 704.5 of 6 NYCRR. Existing and proposed industrial facilities subject to the requirements of 6 NYCRR § 704.5 that are designed to use less than 20 MGD of contact or non-contact cooling water or those with a higher design capacity that use less than twenty five (25) percent of water for cooling purposes will continue to be subject to the requirements of 6 NYCRR § 704.5 and CWA § 316(b) or another subpart of 40 C.F.R. Part 125, as determined by the Department on a case-by-case, best professional judgment (BPJ) basis.

## III. Policy:

This Policy was prepared in furtherance of the powers and duties of the Commissioner and the Department of Environmental Conservation, pursuant to ECL Articles 1, 3, and 11 *et seq.* to conserve and protect the natural resources of the state and to minimize adverse impacts to the environment. In addition, it seeks to clarify the Department's Best Technology Available (BTA) review process and to provide certainty to Department staff's ongoing implementation of 6 NYCRR Part 704.5 regarding requirements applicable to CWIS.

The following performance goals are identified for selection of BTA to minimize adverse environmental impact from a CWIS:

1. Dry closed-cycle cooling as the performance goal for all new industrial facilities sited in the marine and coastal district (ECL § 13-0103) and along the Hudson River up to the Federal Dam in Troy;
2. Wet closed-cycle cooling as the minimum performance goal for all new industrial facilities located along all waters other than those covered by 1 above;
3. Wet closed-cycle cooling or its equivalent as the performance goal for existing industrial facilities that operate a CWIS in connection with a point source thermal discharge; and
4. Wet closed-cycle cooling as the performance goal for all repowered industrial facilities that operate a CWIS in connection with a point source thermal discharge.

Facilities for which a BTA determination has been issued prior to the effective date of this policy and which are in compliance with an existing compliance schedule of BTA implementation and verification monitoring will not be subject to new requirements as a result of this policy unless/until the results of verification monitoring demonstrate the necessity of more stringent BTA requirements. A full technical review will be conducted when a permit renewal or modification application is submitted following the completion of the verification monitoring program.

Facility owners and/or permittees of existing industrial facilities seeking to meet the equivalent performance goal set by this policy shall propose a suite of technologies and operational measures to the Department for consideration as BTA. Operational measures proposed by the facility owner may include but not be limited to: (1) reductions in cooling water capacity, (2) fish protective outages, and (3) reducing cooling water capacity use.

***Definitions:***

**Adverse environmental impact –** the fish and shellfish killed or injured through entrainment and impingement by the operation of cooling water intake structures. The "adverse environmental impact" that must be minimized by the BTA standard of 6 NYCRR §704.5 relates only to aquatic resources.

**Available –** technologies and operational measures that are technically and administratively feasible for a particular facility, consistent with other applicable regulations and public health and safety considerations, with costs not wholly disproportionate to the benefits.

**Best Technology Available (BTA)** – technology based standard established under CWA Section 316(b), 40 C.F.R. Part 125, subpart I; 40 C.F.R. Part 125.90(b); and 40 C.F.R. Part 125, subpart N and 6 NYCRR Part 704.5 as the most effective technology, process or operational method for minimizing adverse environmental impact from a CWIS.

**Calculation baseline** – an estimate of impingement mortality and entrainment that would occur at a facility CWIS assuming that: the cooling water system has been designed as a once-through system; the opening of the cooling water intake structure is located at, and the face of the standard 3/8-inch mesh conventional traveling screen is oriented parallel to, the shoreline near

the surface of the source waterbody and is operated at the full rated capacity 24 hours a day, 365 days a year. This is the baseline of adverse environmental impact to be used in estimating reductions in impingement mortality and entrainment resulting from operating a closed-cycle cooling system.

**Cooling water** - the water used for contact or non-contact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content. The intended use of the cooling water is to absorb waste heat rejected from the process or processes used, or from auxiliary operations on the facility's premises [6 NYCRR § 700.1(a)(11)].

**Cooling water intake structure (CWIS)** - the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of New York State. The cooling water intake structure extends from the point at which water is withdrawn from the waters of the State up to, and including the intake pumps [6 NYCRR § 700.1(a)(12)].

**Dry closed-cycle cooling** - cooling system that uses air flow, rather than the evaporation of water, to remove heat from the power station in order to reduce or eliminate the consumptive use of surface waters.

**Entrainment –** the incorporation of all life stages of fish with intake water flow entering and passing through a cooling water intake structure and into a cooling water system. The Department assumes that entrainment results in 100 percent mortality of the entrained organisms unless a lesser mortality is demonstrated to Department staff based on site-specific studies.

**Equivalent** – reductions in impingement mortality and entrainment from calculation baseline that are 90 percent or greater of that which would be achieved by a wet closed-cycle cooling system.

