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SOUTHERN COMPANY
Energy to Serve Your World®

August 18, 2011

SUBMITTED BY E-MAIL TO *OW-Docket@epa.gov*
Attention: Docket ID No. EPA-HQ-OW-2008-0667

Water Docket
U.S. Environmental Protection Agency
Mail Code: 4203M
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Proposed Regulations for National Pollutant Discharge Elimination System – Cooling Water Intake Structures at Existing Facilities and Phase I Facilities, Docket ID No. EPA-HQ-OW-2008-0667

Enclosed are the comments of Southern Company on proposed regulations of the Environmental Protection Agency ("EPA") governing cooling water intake structures under the Clean Water Act ("CWA"). See 76 Fed. Reg. 22,174 (April 20, 2011). Southern Company provides these comments on behalf of itself and its six subsidiaries potentially affected by the proposal: Alabama Power Company, Georgia Power Company, Gulf Power Company, Mississippi Power Company, Southern Nuclear Company, and Southern Power Company.

Southern Company and its subsidiaries are members of the Utility Water Act Group ("UWAG"), an ad hoc group of electric utilities with an interest in CWA issues. Southern Company supports the views and positions provided by UWAG in its comments filed in this proceeding.

Thank you for the opportunity to share our views. If you have any questions or need additional information, please don't hesitate to contact my associate Donna Hill at 205-257-5234 or dbhill@southernco.com.

Sincerely,

Chris M. Hobson

Chris M. Hobson
Enclosure

Comments of Southern Company

on the

Proposed Regulations for National Pollutant Discharge Elimination System – Cooling Water Intake Structures at Existing Facilities and Phase I Facilities

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I. Introduction

On April 20, the U.S. Environmental Protection Agency (EPA) published a proposed rule to establish requirements under § 316(b) of the Clean Water Act (CWA) for all existing power generating facilities that withdraw more than 2 million gallons per day (MGD) of water from waters of the U.S. and use at least 25 percent of the water they withdraw exclusively for cooling purposes. The proposal also would change the Phase I rule for new facilities by removing provisions allowing restoration and making several other technical corrections.

The Southern Company is the leading energy supplier in the Southeastern United States, serving 4.4 million customers with reliable electricity service generated from a diverse portfolio of energy resources – nuclear, coal, natural gas, and renewables. Southern Company subsidiaries include four vertically integrated electric utilities – Alabama Power, Georgia Power, Gulf Power, and Mississippi Power – as well as Southern Power, which owns generation assets and sells electricity in the wholesale market. Another major subsidiary is Southern Nuclear, the licensed operator of Southern Company's three nuclear generating plants in Alabama and Georgia. We participate in all phases of the electric utility business with more than 42,000 megawatts of electric generating capacity and transmission and distribution lines that would more than circle the earth. Southern Company and its subsidiaries have been serving the Southeast for more than 100 years.

Southern Company submits the following comments on the proposed § 316(b) rule. Southern Company is a member of the Utility Water Act Group (UWAG) and fully supports the comments submitted by UWAG.

II. Executive Summary

EPA's proposed 316(b) rule for existing facilities has been long in the making. The original Phase II rule was proposed in 2002 and finalized in 2004. After litigation that went all the way to the Supreme Court, EPA has proposed a new rule, and has agreed to take final action on the rule by July 27, 2012. Despite the long history and the pending deadline, EPA needs to reconsider some major aspects of its proposed rule.

A major problem with the proposal is that it requires closed-cycle facilities (*i.e.*, those with recirculating cooling towers or cooling ponds) to further reduce impingement and entrainment impacts. Facilities with closed-cycle cooling are already very protective, and have reduced impingement and entrainment by greatly reducing flow. Therefore, the final rule should acknowledge that fact, and only require facilities or units with existing closed-cycle cooling to comply with basic application requirements. If a permit writer determines, based on credible information, that some further requirements are necessary to prevent significant adverse environmental impact to important aquatic populations, communities, or ecosystems, then additional requirements at a closed-cycle facility may be necessary. However, for the great majority of closed-cycle facilities, since they have reduced their use of cooling water by more than 95%, nothing more should be required.

