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The Debate Over Regulation Alternatives for Cooling Water Intake Structures is Heating Up
Nicole M. Magdziak

I. Introduction

Each day more than 279 billion gallons of water are withdrawn to cool industrial facilities.¹ It is possible that in a three-week period a single power plant will impinge a million adult fish, or in a year, entrain three to four billion smaller fish and shellfish.² The withdrawal of water in power plants or manufacturing plants destabilizes wildlife populations in the surrounding ecosystems.³ Ultimately, this withdrawal has led to ongoing tension between environmentalists and the energy industry concerning the use of cooling water intake structures (“CWIS”) at power plants for which these billions of gallons are withdrawn.⁴

This Note focuses on the alternatives for complying with the impingement mortality limitations under consideration pursuant to the Phase II Rule that the Environmental Protection Agency (“EPA”) will promulgate. This Phase II Rule relates to Clean Water Act (“CWA”) Section 316(b), which regulates CWIS. By consent decree, the EPA is required to issue rules regulating CWIS at new and existing facilities in three phases.⁵ Currently, Phase I has been issued for new facilities, Phase II has been issued for existing facilities that fit certain

¹ See *Riverkeeper, Inc. v. EPA*, 358 F.3d 174, 181 (2d. Cir. 2004) (*Riverkeeper I*).

² Impingement occurs when larger organisms like adult fish and shellfish are killed when they become trapped in or against the outside screens that protect the pumps of CWIS. Entrainment occurs when any life stages of fish and shellfish, such as eggs and larvae, are taken in through the CWIS into a cooling water system. 40 C.F.R. § 125.93 (West 2012); see also Olivia Odom, *Annual Review of Environmental and Natural Resources Law: Note: Energy v. Water*, 37 *ECOLOGY L.Q.* 353, 360 (2010); see *Riverkeeper I*, 358 F.3d at 181.

³ See *Riverkeeper I*, 358 F.3d at 181.

⁴ Cooling water intake structures means the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S. 40 C.F.R. § 125.93 (2012).

⁵ 33 U.S.C. § 1326(b); see *Riverkeeper, Inc. v. Whitman*, No. 93 Civ. 0314(AGS), 2001 WL 1505479, *1 (S.D.N.Y. Nov. 27, 2001).

qualifications,⁶ and Phase III has been issued for both existing and new offshore oil and gas extraction facilities.⁷ These rules concern entrainment and impingement of aquatic organisms.⁸

The Phase II Rule was initially promulgated in 2004.⁹ As a result of litigation concerning the Phase II Rule, the United States Supreme Court remanded the Phase II Rule to the EPA for further comment and approval of a cost-benefit analysis.¹⁰ In 2010, the EPA entered a consent decree with environmentalists agreeing to issue a final rule, pursuant to CWA Section 316(b), which sets new guidelines for CWIS in the industrial and power generation sectors by July 27, 2012.¹¹ Currently, promulgation of the Phase II Rule has been extended eleven months from the original deadline; however, the EPA projects that it will publish the final rule earlier, in May of 2013.¹² The extension provides the EPA sufficient time to analyze public comments, data, and options before finalizing the Phase II Rule.¹³

The Phase II Rule establishes national requirements that pertain to the location, design, and capacity of CWIS at facilities covered under the Phase II Rule; these requirements reflect the

⁶ See *infra* Part IV.A.

⁷ National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities, 66 Fed. Reg. 65,256 (December 18, 2001) (codified at 40 C.F.R. pts. 9, 122-25) (hereinafter *Regulations*); National Pollutant Discharge Elimination System--Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, 69 Fed. Reg. 41,576 (Jul. 9, 2004) (codified at 40 C.F.R. pts. 9, 122-25) (hereinafter *First Proposed Rule*); National Pollutant Discharge Elimination System--Final Regulations To Establish Requirements for Cooling Water Intake Structures at Phase III Facilities, 71 Fed. Reg. 35,006 (2006) (codified at 40 C.F.R. pts. 9, 122-25); The original proceedings concerning Phase III rules were stayed pending disposition of the Phase I and Phase II cases. See *ConocoPhillips Co. v. EPA*, 612 F.3d 822 (5th Cir. 2010). The portion of the Phase III rule relating to existing facilities was remanded to the agency for further consideration and the portion relating to new offshore facilities was affirmed. See *ConocoPhillips*, 612 F.3d 822.

⁸ See *First Proposed Rule*, *supra* note 7, at 41,576; see also *Regulations*, *supra* note 7 at 65,256.

⁹ *First Proposed Rule*, *supra* note 7, at 41,576.

¹⁰ *Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208, 227 (2009).

¹¹ *EPA Urged to Bar Site-Specific Cost-Benefit Tests for Cooling Water Intakes*, ENERGY WASHINGTON WEEK, July 25, 2012.

¹² Jim Inhofe & Lisa P. Jackson, *EPA Delays Cooling Water Rule, Driving Calls for Stricter Cost Reviews*, ENERGY WASHINGTON WEEK, August 1, 2012; see also Sonal Patel, *Four Major EPA Air and Water Rule Forthcoming Through May, Agency Schedules Shows*, POWERnews, March 14, 2013, available at http://www.powermag.com/POWERnews/Four-Major-EPA-Air-and-Water-Rules-Forthcoming-Through-May-Agency-Schedule-Shows_5453.html.

¹³ Jonathan Crawford, *EPA extends finalization of cooling water intake rule by nearly 1 year*, SNL FERC POWER REPORT, August 1, 2012.

best technology available (“BTA”), and are to be implemented through National Pollutant Discharge Elimination System (“NPDES”) permits.¹⁴ The EPA is currently considering several alternatives to be added to the Phase II Rules to provide more flexibility to industry owners who must comply with the Phase II Rule standards. Public comments were solicited on each. This Note argues that the proposed Phase II Rule would be more effective if several of the proposed alternatives are adopted.¹⁵

In this Note, Part II discusses the history of the CWA. Part III explains the relevant case history. Part IV contains a description of the proposed Phase II Rule and suggested alternatives. Part V includes an analysis of the various alternatives, reviews the difficulties of performing a cost-benefit analysis and offers a general discussion of agency foot-dragging.

II. The History of the Clean Water Act Section 316(b)¹⁶

The CWA is a technology-based statute, which provides the regulated community with rigorous specified deadlines to achieve increasingly high levels of pollution abatement.¹⁷

Motivated by restoring the integrity of the nation’s waters, Congress utilized the CWA to grant the EPA the authority to set technology standards.¹⁸ The CWA was adopted “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters”¹⁹ with a focus on controlling the effluents of “point sources.”²⁰ When a source, such as a power plant, is discharging a pollutant into navigable water from a point source, it can apply to the EPA for a

¹⁴ National Pollutant Discharge Elimination System-Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities; Notice of Data Availability Related to Impingement Mortality Control Requirements, 77 Fed. Reg. 34,315, 34,316 (June 11, 2012) (hereinafter *Proposed Rule*). NPDES permits are described in CWA § 402, 33 U.S.C. 1342.

¹⁵ *First Proposed Rule*, *supra* note 7, at 41,576; *see also Proposed Rule*, *supra* at 34,318. Section B of the Proposed Rule discusses the alternatives currently under consideration.

¹⁶ 33 U.S.C. § 1326(b).

¹⁷ Odom, *supra* note 2, at 355.

¹⁸ 33 U.S.C § 1251.

¹⁹ 33 U.S.C § 1251(a).

²⁰ A “point source” is “any discernible, confined and discrete conveyance . . . from which pollutants are or may be discharged.” Clean Water Act § 502(14), 33 U.S.C. §1362(14); *see Riverkeeper I*, 358 F.3d at 184.

