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EPA Releases Final Standards for Cooling Water Intakes at Existing Power Plants

Section 316(b) of the Clean Water Act requires EPA to issue regulations ensuring that the design and operation of intake structures minimize adverse environmental impacts from the withdrawal of cooling water from lakes, rivers, estuaries, or oceans. The withdrawal of large volumes of water kills aquatic organisms and their eggs by trapping them against intake screens (impingement) or by drawing them into the cooling system (entrainment). However, a variety of measures reduce this impact substantially. After several rulemakings and subsequent litigation, EPA released the final rule for existing facilities on May 19, 2014.

Background

On March 28, 2011, EPA proposed regulations for cooling water intake structures at existing power plants under section 316(b) of the Clean Water Act (316(b) rule). The proposed rule would have established numeric impingement performance standards based on "best technology available" (BTA) for facilities to reduce the effects of cooling water intake on aquatic organisms. As interpreted by a range of stakeholders, the proposed rule would have essentially required construction of closed-cycle cooling at a number of existing power plant facilities. This requirement drove the majority of retirements shown in a range of analyses that predicted retirements as a result of recent environmental regulations.

On May 31 and June 2, 2012, EPA released two Notices of Data Availability (NODAs) to highlight information received since the proposal and request public comment on possible revisions to the impingement mortality standard as well as results received thus far from a willingness-to-pay survey, which EPA considered using to quantify non-use benefits of the rule. On June 18, 2013, EPA initiated a formal Endangered Species Act (ESA) "Section 7 Consultation" with the U.S. Fish & Wildlife Service and the U.S. National Marine Fisheries Service to consider the rule's potential impacts on threatened and endangered species. OMB received the final rule on July 30, 2013.

Final Rule for Existing Plants

Impingement Mortality Requirements

Compared to the proposed rule, the final rule provides several compliance options, while still ensuring improvements in impingement mortality. The final rule offers the owner or operator of an existing facility[1] the choice of seven compliance options that EPA describes as equivalent in performance to modified traveling screens and thus considered BTA with two limited exceptions.

[1] Facilities that withdraw at least two million gallons per day (mgd), of which at least 25 percent is used for cooling, are subject to impingement mortality requirements.

Compliance Options for Impingement:

1) Closed-cycle recirculating system (CCRS), including cooling tower and impoundment systems.[2]
2) 0.5 Feet per Second Through-Screen Design Velocity.
3) 0.5 Feet per Second Through-Screen Actual Velocity.
4) Existing offshore velocity cap.[3]
5) Modified traveling screens.
6) System of technologies (i.e., a combination of unlisted technologies that reduce impingement, impingement mortality, or both).
7) Impingement mortality performance standard (12-month impingement mortality performance standard of 24 percent).

Additionally, the Director may require additional measures for shellfish, fragile species, or threatened/endangered species or designated critical habitat.

Limited exceptions to the impingement requirements include:

1) *De minimis* rate of impingement if approved by Director. The Director may determine on a site-specific basis that no additional controls are necessary if impingement is so low (*de minimis*) that no additional controls are warranted.
2) Low capacity utilization power generating units if approved by Director. The Director may approve less-stringent requirements for impingement if a facility has an annual average capacity utilization rate of less than eight percent averaged over a 24-month block contiguous period.

Entrainment Mortality Requirements

Unlike for impingement mortality, EPA did not identify a single BTA technology or group of technology controls for entrainment mortality. Instead, the final rule establishes a national BTA entrainment standard for existing units[4] that requires a site-specific determination of BTA entrainment requirements. In establishing BTA for each site, the Director must consider five factors, though the weight given to each factor is at the Director's discretion:

(i) Numbers and types of organisms entrained, including, specifically, the numbers and species (or lowest taxonomic classification possible) of Federally-listed, threatened and endangered species, and designated critical habitat (e.g., prey base);
(ii) Impact of changes in particulate emissions or other pollutants associated with entrainment technologies;
(iii) Land availability inasmuch as it relates to the feasibility of entrainment technology;
(iv) Remaining useful plant life; and
(v) Quantified and qualitative social benefits[5] and costs of available entrainment technologies when such information on both benefits and costs is of sufficient rigor to make a decision.

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[2] CCRS must be designed and operated to minimize make-up and blowdown flows to the satisfaction of the Director and may include authorized impoundments of Waters of the U.S.