**Feasible** – capable of being done; able to be installed and function efficiently within the operating constraints of the facility.

**Impingement mortality –** the death of all life stages of fish as a result of being entrapped on the outer part of a cooling water intake structure or against a screening device during periods of water withdrawal.

**Industrial facilities** –includes all facilities listed in CWA § 306(b)(1)(A) and all other facilities that have a cooling water intake structure in connection with a point source thermal discharge.

**Minimize** - reduce to the smallest amount, extent or degree reasonably possible.

**Once-through cooling water system** - a system designed to withdraw water from a natural or other water source, use it at the facility to support contact and/or noncontact cooling uses, and then discharge it to a waterbody without recirculation.

**Shellfish** – for the purposes of this policy, this includes the horseshoe crab (*Limulus polyphemus*) and members of the Class *Decapoda* [lobster (*Homarus americanus*), crayfish, crabs, and shrimp].

**Wet closed-cycle cooling –** a system designed to withdraw the smallest amount of water to support contact and/or non-contact cooling uses within a facility. A closed-cycle cooling system uses between 93 and 98 percent less water than a once-through cooling system. The water is usually sent to a cooling canal, channel, pond, or tower to allow waste heat to be dissipated to the atmosphere and then is returned to the system. New source water (makeup water) is added to the

system to replenish losses that have occurred due to cooling tower blow-down, drift, and evaporation.

**Wholly disproportionate test** – is neither a traditional cost-benefit analysis nor an economic analysis but simply a comparison of the proportional reduction in impact (benefit) as compared to the proportional reduction in revenue (cost) of installing and operating BTA technology to mitigate adverse environmental impact. This comparison does not monetize the resource and gives presumptive weight to the value of the environmental benefits to be gained.

## IV. Purpose and Background:

State regulations and federal laws mandate that industrial facilities employ BTA to minimize adverse environmental impact when proposing a new or operating an existing CWIS. The purpose of this policy is to identify the goals of the Department in implementing this standard and to ensure consistent application of those goals to industrial facilities in New York State. In addition, this Policy outlines Department staff's ongoing review process and procedures for decision-making.

Throughout New York, over 16 billion gallons of water are withdrawn from state waters through a CWIS system each day for the purpose of industrial cooling. The adverse environmental impact of these CWIS systems results in over 17 billion fish of all life stages (eggs, larvae, juveniles and adults) being entrained or impinged annually. The fish can suffer from lethally high water temperatures, contact with screens, impellers or heat-exchangers, or from exposure to the chemicals used to maintain heat-exchanger cleanliness. Steam electric power plants account for the majority, though not all, of this environmental impact with some of these power plants using well over a billion gallons of water every day for cooling purposes.

*Establishing Closed-Cycle Cooling or the Equivalent as the Performance Goal:*

One of the most efficient and effective ways to minimize or eliminate the number of and mortality to aquatic organisms impinged and entrained during industrial cooling is to minimize or eliminate the use of once-through, non-contact cooling water from the surface waters of New York. The demonstrated technology that achieves the greatest reduction in non-contact cooling water use is closed-cycle cooling. Under the U.S. EPA CWA 316(b) Phase I Rule (40 C.F.R. Part 125, subpart I), wet closed-cycle cooling was identified as the best technology available for new facilities to minimize impingement and entrainment and New York has already required closed-cycle cooling technology to be employed on new facilities and for electric generating facilities being repowered[1]. Given the effectiveness of closed-cycle cooling at reducing adverse environmental impact caused by a CWIS, the biological significance of New York's surface waterbodies and their importance for commercial and recreational uses, particularly in the

[1] See *Matter of Athens Generating Co., LP,* Interim Decision of the Commissioner, June 2, 2000 [2000 WL 33341184 (N.Y.Dept.Env.Conserv.)]. *Citizens for the Hudson Valley v. New York State Bd. on Electric Generation Siting and the Environment,* 281 AD2d 89 (3d Dept. 2001). *Matter of Mirant Bowline, LLC,* Decision of the Commissioner, March 19, 2002 [2002 WL 444950 (N.Y.Dept.Env. Conserv.)]. *Matter of Bethlehem Energy Center,* Interim Decision of the Commissioner, Jan. 31, 2002 [Siting Board Decision Feb. 2002].

marine and coastal district, the tidal reach of the Hudson River and the Great Lakes, this policy establishes closed-cycle cooling as the performance goal for all new and repowered industrial facilities in New York. The performance goal for all existing industrial facilities in New York is closed-cycle cooling or the equivalent.