NPDES permit for a certain limit of discharge.²¹ NPDES permit programs are overseen by the EPA; however, states are the permit-issuing authorities.²²

A. CWA Section 316(b)

Section 316(b) was included in the 1972 amendment to the CWA; however, it seemed to be added as somewhat of an afterthought.²³ Congress, when requiring the BTA under CWA Section 316(b), did not comment on the appropriateness of a cost-benefit analysis.²⁴ Utility companies challenged EPA's final rule under Section 316(b) for procedural flaws.²⁵ This rule came after more than two decades during which each individual permit-issuing authority established the BTA to limit adverse environmental impacts on a site-specific basis.²⁶

Section 316(b) of the CWA states: "Any standard established pursuant to section 301 or section 306 of this Act and applicable to a point source shall require that the location, design, construction, and capacity of cooling water in-take structures reflect the best technology available for minimizing adverse environmental impact."²⁷ Section 301 of the CWA sets forth a framework under which limitations on the discharge of pollutants from existing sources would become more stringent over time.²⁸ Section 306 of the CWA applies to new sources and requires

²¹ *Id.* at 193.

²² John H. Minan, *The Clean Water Act and Power Plant Cooling Water Intake Structures*, 1 SAN DIEGO J. CLIMATE & ENERGY L. 163, 193 n. 27 (2009).

²³ *Riverkeeper I*, 358 F.3d at 187 n.12; see Ryan Connor, *Administrative Law-Agency Deference-Cost-Benefit Analysis Under 33 U.S.C. § 1326(b)*, 77 TENN. L. REV. 187, 192 (2010).

²⁴ Mark Latham, *(Un)restoring the Chemical, Physical, and Biological Integrity of our Nation's Waters: The Emerging Clean Water Act Jurisprudence of the Roberts Court*, 28. VA. ENVTL. L.J. 411, 453 (2010).

²⁵ See *Appalachian Power Co. v. Train*, 566 F.2d 451, 454 (4th Cir. 1977). The procedural flaws included failure to abide by Administrative Procedure Act requirements of notice and comment.

²⁶ *Entergy*, 556 U.S. at 213. The regulation was subsequently revoked and instead, the EPA published draft guidance to be used in implementing the requirements of Section 316(b) via permit decisions on a site-specific basis. *Id.* (citing EPA, Office of Water Enforcement Permits Div., {Draft} Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92-500 (May 1, 1977), available at <http://www.epa.gov/waterscience/316b/files/1977AEIguid.pdf>; see 69 Fed. Reg. at 41,578 (describing system of case-by-case permits under the draft guidance).

²⁷ 33 U.S.C. § 1326(b).

²⁸ 33 U.S.C. § 1311(b).

that the EPA publish performance standards which govern pollutant discharges, including thermal discharges.²⁹

B. Technology of Cooling Water Intake Structures

Cooling water intake structures are used by power plants throughout the country.³⁰ The cooling system is understood to begin at the point where water is withdrawn from the surface, extending to, and including, the intake pumps.³¹ CWIS discharge heat, which is the reason they are regulated under the CWA in the same section that limits thermal effluent.³²

Two types of cooling systems can be used: wet cooling and dry cooling.³³ The type used affects the amount of water required for cooling.³⁴ “‘Wet cooling’ uses circulating water to dissipate heat.”³⁵ The technology required for this type of system is inexpensive; however, the system requires a large amount of water which adversely affects the environment.³⁶ There are two categories of wet cooling systems: once-through systems and closed-cycle systems.³⁷ “‘Once-through,’ or ‘open loop,’ systems withdraw water, cycle it through the cooling system once, and discharge it back into the water source.”³⁸ In “‘closed-cycle systems,’ water is recycled through the system multiple times, with water being withdrawn to compensate for evaporative losses.”³⁹ Across the United States each day, once-through systems use approximately 185 billion gallons of water and account for “approximately 91 percent of the water used for power plant cooling

²⁹ William A. Anderson, II & Eric P. Gotting, *Taken in Over Intake Structures? Section 316(b) of the Clean Water Act*, 26 COLUM. J. ENVTL. L. 1, *12 (2001); 33 U.S.C. § 1316(a)(1).

³⁰ Connor, *supra* note 22, at 187.

³¹ *Id.*

³² Odom, *supra* note 2, at 358; *see also* 33 U.S.C. § 1326(a)-(b) (2012).

³³ Odom, *supra* note 2, at 358.

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.* at 358-59.

³⁸ *Id.*

³⁹ Odom, *supra* note 2, at 358-59.

nationwide.”⁴⁰ Closed-cycle systems use approximately thirty to fifty times less water.⁴¹ However, more than 75 percent of that water is lost through the process, which is about three percent of the nation’s water consumption.⁴² The choice of system depends on the specific site under consideration.⁴³ Closed-cycle systems are used where there is no dependable source of water; once-through systems are better suited for sites where there is an abundance of surface water and no thermal discharge constraints.⁴⁴

“‘Dry cooling’ uses air to dissipate heat,” similar to an automobile radiator.⁴⁵ Condensers in these systems use direct or indirect air-cooled steam.⁴⁶ This use of condensers results in minimal amount of water use.⁴⁷ Unfortunately, less than one percent of existing thermoelectric power plants use this type of cooling system.⁴⁸

III. Case History/Background

The EPA placed CWA Section 316(b) on EPA’s back burner until around 1995, when various environmental groups brought an action to force the regulation of CWIS by the EPA.⁴⁹ It was at that time that the EPA, through a consent decree, established a timetable for promulgation of regulations under Section 316(b) in three phases.⁵⁰ Each of these phases was designed to reduce the impingement and entrainment of aquatic organisms caused by CWIS.⁵¹

A. Case Law

1) *Riverkeeper, Inc. v. EPA (Riverkeeper I): Challenge to Phase I Regulations*

⁴⁰ Odom, *supra* note 2, at 359.

⁴¹ *Id.*

⁴² *Id.*

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.* at 358.

⁴⁶ Odom, *supra* note 2, at 359.

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ *Whitman*, 2001 U.S. Dist. LEXIS 21030, at *1.

⁵⁰ *Entergy*, 556 U.S. at 213; *see also* *Cronin v. Browner*, 898 F. Supp. 1052, 1064 (S.D.N.Y. 1995) (The court issued the consent decree setting specific deadlines for the EPA to promulgate regulations in phases.).

⁵¹ *Riverkeeper I*, 358 F. 3d at 184.

In 2004, the first in a series of cases regarding the EPA’s promulgation of rules under CWA Section 316(b) occurred, concerning the Phase I Rule to regulate new point sources.⁵² On December 18, 2001, the EPA issued a Phase I Rule to regulate new point sources pursuant to CWA Section 316(b).⁵³ The environmental petitioners argued that the Phase I Rule conflicted with the CWA.⁵⁴ The industry representatives argued that the Phase I Rule was not flexible enough, too vague, contradictory to the statute, and unsupported by the record.⁵⁵

Judge Katzmann relied on an analysis of the two provisions that Section 316(b) cross-references, Sections 301 and 306, to inform his interpretation of the section.⁵⁶ Section 301 requires a two stage technological standard of “the best practicable control technology currently available” (“BPT”), and then later a more stringent “best available technology economically achievable” (“BAT”).⁵⁷ Section 306 requires that the EPA establish standards of performance for new source pollutant discharge based on “the best available demonstrated control technology,” a standard that achieves the greatest degree of effluent reduction.⁵⁸ The Section 316(b) standard that all CWIS should reflect “the best technology available for minimizing adverse environmental impact” differs from the standards set forth in Sections 301 and 306.⁵⁹

The court noted that there is no explicit directive that regulations pursuant to Section 316(b) are subject to the requirements of Sections 301 and 306, but held that the EPA is permitted to look to these sections for guidance and to decide that “not every statutory directive

⁵² *Riverkeeper I*, 358 F.3d at 174.