Also, EPA has broken with traditional practice and proposes that permit writers consider impingement controls on a more rapid compliance schedule than that provided for entrainment controls. This is a major flaw because all of the intake's environmental issues – including impingement and entrainment – should be assessed holistically. Some types of entrainment

controls (such as cooling towers) also reduce impingement. Unless there is a joint consideration of impingement and entrainment controls, a facility may be required to install costly impingement controls only to find, a few months or a year later, that the entire cooling system must be upgraded with new entrainment controls. The piecemeal approach that EPA proposes would cause more disruption of facility operations and possibly lead to stranded costs (*i.e.*, those invested in impingement controls that may be unnecessary in light of the later entrainment controls). Thus, this two-part determination process will increase uncertainty and lead to wasted efforts.

Equally important, EPA's numeric impingement mortality standards are not representative and are not feasible. EPA proposes that facilities limit impingement mortality to 31% (monthly average) and 12% (annual average). EPA developed these standards using a very limited dataset (just 8 data points from three facilities). All three facilities are located in the same state (New York). It is self-evident that the chosen data are not representative of nation-wide impingement mortality, particularly the Southeast. Furthermore, Southern Company believes the vast majority of its facilities will be unable to comply with the numeric standards. For example, plants such as McIntosh, Mitchell, Crist and Vogtle impinge very few fish per month. Because EPA's standard is proposed as a percentage of impinged fish, they would be in danger of violating EPA's proposed monthly standard on a regular basis. Therefore, if Plant McIntosh impinges three fish in December and one fish dies, it would be in violation of the proposed impingement mortality standard. Southern urges EPA to refrain from imposing any numeric impingement standards.

Instead of rigid and impractical numeric impingement standards, for facilities with an intake flow greater than 125 MGD, EPA should adopt pre-approved technologies (including

modified Ristroph screens, wedgewire screens, and Geiger or Beaudrey or Hydrolox screens). Under this approach, no impingement monitoring would be required. The permittee would ensure the proper installation, operation, and maintenance of the pre-approved technologies, as mandated through permit conditions. Additionally, as an alternative to installing pre-approved technologies, a facility would be deemed in compliance with the rule if it demonstrated an intake approach velocity of 1.0 foot per second (fps) or less. There is no scientific basis for the proposed 0.5 fps through-screen velocity standard, and changing the standard to 1.0 fps would better reflect the scientific data on fish swim speeds. Entrainment controls would still be determined based on a site-specific approach. In each permit proceeding, impingement and entrainment controls would be considered – and decided upon – at the same time.

For facilities with flows equal to or less than 125 MGD, Southern recommends that they not be subject to entrainment controls because they present a very low risk of adverse environmental impact through entrainment. As to impingement controls, these facilities should choose from the pre-approved technologies listed above, or demonstrate an approach velocity of 1.0 fps or less.

For all facilities, EPA should remove additional impingement control requirements, such as the barrier net requirement for ocean and tidal water intakes, and the requirement to provide an escape route for all impinged organisms (*i.e.*, the "no entrapment" provision). Deploying barrier nets at all ocean or tidal water intakes is not feasible, due to site-specific issues such as interference with navigation, lack of space, or problems maintaining the net due to high currents, high debris loading or weather-related incidents. It is also infeasible, as explained in these comments, to return all impinged fish and shellfish to the source waterbody. If a regulator believes that actions beyond installation, operation, and maintenance of the pre-approved

technologies or compliance with the velocity standard need to be taken, it should be decided on a case-by-case basis, and technologies that work at the particular location should be considered.

EPA should also provide a mechanism through which any facility can seek alternative requirements if site-specific circumstances make EPA's specified technologies environmentally unnecessary, technically unavailable, or more economically burdensome than the Agency anticipates.

Finally, Southern Company urges EPA to adopt a *de minimis* exemption for facilities with very low impingement and entrainment. If a facility demonstrates low impingement under typical operating and environmental conditions, it makes no sense to require costly technological changes. For example, based on a 12-month study at one of our facilities, we estimate that the facility impinged an average of 86 organisms per month, cumulatively weighing less than three pounds, over the course of a year. In this case, the amount of environmental benefit to be derived from new controls does not justify the time and expense of the effort. For this reason, the rule should not be finalized without the inclusion of a *de minimis* exemption.