*Exemption from the Entrainment Performance Goal*

An existing electric generating facility operated at less than fifteen (15) percent of its electric generating capacity over a current 5-year averaging period will be subject to the impingement mortality reduction performance goals of this policy and may be exempt from meeting the entrainment performance goal of this policy provided that the facility is operated in a manner that minimizes the potential for entrainment. For these facilities, site-specific performance goals for entrainment will be determined by the Department on a on a case-by-case, BPJ basis.

**V. Responsibility:**

The Division of Fish, Wildlife and Marine Resources has the primary responsibility to ensure that BTA determinations are made consistent with this Policy. Additionally, the Divisions of Water and Environmental Permits ensure that the requirements of this policy are reflected in all final SPDES permits issued to industrial facilities that operate or propose to operate a CWIS in connection with a point source thermal discharge. Specific Division responsibilities are as follows:

*Division of Environmental Permits (Permits)* - As the Project Manager, Permits staff coordinate the BTA determination with the development of the SPDES permit modification. Permits staff also ensure compliance with 6 NYCRR Part 621 (Uniform Procedures) and 6 NYCRR Part 617 (State Environmental Quality Review). This includes preparation of all required public notices and coordination with other state and federal agencies, including but not limited to the New York State Department of Public Service and the New York Independent Systems Operator (NYISO). Permits staff are also the primary contact for the public expressing interest in a SPDES modification. In addition, Permits staff oversee the permit process with respect to compliance with Uniform Procedures Act (UPA) and State Environmental Quality Review Act (SEQRA) requirements. With respect to non-BTA land use and other environmental impacts, Permits staff seek other agency or outside expertise as needed.

*Division of Fish, Wildlife and Marine Resources (DFWMR)* - DFWMR staff conduct the biological assessment of the facility CWIS and take the lead role in making the BTA determination with respect to aquatic resource impacts. In addition, DFWMR staff identify natural resource impacts associated with BTA compliance.

*Division of Water (DOW)* - DOW Staff assess the potential for water quality impacts that may result from construction and implementation of BTA technologies and incorporate the final BTA determination into the SPDES permit.

**VI. Procedure:**

*Implementation of this Policy:*

This policy will be implemented when: (i) an applicant seeks a new SPDES permit; (ii) a permittee seeks to renew an existing SPDES permit; or (iii) a SPDES permit is modified either by the Department or by the permittee, for a facility that operates a CWIS in connection with a point source thermal discharge pursuant to 6 NYCRR § 704.5; 40 CFR Part 125, subpart I and subpart N; and 40 CFR Part 125.90(b). In addition, when issuing SPDES permits for industrial facilities using a CWIS, staff are guided by the applicable SPDES regulations, including 6 NYCRR 750-1.11 "Application of Standards, Limitations and Other Requirements." These regulations require that both federal minimum requirements and State water quality requirements are met, and that other impacts are evaluated and mitigated as required by applicable law and regulations.

DFWMR staff will develop permit conditions for BTA compliance on a site-specific, case by case basis in accordance with this Policy and 6 NYCRR Part 704.5, and Section 316(b) of the federal Clean Water Act (*see* *Matter of Athens Generating Co., L.P.*, Interim Decision of the Commissioner, June 2, 2000).

Once a site-specific BTA determination is made by DFWMR staff, the Department will undertake a SEQRA review to ensure that any significant impacts associated with the construction and operation of the selected BTA are avoided, minimized, or mitigated.

*Cost Considerations in Making Site Specific BTA Determinations*

After selecting the best technology available for an industrial facility, the Department will consider the cost of the feasible technologies and will determine whether or not the costs of the technologies are wholly disproportionate to the environmental benefits to be gained from the technology. The Department will not undertake a formal cost-benefit analysis whereby the environmental benefits would be monetized. Such an analysis is neither desirable nor required by law. *See Entergy Corp v Riverkeeper, Inc., et al.*, 556 U.S. __, 129 S.Ct. 1498 (2009). For each site-specific BTA determination, the Department will select a feasible technology whose costs are not wholly disproportionate to the environmental benefits to be gained.

*Nuclear-Fueled Power Plants*

If the owner or operator of a new or existing nuclear-fueled power plant demonstrates to Department staff that compliance with the performance goals of this Policy would result in a conflict with any safety requirement established by the Nuclear Regulatory Commission (NRC), with appropriate documentation or other substantiation from the NRC, the Department will make a site-specific determination of best technology available for minimizing adverse environmental impact that would not result in a conflict with the NRC's safety requirements.