⁵³ *Id.* at 181; *see* 40 C.F.R. § 125.81(a) (2012). The Phase I Rule applies to new facilities constructed after adoption of the Phase I Rule that use at least twenty five percent of the gallons of water per day that the facility withdraws for cooling . Certain offshore oil and gas facilities are excluded.

⁵⁴ *Riverkeeper I*, 358 F.3d at 183.

⁵⁵ *Id.*

⁵⁶ *Id.* at 185.

⁵⁷ 33 U.S.C. § 1311(b)(1)(A) (for BPT); 33 U.S.C. § 1311(b)(2)(A) (for BAT);

⁵⁸ 33 U.S.C. § 1316(a)(1); *see Riverkeeper I*, 358 F.3d at 185.

⁵⁹ *Riverkeeper I*, 358 F.3d at 185.

contained therein is applicable” to rulemaking under Section 316(b).⁶⁰ Ultimately, Judge Katzmann decided that the EPA was justified in determining how much ambiguity in the statute the EPA will tolerate when measuring compliance.⁶¹ The court denied all the industry petitions.⁶²

2) ***Riverkeeper v. EPA (Riverkeeper II): Challenge of Phase II Regulation***

In 2007, the second CWIS case, in the Second Circuit, was concerned with the Phase II Rule promulgated on July 9, 2004.⁶³ In this case, the Environmentalists challenged the Phase II Rule based on EPA’s decisions of what constituted allowable BTA.⁶⁴ Industry challengers advanced several arguments, including that Section 316(b) did not apply to existing facilities, and that the record did not support EPA’s definition of “adverse environmental impact.”⁶⁵

Judge Sotomayor, writing for the majority, identified the differences between a cost-benefit analysis, like that used in BPT, and a cost-effectiveness consideration, like that used in BAT.⁶⁶ In BPT, one performs a comparison of the costs and benefits associated with various ends and then one selects “the end with the best net benefits.”⁶⁷ In BAT, one determines the “means to be employed to reach a certain level of benefit already established.”⁶⁸ The court then considered how cost-benefit and cost-effective principles would apply to BTA.⁶⁹

In relation to CWA Section 316(b), there was no explicit provision for accounting for the costs associated with reducing adverse environmental impact.⁷⁰ There were two ways in which the EPA was permitted to consider costs: “(1) to determine what technology can be ‘reasonably

⁶⁰ *Id.*

⁶¹ *Id.* at 189.

⁶² *Id.* at 205.

⁶³ *Riverkeeper, Inc. v. EPA*, 475 F.3d 83, 83 (2d. Cir. 2007) (*Riverkeeper II*).

⁶⁴ *Id.* at 96.

⁶⁵ *Id.* at 96-97.

⁶⁶ *Id.* at 98.

⁶⁷ *Id.*

⁶⁸ *Id.*

⁶⁹ *Riverkeeper II*, 475 F.3d at 98.

⁷⁰ *Id.* at 99.

borne' by the industry and (2) to engage in cost-effectiveness analysis in determining BTA."⁷¹ If the EPA chose a cost-effectiveness analysis, the EPA still must have ascertained whether the entire industry can "reasonably bear the cost of the adoption of the technology, bearing in mind the aspirational and technology-forcing character of the CWA."⁷² Next, the EPA is permitted to consider factors, including cost-effectiveness, to choose a technology that might cost less but would still achieve the same results as the benchmark technology.⁷³ The majority concluded that that statute's BTA standard does not allow the EPA to engage in a cost-benefit analysis; however, the EPA is allowed, but not required, to consider the cost-effectiveness of technologies whose performance does not differ from that of the best technology if the industry can reasonably bear the cost.⁷⁴ The issue was remanded to the EPA for an explanation of its decision in establishing BTA or a new determination of BTA.⁷⁵

3) ***Entergy v. Riverkeeper*: Cost Benefit Analysis is Allowed in Phase II Rule**

In 2009, the Supreme Court of the United States granted certiorari in *Riverkeeper II* to review whether the cost-benefit analysis was appropriate for determining the content of regulations the EPA promulgated pursuant to Section 316(b).⁷⁶ In this 5-4 decision, the court concluded that the EPA was permitted to conduct a cost-benefit analysis when promulgating the Phase II Rule.⁷⁷ Following the same reasoning as the Second Circuit, the Court discussed the various standards in the CWA; however, the Court found that it was reasonable for the EPA to treat the BTA test differently than the BADT test because the text was different; therefore,

⁷¹ *Id.*

⁷² *Riverkeeper II*, 475 F.3d at 100.

⁷³ *Id.* at 99-100.

⁷⁴ *Id.* at 101.

⁷⁵ *Id.* at 130.

⁷⁶ *Entergy*, 556 U.S. at 212.

⁷⁷ *Id.* at 226.

*Chevron U.S.A., Inc. v. National Resources Defense Council, Inc.*⁷⁸ permits the EPA to do something different.⁷⁹ The BTA goal of minimizing adverse environmental impact was modest when compared to the other standards' goals, and it lacked the statutory factors as provided for in the other tests.⁸⁰ Moreover, since the goal of the BTA standard was less ambitious, it provided the EPA with the discretion to evaluate the effluent reduction that was necessary under the circumstances, and it allowed for a consideration of costs and benefits.⁸¹ Further, the Court asserted that "best technology" may mean the "technology that *most efficiently* produces some good"⁸² and it may mean technology as to which the industry could reasonably bear the cost that attains the highest reduction in adverse environmental impacts.⁸³

As additional reasoning, the Court noted the lack of express statutory authorization to use a cost-benefit analysis for the BTA test.⁸⁴ The majority recognized that under *Chevron*, the fact that an agency is not required to engage in cost-benefit analysis does not "mean that an agency is not *permitted* to do so."⁸⁵ The Court reasoned that just because there was no express authorization in the text of the statute does not mean a cost-benefit analysis was forbidden; that would mean costs cannot be considered in any regard whatsoever.⁸⁶ Ultimately, the Court held that the EPA reasonably concluded that a cost-benefit analysis was not forbidden by the statute.⁸⁷

⁷⁸ *Chevron U.S.A., Inc. v. Nat'l Res. Def. Council, Inc.*, 467 U.S. 837, 842-43 (1984). In determining whether an agency has correctly interpreted a statute, there is a two-step test under *Chevron*. First, the court determines if Congress has spoken directly to the issue and if the intent of Congress is clear, then that is the end of the Court's review. If Congress's intent is not clear and the statute is ambiguous or silent on the issue, then the court determines if the agency's construction is permissible.

⁷⁹ *Entergy*, 556 U.S. at 222.

⁸⁰ *Id.* at 222.

⁸¹ *Id.* at 219.

⁸² *Id.* at 218 (emphasis in original).

⁸³ *Entergy*, 556 U.S. at 218 (citing 475 F.3d at 99-100).

⁸⁴ *Id.* at 222.

⁸⁵ *Entergy*, 556 U.S. at 223 (emphasis in original).

⁸⁶ *Id.*

⁸⁷ *Id.* at 223-24.