[3] An offshore velocity cap is defined as an open intake designed to change the direction of water withdrawal from vertical to horizontal, thereby creating horizontal velocity patterns that result in avoidance of the intake by fish and other aquatic organisms. To qualify under this provision, it must be located a minimum of 800 feet from the shoreline and use bar screens or otherwise exclude marine mammals, sea turtles, and other large aquatic organisms.

[4] All facilities are subject to site-specific entrainment analysis; however, facilities that withdraw at least 125 mgd, of which at least 25 percent is used for cooling, are subject to site-specific entrainment characterization study requirements. For impoundments constructed in uplands or not in waters of the United States, the point of compliance for measuring AIF to determine if it is greater than 125 mgd is the intake into the impoundment from the waters of the United States.

[5] Social benefits are defined as "the increase in social welfare that results from taking an action. Social benefits include private benefits and those benefits not taken into consideration by private decision makers in the actions they choose to take, including effects occurring in the future. Benefits valuation involves measuring the physical and biological effects on the environment from the actions taken. Benefits are generally treated one or more of three ways: a narrative containing a qualitative discussion of environmental effects, a quantified analysis expressed in physical or biological units, and a monetized benefits analysis in which dollar values are applied to

Additionally, the Director may consider the impact on the reliability of energy delivery within the immediate area. If all the technologies considered have social costs not justified by social benefits, or have unacceptable adverse impacts that cannot be mitigated, the Director may determine that no additional control requirements are necessary. In other words, the Director may reject an otherwise available technology as a BTA standard for entrainment if the social costs are not justified by the social benefits.

ESA Requirements

As a result of the formal ESA consultation with the U.S. Fish & Wildlife Service and the U.S. National Marine Fisheries Service (collectively, the Services), the final 316(b) rule requires facilities to identify all federally-listed threatened and endangered (T&E) species and/or designated critical habitat that are or may be present in the "action area"[6] based on readily available information at the time of the permit application.[7] Further, the rule requires the Director to submit all permit applications to the appropriate field office of the Services for a 60-day review prior to public notice of the draft or proposed permit. The preamble notes that this process allows the Services to have the opportunity to provide information and recommendations to the permit writer, and the Director is required to consider such information as a relevant factor, along with other relevant factors in deciding what conditions to establish in the permit. However, the rule also notes that EPA expects any measures the Services recommendations will be consistent with the ESA requirements concerning "reasonable and prudent measures." Under existing regulations, "reasonable and prudent measures" cannot alter the basic design and "[i]nstallation of closed-cycle cooling is a major design alternation of a facility involving significant design and construction activities."

The rule also requires the Director to provide to the Services a copy of the fact sheet or statement of basis (for EPA-issued permits), permit application (if any), and draft permit (if any). The Director must also include any specific information the Director has about T&E species and critical habitat that are or may be present in the action area, including any proposed control measures and monitoring and reporting requirements for such species and habitat.

In the site-specific permit, the Director may require additional control measures, monitoring requirements, and/or reporting requirements, which may include measures identified by the Services to protect T&E species and critical habitat. Finally, the rule requires that permits include a statement confirming that nothing in the 316(b) permit authorizes take of a T&E species.

The preamble explains that EPA will use its authority under the Clean Water Act to object to any permit if EPA finds that the "issuance of the permit is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat."

As part of the rulemaking package, the Services also released a Biological Opinion that concludes that "it is our biological opinion that EPA's action, as proposed, is not likely to jeopardize the continued existence of ESA-listed species listed in Tables 2 and 3 of this Opinion and is not likely to destroy or adversely modify

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quantified physical or biological units. The dollar values in a social benefits analysis are based on the principle of willingness-to-pay (WTP), which captures monetary benefits by measuring what individuals are willing to forgo in order to enjoy a particular benefit. Willingness-to-pay for nonuse values can be measured using benefits transfer or a stated preference survey."
Social costs are defined as "means costs estimated from the viewpoint of society, rather than individual stakeholders. Social cost represents the total burden imposed on the economy; it is the sum of all opportunity costs incurred associated with taking actions. These opportunity costs consist of the value lost to society of all the goods and services that will not be produced and consumed as a facility complies with permit requirements, and society reallocates resources away from other production activities and towards minimizing adverse environmental impacts.