*Failure to Meet the Entrainment Performance Goal of this Policy*

The performance goal for existing industrial facilities in New York is closed-cycle cooling or the equivalent. Department staff believe that the majority of facilities that install and properly operate and maintain approved closed-cycle-equivalent technologies should be capable of meeting the performance goals established in this policy. This is based on multiple years of experience in assessing BTA for facilities in New York State, on continued review of research and studies associated with performance of BTA technologies, and on participation in the national rulemaking effort associated with CWA Section 316(b). However, for facilities that fail to meet the entrainment performance goal through the use of technologies other than closed-cycle cooling, the Department may initiate a modification to a facility's SPDES permit to require additional mitigative measures to meet the entrainment performance goal, or if appropriate, propose a BTA determination with site-specific entrainment reduction requirements if no other available mitigative alternative remains.

## VII. Related References:


California Environmental Resources Control Board. 2010. Water quality control policy on the use of coastal and estuarine waters for power plant cooling. State Water Resources Control board Resolution No. 2010-0020. May 4, 2010. 6pp.

California Environmental Resources Control Board. 2008. Scoping Document: Water quality control policy on the use of coastal and estuarine waters for power plant cooling. State Water Resources Board. March 2008. 91pp.

Clean Water Act, 33 U.S.C. §§ 1251 – 1387

Clean Water Act §§ 306, 316(b)

Environmental Protection Agency. 1977. Permits Division, Office of Waste Enforcement, EPA, *Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b),* PL 92-500 (Draft 1977).

*Entergy Corp. v Riverkeeper, Inc., et al.,* 556 U.S. __, 129 S.Ct. 1498 (2009).

*Entergy Nuclear Indian Point 2, LLC, et al. v. New York State Dept. of Envtl. Conservation,* 23 AD3d 811 (3d Dept. 2005), *leave to appeal dismissed in part, denied in part* 6 NY3d 802 (2006).

*Hudson Riverkeeper Fund, Inc. v. Orange and Rockland Utilities, Inc.,* 835 F.Supp. 160 (S.D.N.Y. 1993)

Maulbetsch, John S., and Michael N. DiFilippo. 2008. *Performance, Cost, and Environmental Effects of Saltwater Cooling Towers.* California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-043.

*Matter of Dynegy Northeast Generation, Inc., on behalf of Dynegy Danskammer, LLC,* Decision of the Deputy Commissioner, May 24, 2006 [2006 WL 1488863 (N.Y.Dept.Env.Conserv.)]; Riverkeeper, Inc. v Johnson, 52 AD3d 1072 (3d Dept. 2008), appeal denied 11 NY3d 716 (2009).

*Matter of Athens Generating Co., LP,* Interim Decision of the Commissioner, June 2, 2000 [2000 WL 33341184 (N.Y.Dept.Env.Conserv.)], *Citizens for the Hudson Valley v. New York State Bd. on Electric Generation Siting and the Environment,* 281 AD2d 89 (3d Dept. 2001).

*Matter of Mirant Bowline, LLC,* Decision of the Commissioner, March 19, 2002 [2002 WL 444950 (N.Y.Dept.Env. Conserv.)].

*Matter of Bethlehem Energy Center,* Interim Decision of the Commissioner, Jan. 31, 2002 [Siting Board Decision Feb. 2002].

*Matter of Besicorp-Empire Development Co., LLC,* Decision of the Commissioner, Sept. 23, 2004 [Siting Board Decision Sept. 2004].

*Matter of Public Service Co. of New Hampshire, et al.* (Seabrook Station, Units 1 and 2 - National Pollutant Discharge Elimination System), June 10, 1977 [1977 WL 22370 (E.P.A.), 1 E.A.D. 332].

National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities; Final Rule, 66 Fed.Reg. 65,255 (Dec. 18, 2001) (codified at 40 C.F.R. pts. 9, 122-25 [Phase I Rule].

National Pollutant Discharge Elimination System: Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities; Final Rule, 69 Fed.Reg. 41,576 (July 9, 2004) (codified at 40 C.F.R. pts. 9, 122-25) [Phase II Rule].

NERC (2008). Electric reliability impacts of a mandatory cooling tower rule for existing steam generating units, U.S. Department of Energy/North American Electric Reliability Corporation**:** 46 pp.

Riverkeeper I: *Riverkeeper, Inc. et al. v U.S. EPA*, 358 F.3d 174 (2d Cir. 2004) Riverkeeper II: *Riverkeeper, Inc. et al. v U.S. EPA*, 475 F.3d 83 (2d Cir. 2007).

Stark letter (2005) 24 January 2005 letter to EPA B. Grumbles from Deputy Commissioner L. Stark.

Tetra Tech, Inc. 2008. California's coastal power plants: alternative cooling system analysis. Final report to the California Ocean Protection Council. February 2008.

Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Parts 700, 704 and 750.

40 C.F.R. Part 125 - Criteria and Standards for the National Pollutant Discharge Elimination System (NPDES) permits.