Justice Breyer concurred with the majority's opinion to the extent that it allowed a cost-benefit analysis; however, Justice Breyer thought it necessary to further explain the legislative history to show the CWA was not meant to prohibit cost-benefit analyses.⁸⁸ In his dissent, Justice Stevens concluded that Congress prohibited use of a cost-benefit analysis when setting regulatory standards for this section.⁸⁹ Since the EPA found it difficult to put a price on all aquatic life, the EPA took a narrowing "short cut," consequently skewing the Agency's calculation of the resulting benefits.⁹⁰ This short cut involved only putting a value on species that are commercially or recreationally harvested instead of all aquatic life.⁹¹ These species account for less than two percent of all fish and shellfish that are impacted.⁹² The dissent relied on the principle that if Congress authorized cost-benefit analysis in other parts of a statute, its silence can be decisive.⁹³ According to Stevens, Congress did not authorize the use of cost-benefit analysis in Section 316(b) as was done in other parts of the CWA.⁹⁴

IV. Environmental Protection Agency Proposed Rule for Phase II Existing Facilities

A. Phase II: Regulation of Existing Sources

Pursuant to Phase II of the consent decree, on July 9, 2004, the EPA issued a Final Rule, governing CWIS at large, existing power plants.⁹⁵ To be considered a Phase II facility, the facility must be a point source that "uses or proposes to use cooling water intake structures with a total design intake flow of 50 million gallons per day or more to withdraw cooling water from waters of the United States" and that has, as its primary activity, the generation and transmission

⁸⁸ *Id.* at 230-31 (Breyer, J. concurring).

⁸⁹ *Id.* at 237 (Stevens, J. dissenting).

⁹⁰ *Id.* at 238.

⁹¹ *Entergy*, 556 U.S. at 238 (Stevens, J. dissenting).

⁹² *Id.*

⁹³ *Id.* at 239.

⁹⁴ *Id.* at 240.

⁹⁵ *Riverkeeper II*, 475 F.3d at 92.

of electric power or the generation of electric power sold to another entity for transmission.⁹⁶ NPDES permits would be used to implement the proposed national requirements of the Phase II Rule.⁹⁷ The established standards of the Phase II Rule are an “80 to 95 percent reduction in impingement mortality and a 60 to 90 percent reduction in entrainment.”⁹⁸ To be in compliance with the Phase II Rule, existing power plants must achieve these standards, with some exceptions.⁹⁹

The EPA concluded that it would be too expensive to require all existing facilities to convert to closed-cycle cooling systems.¹⁰⁰ Although a ninety-eight percent reduction in impingement and entrainment mortality could be achieved by requiring closed-cycle systems, the technology would cost approximately \$3.5 billion per year.¹⁰¹ In addition, the construction of additional power plants would likely be necessary to account for the loss in energy resulting from a change to closed-cycle operations.¹⁰² Thus, the EPA offered the following alternatives instead of requiring a closed-cycle system.

With respect to impingement, the EPA allowed a suite of technologies as the BTA for Phase II facilities.¹⁰³ As a result, to establish the BTA, the EPA offered five compliance alternatives set forth in the Phase II Rule: 1) Show that the owner or operator has reduced, or will reduce, flow through the use of a closed-cycle system; 1a) Show that the maximum through-screen design intake velocity has been, or will be, reduced to 0.5 feet per second or less, achieving impingement standards, but not entrainment standards; 2) Show that the “current

⁹⁶ 40 C.F.R. § 125.91 (2012). Of the water withdrawn, the facility must use at least twenty five percent exclusively for cooling purposes. This usage will be measured on an average annual basis.

⁹⁷ *Proposed Rule*, *supra* note 14, at 34,317.

⁹⁸ *Riverkeeper II*, 475 F.3d at 105 (citing 40 C.F.R. § 125.94(b)(1), (2)).

⁹⁹ *Id.*

¹⁰⁰ Latham, *supra* note 23, at 453.

¹⁰¹ *First Proposed Rule*, *supra* note 7 at 41,605.

¹⁰² *First Proposed Rule*, *supra* note 7 at 41,605.

¹⁰³ *Id.* at 41,607. The technologies include closed-cycle cooling, fine- and wide-mesh wedge-wire screens, aquatic filter barrier systems, barrier nets, and fish return systems.

design and construction technologies, operation measures, and/or restoration measures meet the performance standards”; 3) Show that additional technology will be installed and properly operated and maintained, which in combination with existing technology and design, will meet the standards; 4) Show the owner will install an approved design and technology; or 5) Show the facility installed, or will install, a BTA approved for the specific site on a site-specific basis.¹⁰⁴

To reduce impingement mortality, the EPA decided the BTA was modified traveling screens.¹⁰⁵ Based on this technology, the EPA set standards for impingement mortality with which existing facilities must comply.¹⁰⁶ A facility has two ways to demonstrate the reductions in impingement mortality: reduce the impingement of fish and shellfish, or increase the number of impinged fish or shellfish that survive.¹⁰⁷ Under the proposed rule, owners or operators of a facility would have a choice between two options for achieving this performance-based goal: a numeric mortality limit for fish impingement or a velocity limitation.¹⁰⁸ If a facility can show that the costs of complying with one of the other compliance alternatives are significantly greater than those considered by the Administrator when the EPA developed the national performance standards, the permit-issuing authority may issue a permit.¹⁰⁹

B. Impingement Mortality (“IM”) as Described in the Current Proposed Rule

¹⁰⁴ 40 C.F.R. § 125.94(a) (2012); *see also* 40 C.F.R. § 125.99(a) and (b) (This section contains the approved designs and technologies.).

¹⁰⁵ Jonathan L. Black, Laboratory Evaluation of Modified Traveling Screens for Protecting Fish at Cooling Water Intakes (May 2007) (unpublished M.S. thesis, University of Massachusetts, Amherst) (on file with ScholarWorks @UmassAmherst, University of Massachusetts, Amherst). When the CWA was adopted, traveling screens that prevent debris in the water from clogging steam condensers began to be modified to decrease the number of fish killed. The first modifications made resulted in the Ristroph screen which had a screen basket with a lifting bucket to hold collected organisms as they were carried up with the rotation of the screen. Fish are washed into a collection trough and are transported back to a safe release location. Advancements are continuously made; *see Proposed Rule, supra* note 14, at 34,317.

¹⁰⁶ *Proposed Rule, supra* note 14, at 34,317.

¹⁰⁷ *Id.* at 34,318.

¹⁰⁸ *Id.* at 34,317. Fish mortality would be measured directly through sampling by the owner or operator to show the facility complies with the standards, using any appropriate technology to meet the requirement. A facility’s maximum intake velocity is demonstrated to the permitting authority to be less than 0.5 feet per second under certain design conditions.

¹⁰⁹ Connor, *supra* note 22, at 195.

Currently, the proposed impingement mortality limitations are nationally uniform and are expressed as a monthly average and an annual average.¹¹⁰ As proposed, the Phase II Rule allows a facility to use any technology it chooses to meet the limitation.¹¹¹ The EPA believes this approach is more flexible than establishing a design standard and this approach will promote innovation in meeting the limitations.¹¹² There are several advantages associated with a technology-based standard: an increase in regulatory certainty, easier demonstration of compliance, and decrease in cost because pre-approved technologies require less monitoring.¹¹³

C. Other Alternatives Under Consideration by the EPA for Compliance

Initially, the EPA established two ways to comply with the standard for impingement mortality at a Phase II facility: reduce the impingement of fish and shellfish, or increase the number of impinged fish or shellfish that survive.¹¹⁴ Additionally, facilities were allowed to choose any technology to meet this limitation. The EPA received comments from members of Congress, state and local elected officials, and industry stakeholders, suggesting the Phase II Rule needed even more flexibility.¹¹⁵ As a result, the EPA has gathered more data and is considering seven alternatives. These will be discussed individually below.

i. Impingement Mortality Limitations

There are two ways in which the EPA allows a facility to demonstrate its compliance with impingement mortality limitations.¹¹⁶ The impingement mortality performance standards provide both monthly and annual requirements that are measured as a maximum allowable

¹¹⁰ *Proposed Rule*, *supra* note 14, at 34,317-18.

¹¹¹ *Id.*

¹¹² *Id.* at 34,317.

¹¹³ *Id.*

¹¹⁴ *Id.* at 34,318.