[6] The preamble defines the action area as "generally…the area in the vicinity of impingement and entrainment at the cooling water intake structure."

[7] The Biological Opinion released by the Services notes that "readily available information" means information that is publicly available information and includes information obtained by the Services. It is not limited to information that is in the facility's possession; however, facilities are not required to create new information (e.g., new studies or surveys).

designated critical habitat in Tables 2 and 3." It also notes that the Opinion provides an incidental take exemption to EPA, and "any take incidental to the operation of a CWIS permitted under the Rule through the implementation process described in this Opinion will be exempt from Section 9 and Section 4(d) prohibitions if the owner/operator implements enforceable control measures, monitoring, and reporting as agreed upon by the owner/operator and the Services, and as reflected in the permit."

Requirements for New Units at Existing Facilities

While the current rule's focus is existing facilities, it also covers new units at existing facilities. (A previous rulemaking covers entirely new "greenfield" facilities.) The final rule defines a new unit defined as a new "stand-alone" unit at an existing facility where construction of the new unit begins after the effective date for the final rule (likely summer 2014) and that does not otherwise meet the definition of a new facility from the previous rulemaking. In the preamble, EPA notes that this definition is intended to capture "facilities that are undergoing major construction projects involving the construction of a new stand-along unit, while not discouraging upgrades. For example, a nuclear facility conducting a measurement uncertainty capture or stretch power uprate, or a fossil fuel facility repowering an existing generating unit, would not be considered to result in the relevant unit becoming a new unit.... An existing unit that is repowered or undergoes significant modifications (such as where the turbine and condenser are replaced) is not considered a new unit."

Compliance Timeline

The proposed rule required compliance with the impingement mortality standards within eight years, creating a potential conflict with entrainment requirements. In the final rule, permit application deadlines depend on renewal cycle; the cutoff is 45 months from the effective date of the final rule. Requirements are sequenced; After issuance of a final permit that establishes entrainment requirements, compliance with the impingement standards is required as soon as practicable. The Director may establish interim compliance milestones in the permit. Compliance with the entrainment standard is also required as soon as practicable, based on a schedule of requirements established by the Director. The Director may establish interim compliance milestones. New units at existing facilities must comply upon commencement of the new unit's operation. EPA expects that electric generators will install impingement technologies during the five-year window of 2018 through 2022; however, there is no statutory limit to the length of a compliance schedule if justified by appropriate factors, such as measures needed to maintain adequate energy reliability. (See table.)

	If your current permit expires *within 45 months* of effective date*	If your current permit expires more than 45 months from effective date*
Year 1	*Initiate discussions with Director* Begin two-year monitoring, if necessary	*Initiate discussions with Director*
Year 2		Begin two-year monitoring, if necessary
Year 3	**Permit renewal (may include interim steps)** *Submit application at least 180 days prior*	Permit application due
Year 4		**Permit renewal** *Submit application at least 180 days prior*
Year 5		
Year 6		
Year 7		
Year 8	**Permit renewal** *Submit application at least 180 days prior*	
Year 9		**Permit renewal** *Submit application at least 180 days prior*
Year 10		
Year 11		
Year 12		

** Mid-2018, assuming FR publication of the final rule in June 2014*

EPA expects that electric generators will install IM technologies during the 5-year window of 2018 through 2022; however, there is no statutory limit to the length of a compliance schedule if justified by appropriate factors provided in § 125.98(c), such as measures needed to maintain adequate energy reliability.

Willingness to Pay Survey

In the final rule, EPA elected not to rely on the controversial willingness to pay survey to quantify the rule's benefits. The preamble further notes that the results were not designed to be statistically representative at the facility level for the calculation of benefits for individual site-level permitting decisions. The final rule does not require Directors to require facility owners or operators to conduct or submit a willingness to pay survey to assess site-specific benefits, and only that benefits should be quantified or monetized where possible, although assessment of costs and benefits should be of sufficient rigor and quantification. For example, the Director may decide not to rely on benefit-cost information in establishing the entrainment controls when the benefits analysis includes only a qualitative discussion of nonuse benefits.

Next Steps

The rule will become effective 60 days after the rule's publication in the Federal Register. We would expect the filing of both petitions for reconsideration and litigation in the D.C. Circuit. Thus far, Riverkeeper, one of the plaintiffs that challenged the previous rules, has indicated an intent to litigate the final rule.

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