¹¹⁵ *Id.*

¹¹⁶ *Proposed Rule*, *supra* note 14, at 34,321.

mortality.¹¹⁷ The proposed limitations were based on modified traveling screens, which the EPA considers the BTA when they are operated properly.¹¹⁸ Although the EPA recognizes that not all existing facilities can retrofit the traveling screens they currently use to modified traveling screens, the EPA expects that most owners or operators would modify their current screens to comply with the impingement mortality limitations.¹¹⁹ The EPA expects more than ninety percent of the facilities could choose to implement the design standards instead of choosing to “comply with the numerical impingement mortality limitations if the EPA adopted the approach.”¹²⁰ The impingement mortality limitations would be met if the facility complies with the specified operational conditions.¹²¹ These conditions are established from the facility owner obtaining two years’ worth of data at their site.¹²² There would be no subsequent monitoring required by the owner to show compliance if the best management practices were employed; the limitations would be considered met.¹²³

ii. Credit for Existing or Newly Installed Technologies

The EPA’s objective in establishing the impingement mortality limitations is to minimize adverse environmental impacts by ensuring that fewer aquatic organisms such as fish and shellfish are killed by CWIS.¹²⁴ These impingement mortality limitations do not account for existing technologies at facilities that might already reduce impingement.¹²⁵ Since the impingement mortality limits are numeric, it is difficult to account for the benefits of the existing

¹¹⁷ *Proposed Rule, supra* note 14, at 34,321-22.

¹¹⁸ *Id.* at 34,321.

¹¹⁹ *Id.* at 34,322.

¹²⁰ *Id.*

¹²¹ *Id.*

¹²² *Id.*

¹²³ *Proposed Rule, supra* note 14, at 34,322.

¹²⁴ *Id.*

¹²⁵ *Id.*

technologies.¹²⁶ The EPA would give credit to facilities not only for technology which is newly installed, but also for preexisting technology when facilities demonstrate they comply with the standards.¹²⁷ Each facility would be required to make monthly and annual calculations of average impingement rate in order to determine the credit that can be applied.¹²⁸ These site-specific calculations require a baseline.¹²⁹ Data would need to be collected over several years to establish this baseline; however the EPA is also considering allowing the use of baselines from site-specific analysis from old data.¹³⁰ The EPA outlined formulas for the baseline calculations.¹³¹

iii. Facilities with Low Impingement Rates

Some facilities naturally have low impingement rates and, as a result, are not in jeopardy of violating the impingement standards.¹³² Low impingement rates usually result from the “intake location for the specific water body from which water is withdrawn for cooling, or the implementation of other technologies.”¹³³ The EPA is cognizant of the fact that it is unlikely that facilities with low impingement rates have an adverse impact on the aquatic organisms and it is not meaningful to evaluate technology performance for them.¹³⁴

One suggested approach for low impingement sites is to “establish an exemption based on an annual limit on biomass impinged.”¹³⁵ Another approach, which would be easier to implement, would be “to establish an annual limit on the absolute number of fish that may be impinged.”¹³⁶ Some comments indicate a concern over such an approach, because although there

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ *Id.* at 34,323.

¹²⁹ *Proposed Rule, supra* note 14, at 34,323.

¹³⁰ *Id.* at 34,323-24.

¹³¹ *Id.* at 34,324.

¹³² *Id.*

¹³³ *Id.*

¹³⁴ *Id.* at 34,325.

¹³⁵ *Proposed Rule, supra* note 14, at 34,325.

¹³⁶ *Id.*

may be a low number of a particular impinged organism, the organisms might be species of concern.¹³⁷ If a site permit writer were to consider the annual standards it would be using a site-specific approach.¹³⁸ A state regulator would be responsible for determining that existing impingement reduction technologies are sufficient by having a “multi-year average impingement rate below that assigned number.”¹³⁹ The EPA is considering who would set that number - the EPA, or the permitting authority, which is the state.¹⁴⁰

iv. Site-specific approach for reducing impingement mortality

Commenters to the Phase II Rule requested that the EPA include site-specific impingement mortality requirements similar to those for entrainment; however, the EPA decided against such site-specific impingement mortality requirements.¹⁴¹ The EPA has identified available, feasible, low-cost technology to decrease impingement mortality that is demonstrated on a national, not site-specific, basis.¹⁴² Thus, uniform national standards are established in the proposed Phase II Rule.¹⁴³ The EPA recognizes several advantages to a uniform national standard including assurance that all facilities will reach an impingement mortality reduction level that the EPA considers a bare minimum.¹⁴⁴ Alternatively, commenters set forth disadvantages. A national standard may be hard to implement because the Phase II Rule covers a wide range of facility types and intake configurations.¹⁴⁵ Further, the available technologies are not guaranteed to achieve the impingement mortality limitations at all particular sites and the cost of these technologies will vary depending on specific site conditions leading to the inability

¹³⁷ *Id.*

¹³⁸ *Id.*

¹³⁹ *Id.*

¹⁴⁰ *EPA Weighs Compliance Flexibilities for Power Plant’s Water Intakes*, ENERGY WASHINGTON WEEK, June 13, 2012.

¹⁴¹ *Proposed Rule*, *supra* note 14, at 34,317.

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ *Id.* at 34,318.

of some sites to adopt them.¹⁴⁶ The EPA is now considering whether to adopt an approach that would allow establishment of impingement controls on a site-specific basis either generally or limited to those circumstances in which the facility demonstrated that the national controls were not feasible.¹⁴⁷

Several interested parties have differing views on whether there should be a national standard or a site-specific approach. Environmental comments suggest that a site-specific approach would delay and confound the permit process and would “turn the permitting authority into little more than a rubber stamp for the companies’ proposals” because of the time it would take to visit each site.¹⁴⁸ Further comments suggest that a site-specific approach should be an alternative to nationwide standards, not a replacement for them, because smaller facilities may not have the resources necessary to do the appropriate required studies to develop an impingement standard for their particular site.¹⁴⁹ States seem to favor a national standard rather than a site-specific approach due to the current strain that already exists on their limited resources since budgets are already being stretched; although some states are not opposed to an approach that would permit site-specific standards only if the owner of a site can sufficiently show the uniform national standard was not achievable.¹⁵⁰

v. Closed-Cycle Recirculating Systems

Contrary to some commenters’ suggestions, the EPA provided several reasons for rejecting the idea of an automatic exemption from the impingement mortality requirements for a

¹⁴⁶ *Id.* at 34,317.

¹⁴⁷ *Proposed Rule, supra* note 14, at 34,317.

¹⁴⁸ *EPA Urged to Bar Site-Specific Cost-benefit Tests for Cooling Water Intakes*, ENERGY WASHINGTON WEEK, July 25, 2012.

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*

site using a “cooling tower as a closed-cycle recirculating system” (“CCRS”).¹⁵¹ The EPA excluded this alternative because there was potential for withdrawing significant volumes of water in relation to large facilities with wet cooling towers.¹⁵² Moreover, based on site visits, a CCRS was unnecessary since most sites with intakes providing cooling water already satisfy the proposed intake velocity requirement.¹⁵³ Further, EPA determined that even in a CCRS, a large amount of water was still withdrawn and was not recycled back to the cooling system. Thus, the CCRS alternative offered no reduction in impingement.¹⁵⁴

EPA is currently considering an alternative provision that would allow the owner or operator to demonstrate compliance with the impingement mortality limitation either through defined technologies or through studies that demonstrate the impingement mortality reduction performance of optimized travelling screens at a facility.¹⁵⁵ Such an alternative might include a provision that allows a facility to comply with the impingement mortality limitations if water withdrawals are minimized by a facility’s employment of CCRS; however, there is debate over the definition of CCRS to be used.¹⁵⁶ Currently, the definition of a CCRS is the same as the one used in the Phase I Rule.¹⁵⁷ The EPA is considering a revision of the definition to grant existing facilities with operating CCRS more flexibility in showing compliance.¹⁵⁸ Industry commenters with existing facilities that are currently in compliance are concerned that the new definition of a CCRS may jeopardize their compliance with the standard.¹⁵⁹ The new definition, according to

¹⁵¹ As defined for the New Facilities in Phase I Rules, CCRS “means a system designed, using minimized makeup and blow-down flows, to withdraw water from a natural or other water source to support contact and/or noncontact cooling uses within a facility. 40 C.F.R. § 125.83; see *Proposed Rule*, *supra* note 14, at 34,319.

¹⁵² See *supra* note 14, at 34,319. Wet cooling is described *supra* Part II.B.

¹⁵³ *Id.*

¹⁵⁴ *Id.*

¹⁵⁵ *Id.* at 34,319.

¹⁵⁶ *Id.*

¹⁵⁷ 40 C.F.R. § 125.83.

¹⁵⁸ *Proposed Rule*, *supra* note 14, at 34,319.

¹⁵⁹ *Id.*

some industry commenters, is more stringent since it places additional restrictions on what operations are necessary to be considered closed cycle.¹⁶⁰

vi. Measurement of Intake Velocity

The EPA proposed an intake velocity limitation corresponding to a facility's design intake flow ("DIF") as a design standard for showing compliance with impingement mortality standards.¹⁶¹ EPA's studies show that an intake velocity of 0.5 feet per second or lower provides similar or greater reductions in impingement than the BTA of modified travelling screens; thus, an intake velocity limitation was offered as an alternative way for a facility to comply.¹⁶²

Measurement of the velocity would take place where the intake first contacts the source water.¹⁶³

Actual intake velocity may also be used to demonstrate compliance with this requirement.¹⁶⁴

Maximum velocity has to be achieved under all conditions.¹⁶⁵ The EPA expects a facility to record the average monthly velocity to demonstrate compliance with the actual intake velocity criteria.¹⁶⁶ This recorded velocity might be used if it is technically difficult to measure through-

screen velocities due to site conditions and the particulars of screens or other technology used.¹⁶⁷

It is important to the EPA that the velocity is measured through the screen or intake structure and not at some other point near the intake because of the effect the shape of the screen or intake structure can have on the velocity.¹⁶⁸

Industry comments presented several concerns with an intake velocity standard. Some commenters suggested that the alternative may be "technologically infeasible and/or

¹⁶⁰ *Id.*

¹⁶¹ *Id.* at 34,320.

¹⁶² *Id.*

¹⁶³ *Proposed Rule, supra* note 14, at 34,320.

¹⁶⁴ *Id.*

¹⁶⁵ *Id.*

¹⁶⁶ *Proposed Rule, supra* note 14, at 34,319. Actual intake velocity would mean "the actual flow (i.e., volume) across the screen surface area would be used to calculate the maximum expected velocity through that screen."

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

economically impracticable” because the requirement to meet the velocity “under all conditions” might be overly conservative.¹⁶⁹ Further, the industry, concerned with the integrity of the systems in use at plants, points out that certain maintenance procedures are essential to ensure that the cooling water flow remains uninterrupted so the system is not compromised and therefore, the velocity might be measured inaccurately when maintenance occurs.¹⁷⁰ The industry also suggests using flexibility in how velocity is calculated, such as allowing measurements of water depth, pressure differential, or plant intake flow.¹⁷¹

vii. Species of concern

The EPA understands that the source water characteristics for each facility are potentially highly variable; therefore the EPA decided that the impingement mortality limitations should be applied to site-specific species of concern.¹⁷² Applying limitations to site-specific species of concern allows the EPA to prioritize certain fish and shellfish.¹⁷³ The Director of the EPA would be responsible for identifying species of concern and prioritizing them at a specific site.¹⁷⁴ Species would be considered of concern if they were: “[i]mportant migratory or commercial species; threatened or endangered; or of insufficient abundance in the source water to support the growth and abundance of those species that prey upon them.”¹⁷⁵ Commenters argue the EPA’s proposed flexibility, which allows an owner or operator to focus the technology-based requirements on the species at the facility that are deemed important, may not work because many states have already identified species of concern, which might conflict with the Director’s

¹⁶⁹ *Id.*

¹⁷⁰ *Id.*

¹⁷¹ *Id.*

¹⁷² *Proposed Rule, supra* note 14, at 34,325; *see Species of Concern Law and Legal Definition*, USLEGAL, INC., <http://definitions.uslegal.com/s/species-of-concern/> (Species of concern, an informal term, refers to “species that need proactive protection, but for which insufficient information is available to indicate a need to list the species as endangered.” This term is not defined in the Endangered Species Act.)

¹⁷³ *Proposed Rule, supra* note 14, at 34,325.

¹⁷⁴ *Id.*

¹⁷⁵ *Id.*

determination.¹⁷⁶ Additionally, the EPA would allow the Director to distinguish representative indicator species (“RIS”) from species of concern.¹⁷⁷ RIS would have to be monitored at the site, but the impingement mortality limitation would not apply to them unless they become a species of concern.¹⁷⁸ In such an instance, not all RIS would be considered species of concern.¹⁷⁹

D. Cost-Benefit Analysis

The Court in *Entergy* permitted the EPA to conduct a cost-benefit analysis when determining an appropriate Phase II Rule.¹⁸⁰ Using cost-benefit analysis is not an easy task. It is very difficult to calculate unregulated externalities such as “noncommercial environmental benefits, intangible values, and potential impacts of inaction.”¹⁸¹ To improve cost analysis, the EPA conducted a survey measuring a ratepayer’s willingness to pay higher utility costs so that additional protection measures for aquatic organisms could be implemented in cooling water intake structures.¹⁸² The survey asks people if they are willing to spend more “to improve ecological habitats generally by spending more money on structures designed to keep fish out of cooling water intakes.”¹⁸³ It is currently unclear whether the improved ecological habitats that respondents are willing to pay for will result from facilities’ implementation of those structures designed to keep fish out of cooling water intakes.¹⁸⁴ Tom Kuhn, President of the Edison Electric Institute (EEI), which represents energy companies and trade associations, believes the survey is misleading.¹⁸⁵ He says, “[The survey] infers . . . that improvements in fish populations and

¹⁷⁶ *Id.*

¹⁷⁷ *Id.*

¹⁷⁸ *Id.*

¹⁷⁹ *Proposed Rule*, *supra* note 14, at 34,325.

¹⁸⁰ 556 U.S. at 226.

¹⁸¹ Odom, *supra* note 2, at 363.

¹⁸² *Industry Fear Costs Study May Counteract Flexibilities in Cooling Water Rule*, WATER POLICY REPORT, June 18, 2012.

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ *Id.*

aquatic ecosystems can result from regulating cooling water intake structures.”¹⁸⁶ Moreover, the industry said this study was “deeply flawed” and will counteract the flexibility the EPA is proposing in the Phase II Rule.¹⁸⁷

Additionally, the EPA compared “the initial capital cost of retrofitting existing once-through cooling systems to closed-cycle systems with the cost of mandating less effective modifications of once-through systems.”¹⁸⁸ The EPA concluded that allowing a suite of technologies, instead of requiring conversion to closed-cycle cooling, would cost nine times less.¹⁸⁹ Unfortunately, the EPA only considered the capital costs of retrofitting current systems, not new technology that is installed.¹⁹⁰ Further, the EPA failed to consider costs beyond the plant’s initial investment, such as the potential monetary savings of “reducing the energy sector’s dependence on water[.]”¹⁹¹ The energy and water sectors are mutually dependent: the energy sector needs a stable supply of water, and the water sector needs a stable supply of energy.¹⁹² Without a sufficient water supply, a power plant cannot be cooled and, thus, would shut down which has both social and economic costs for the growing population.¹⁹³

V. Analysis

This part will begin with a discussion of which of the seven alternative approaches for compliance should or should not be adopted. Following this discussion, there will be an analysis of the difficulties and shortcomings of conducting a cost-benefit analysis in a CWIS context. Finally, there will be a general discussion of industry foot-dragging and regulatory delay in the regulation of CWIS.

¹⁸⁶ *Id.*

¹⁸⁷ *Id.*

¹⁸⁸ Odom, *supra* note 2, at 366.

¹⁸⁹ *Id.* at 366-67.

¹⁹⁰ *Id.* at 364.

¹⁹¹ *Id.* at 367.

¹⁹² *Id.* at 374-75.

¹⁹³ *Id.* at 376.

A. Other Alternatives Under Consideration by the EPA

Not all of the seven alternatives proposed by commenters and under consideration by the EPA are both reasonable and practical to adopt into the final Phase II Rule. The proposed Phase II Rule already provides the industry with numerous options to comply with the standard. In the interest of finding a balance between environmentalist and industry concerns, the EPA is willing to be more flexible in its final Phase II Rule. The EPA should adopt impingement mortality limitations, low impingement mortality facilities, and credits for existing or new technology installation. The EPA should not adopt the site-specific, closed-cycle recirculating systems, measurement of intake velocity, or species of concern approaches.

i. Alternatives that Should be Adopted

The first alternative the EPA should consider adopting is the impingement mortality limitations alternative because it allows a streamlined process which will improve compliance monitoring by the EPA. This alternative does in fact require site-specific determinations, which could increase administrative burdens and tend to become economically infeasible¹⁹⁴; however the site-specific determinations are made by the facility owner to establish a baseline for their particular sites compliance while having a modified traveling screen. At that point, once the BTA is known to be functioning properly, the monitoring is actually reduced, as is impingement. This is a significant benefit to the process of monitoring and assessing compliance efficiently. Most facilities will be able to retrofit their facilities to contain the BTA and comply with the standard. This standard is more widely accepted, less controversial, and less difficult to implement.¹⁹⁵

The second alternative that the EPA should adopt is a credit for existing or newly installed technologies. Such credits would satisfy the industry because if the facility already has

¹⁹⁴ See *infra* Part V.A.ii. (Site-specific alternative issues).

¹⁹⁵ See *supra* Part IV.C.iv.

technology that is helping to reduce impingement to meet the standard, the credit the facility obtains would likely mean a reduction in cost to satisfy the standard. Further, even if some cost is incurred for installing new technology to comply, a credit can be obtained to offset other operational costs. Additionally, the environmentalists are satisfied because the standard is met and there is less impingement of aquatic organisms ultimately affecting the entire ecosystem.

Moreover, when considering the baseline calculation necessary for the credit alternative, the EPA is flexible; although the calculation formulas to determine baseline must be included in the Phase II Rule because the formulas can be complicated. The owners of the facilities must understand how the formulas work and what measurements are required to determine the impingement limitation. Further, if the technology existing at the facility is relatively old, there may be insufficient data to complete the calculation; however, this insufficient data is partially addressed by the EPA's flexibility in possibly allowing old baseline calculations from site-specific analysis by the owners to be sufficient. Overall, this alternative is beneficial.

The final alternative that the EPA should adopt is the exemption of facilities with low impingement rates. So long as there are no changes in the water characteristics or in the facility which would signal a potential violation of the standards, it is a waste of resources and money to require such sites to conduct studies and monitor the sites. Additionally, this alternative is appropriate because it is unreasonable to ask a facility with low impingement rates to install a new, expensive technology to comply with the Phase II Rule. The only downside to this alternative is the administrative burdens placed on states, including site visits to determine if the impingement rate is low.¹⁹⁶ Regardless, this alternative is helpful for those in the industry who already have very low impingement rates without causing impingement to increase.

¹⁹⁶ *EPA Urged to Bar Site-Specific Cost-Benefit tests for Cooling Water Intakes*, ENERGY WASHINGTON WEEK, July 25, 2012.

ii. Alternatives that Should Not be Adopted

The first alternative that the EPA should not adopt is a site-specific approach. There are both advantages and disadvantages to a site-specific approach; however, when balancing the costs and benefits, it is more appropriate to exclude such an alternative. A site-specific approach, as commenters suggest, requires man-power to go to each individual site and determine if the facility complies with the standard and funds, neither of which are readily available in the current state of the economy. The compliance process would be further complicated because it takes time and money to coordinate the man-power to go to each site. Further, it takes a significant amount of time to actually assess compliance at each individual site, leading to regulatory delays. Overall, it is less practical than having a single national standard.

Some people do find it reasonable to consider the site-specific approach instead of a uniform national standard in view of the wide variety of sites that exist.¹⁹⁷ No two sites will be the same, even if they use the same type of CWIS, because of the site's particular surroundings. For example, it is possible that a certain body of water contains more organisms that can potentially be impinged compared to another site on a body of water that contains fewer. This skews the number of organisms impinged and affects whether the facility complies with the Phase II Rule. Overall, when balancing the advantages and disadvantages, based on the delay and costs in having to evaluate each site, this option is unreasonable and impracticable.

The second alternative that should be excluded is CCRS. Currently, the EPA uses the Phase I Rule definition of CCRS and that definition is not appropriate for the Phase II Rule because of the differences in facilities that are covered. The EPA would have to spend time determining a new definition for CCRS. Such a process would necessarily mean solicitation of comments from the industry, environmentalists, scientists, and others, causing a further delay in

¹⁹⁷ *Proposed Rule, supra* note 14, at 34,317.

promulgating the Phase II Rule. Moreover, in order to assure a CCRS is operating at its maximum potential in reducing flow, the EPA must tailor the definition of CCRS which will require extensive research. Although some existing facilities might comply with this new definition already, other facilities might have to make costly adjustments to their systems. The regulatory delay, costs, and other alternatives already available outweigh the potential benefit of adding this alternative.

The third alternative that should not be adopted is a measurement of intake velocity because the industry's concerns about technological and economic feasibility and maintaining the integrity of CWIS outweigh the potential benefit of the alternative. Considering the financial investment made at each site for CWIS, it is important to maintain the integrity of CWIS. The EPA should not adopt an alternative without researching what maintenance is required for each system and how it will affect flow and ultimately the integrity of CWIS. The EPA also needs to collect additional information and data to truly understand the difficulties inherent in attempting to take a velocity measure at some sites due to the structures used. To collect such data, additional man-power must be employed. The time to collect this data will lead to regulatory delays. Moreover, it is likely that the requirement that the velocity meet the standard "under all conditions" is overly conservative and stringent. However, it is possible for the EPA to adjust the alternative and provide for exceptions to the requirement that the velocity be met "under all conditions" to account for certain essential maintenance procedures and provide some flexibility in the alternative. For additional flexibility, the EPA allows alternative direct measurements, for example, of water depth; however, this will only aid in further complicating the collection of data from each site. The EPA has to research if these direct measurements are actually sufficient,

which will only exacerbate the delay in promulgating a final rule. Such an alternative might be appropriate once the research is completed but is unnecessary at this stage of the rulemaking.

The final alternative that should be excluded is the species of concern alternative. Currently, there is no official definition of a species of concern.¹⁹⁸ For this alternative, the Director of EPA must carefully construct a definition of a species of concern for each particular site. The EPA must develop a definition at each site that is clear and covers all potential species that are important for commercial fisheries, that are endangered or threatened, or that are an intricate part of that particular ecosystem structure. This process will take time and man-power to generate the necessary data and research. Thus, there will be further regulatory delay and costs associated with having the Director establish such species of concern at each individual CWIS site. Moreover, most states have already determined species of concern, so duplicating this process is unnecessary; however, it would take time to compare such a state list with what would become the Director's list. In addition, by allowing individual sites to establish RIS which would need to be monitored by the site, but are exempt from the limitation, there could be confusion among species. Further, the RIS could eventually become species of concern and the monitoring would have to be reported for further determination by the Director, again a time-consuming process. This alternative further delays promulgation of the Phase II Rule and is unnecessary given the sufficiency of the existing alternatives.

B. Difficulties in Cost-Benefit Analysis

Although the Court in *Entergy* permitted EPA to employ a cost-benefit analysis in relation to promulgating a Phase II Rule, there are many difficulties associated with performing a cost-benefit analysis in an environmental situation.¹⁹⁹ In the context of CWIS, it is not an easy

¹⁹⁸ See *supra* Part IV.C.vii.

¹⁹⁹ 556 U.S. at 226.

task to assign a value to something like a fish in a river or to understand the benefit that fish may have to a particular person or ecosystem. Such costs and benefits have no true market value. The benefit, for example, might depend on whether a person fishes in that river recreationally or commercially, or if a person just enjoys knowing the fish exist in the river. That same fish not only has an economic cost, but also other costs, such as an interruption in the function of the entire river ecosystem, which is difficult to value. In contrast to the environmental costs and benefits, it is easier to assign a cost to installing a new technology at a facility. In performing a cost-benefit analysis when promulgating this final rule, the EPA has to value various costs and benefits for the industry and environmentalists. Thus far, the EPA has failed to adequately consider the benefits in relation to all potential costs and to monetize the appropriate costs. Thus, a sufficient cost-benefit analysis has not occurred.

A consumer survey²⁰⁰ assessing willingness to pay will not accurately represent what the cost will actually be. It merely facilitates in determining what the public is willing to pay for in relation to protecting aquatic organisms and ecosystems. The EPA also must consider the costs to the industry in relation to the technology that the facilities will have to install. Additionally, the EPA must consider the cost of the fish that are being impinged and the fish in the river as a whole. The EPA failed to consider the benefit of 98.2 percent of aquatic species that are commercially or recreationally valuable.²⁰¹ It is difficult to allocate a value to these fish, but the value must be considered. Currently, environmentalists argue that a strict market-based analysis, similar to that used in a cost-benefit analysis, will undervalue fish that do not have a commercial value.²⁰² Moreover, there are many benefits of a healthy environment that cannot be monetized. The EPA, when considering environmental concerns, must consider models “linking river

²⁰⁰ See *supra* Part IV.D.

²⁰¹ Odom, *supra* note 2, at 363-64.

²⁰² *Id.*

management decisions, economic consequences, and ecosystem vitality[;]” however these models are rare and difficult to validate.²⁰³ The benefit of having even just a single additional fish in the river that was not impinged is not easily monetized. For just that one fish there must be a consideration of the impact on the river ecosystem, the health of other organisms in that ecosystem, and the economic and social human impact. In this situation, it seems unlikely that an accurate and complete cost-benefit analysis will be completed in a reasonable time. The EPA should balance the cost of implementing new technology with the benefit of impinging less fish. Unfortunately, there will not be a strict formula to achieve this balance.

Additionally, it is important for the EPA to consider costs that do not relate directly to installing new technologies or the investment costs associated with a power plant. Such costs include the use of water in the energy sector and the use of energy in the water sector. These sectors are highly dependent on one another. Without water, a power plant would ultimately need to be shut down, and that process is very expensive both financially and socially.²⁰⁴ There is also a benefit to consider if the energy sector can use less water and produce the required energy for the water sector and society in general. Using less water will prevent a strain on the ecosystem and lessen the possibility of a water shortage from increased population.²⁰⁵ The EPA needs to improve its cost-benefit analysis to promulgate the final Phase II Rule.

C. Overarching Issues of Industry Foot-Dragging and Regulatory Delay

Decades have passed since the CWA was amended to include Section 316(b) and the EPA was first obligated to issue regulations pursuant to Section 316(b). Almost 20 years have passed since the 1995 case creating a timetable for promulgation of such rules in three phases, and yet there is still no Phase II Rule. Additionally, promulgation of the Phase II Rule was

²⁰³ *Id.* at 363.

²⁰⁴ *See supra* Part V.D.

²⁰⁵ Odom, *supra* note 2, at 375-77.

already recently extended eleven months.²⁰⁶ There must be some limit on how many times delay can occur before it would be appropriate for the courts to step in again.

Although it is important to consider the implications of issuing a rule, it is equally important to promulgate a rule in order to prevent further degradation of the integrity of the environment, specifically thermal pollution of water and destruction of organisms in an ecosystem.²⁰⁷ A cycle of deadlines followed by extensions for consideration of further costs and new technologies is evident without promulgation of a Phase II Rule as soon as possible. This cycle has happened far too many times before concerning regulation of CWIS. It is more appropriate for the EPA to promulgate a rule and issue guidance documents as new technologies come along to keep pace with the changes in the industry instead of postponing promulgation of the Phase II Rule as a whole. If necessary, the EPA could always amend the Phase II Rule to include such new innovations.

Industry and environmental groups both welcomed the eleven-month delay in this situation. Steve Fleischli, a senior attorney with the Natural Resources Defense Council, has said, they “see the proposal as incredibly weak.”²⁰⁸ Melissa McHenry, a spokeswoman for American Electric Power Company, has said, the EPA should ““make sure the standards are appropriate and do not impose unnecessary costs.”²⁰⁹ Although it is necessary for the EPA to review comments that were submitted, this process needs to end at some point. As the comment process continues, the EPA is becoming more and more sensitive to the industry and less

²⁰⁶ See Jonathan Crawford, *EPA extends finalization of cooling water intake rule by nearly 1 year*, SNL FERC POWER REPORT, Aug. 1, 2012.

²⁰⁷ 33 U.S.C. § 1251(a).

²⁰⁸ Jonathan Crawford, *Industry encouraged by EPA notice on cooling water intake rule*, SNL ELECTRIC UTILITY REPORT, June 11, 2012.

²⁰⁹ *Id.*

concerned with the environmental impacts that result from the alternatives.²¹⁰ The EPA should be balancing the interests of both, not favoring one over the other. A final rule must be made by the next deadline. More extensions are simply unacceptable.

VI. Conclusion

The EPA needs to take the eleven-month extension they were provided and use it wisely. It is important that the EPA receive comments on the proposed alternatives for the Phase II Rule and sufficiently consider and balance the costs and benefits of its approach. However, it is equally essential that EPA work expeditiously and efficiently to prevent the need for another extension. The EPA needs to promulgate this Phase II Rule so that it can be enforced and the industries do not get to continue its non-compliance. Ultimately, this affects not only ecosystems as a whole, but fishermen, recreational users, and communities. There is also an appropriate interest in the power plant industry obtaining a fair Phase II Rule. A balance is necessary to ensure an efficient amount of enforcement resources are expended by the government. This balance should also ensure fewer facilities are impinging aquatic organisms solely because they cannot afford to comply. Several compliance alternatives should be adopted into the Phase II Rule to increase its flexibility and yet still reduce impingement. Even if a rule is completed, there is still a chance that it will once again be challenged in court, so time is of the essence.²¹¹

²¹⁰ See generally Jonathan Crawford, *Industry encouraged by EPA notice on cooling water intake rule*, SNL ELECTRIC UTILITY REPORT, June 11, 2012.

²¹¹ *EPA Weighs Compliance Flexibilities for Power Plant's Water Intakes*, ENERGY WASHINGTON WEEK, June 13, 2012. "Activists recently told White House officials that a cost-benefit analysis weighing the value of an aquatic ecosystem would likely be the subject of litigation if EPA includes it in the final rule."