III. Assessments of EPA's Regulatory Options

Through our evaluation of EPA's preferred option (Option 1), which requires impingement mortality controls and allows for site-specific entrainment controls, we have determined that many of our plants cannot use either method of impingement compliance, as described below.

EPA proposes that facilities with a maximum intake velocity of 0.5 feet per second (fps) under all conditions would satisfy the rule's impingement mortality standards. Our preliminary analysis of the intake velocity compliance method demonstrates that expanding many of our existing intakes to meet the standard would be infeasible for 13 facilities and would be extremely expensive for others. For many facilities, we do not own enough river/lake shoreline or have

enough space behind the screens for water collection to expand the intake structures. Alternatively, EPA proposes that facilities demonstrate impingement mortality of no more than 12 percent (annual average) and 31 percent (monthly average). We have very serious concerns about whether any facility could comply with these numeric standards over the long term. It is not Southern Company's policy to install a technology that cannot reliably meet regulatory standards. Therefore, for some of our facilities, there is no cost-effective, reliable alternative for complying with the proposed impingement control standards. This fact will force many of our facilities to either (1) build new intake structures at different locations or (2) retrofit closed-cycle cooling to meet the intake velocity standard. The costs of these large capital projects cannot be justified by the benefits. However, with the amendments and clarifications suggested below, it is possible that Option 1 could be reformulated into an acceptable framework for the rule.

EPA developed four primary options. Each option is described briefly in the Preamble. Of the four options, Southern Company endorses Option 4, which provides that the rule would apply only to facilities with a total design intake flow (DIF) of greater than 50 MGD. A threshold increase to 50 MGD is appropriate because much of the data EPA relied on as support for this proposed rule came from the previous Phase II rulemaking, which was focused on a 50 MGD threshold. *See, e.g.*, Phase II Technical Development Document[1] 5-23 (water use efficiency), 8-9 (construction downtime), 8-40 (compliance costs for assessment of national economic impacts), and 12-9 (air emissions associated with closed-cycle).

Options 2 and 3 are unacceptable, as they mandate closed-cycle cooling for facilities with a design intake flow (DIF) over 125 MGD (Option 2) or everywhere (DIF > 2 MGD) (Option 3).

[1] Technical Development Document for the Final Section 316(b) Phase II Existing Facilities Rule, EPA 821-R-04-007 (EPA Docket OW-2008-0049, DCN 6-0004) (2004).

Uniform application of closed-cycle cooling is infeasible as a national standard for existing facilities. As EPA states:

> EPA proposes to reject closed-cycle cooling as the basis for national entrainment controls and choose an option under which the permitting authority would establish entrainment controls on a site-specific basis….EPA concluded that closed-cycle is not the best technology available for minimizing adverse environmental impact on a national basis. The record shows that closed-cycle cooling is not practically feasible in a number of circumstances….EPA knows that the circumstances are not isolated or insignificant.

76 Fed. Reg. at 22,207 col. 1. Southern Company agrees with EPA's decision that retrofitting closed-cycle cooling is not feasible at many existing facilities and therefore finds Options 2 and 3 unacceptable.

IV. The Rule Should Exempt Facilities with Closed-Cycle Recirculating Systems

EPA should provide a clear exemption for facilities with closed-cycle recirculating systems (CCRS). CCRS reduces the use of cooling water by more than 95% (66 Fed. Reg. 65,273 (Dec. 18, 2001)), thereby reducing impingement and entrainment mortality. The following table compares the estimated water withdrawals for cooling (in gallons/MWhr) for various types of steam electric plants with CCRS versus once-through cooling systems. CCRS systems for any of the steam-based plants – whether coal, gas, oil or nuclear – withdraw just a fraction of the water required for once-through cooling.[2]

[2] EPRI. *Comparison of Alternate Cooling Technologies for U.S. Power Plants: Economic, Environmental and Other Tradeoffs*. Palo Alto, CA: EPRI; 2004; 1005358.

Table 1. Estimated Plant Cooling Water Withdrawals[3]

Plant Type/Fuel	Once-Through Cooling System (gallons/MWhr)	Closed-Cycle Recirculating Cooling System (gallons/MWhr)
Steam/Coal	25,000 to 45,000	550 to 800
Steam/Gas	20,000 to 35,000	500 to 700
Steam/Oil	20,000 to 35,000	500 to 700
Steam/Nuclear	35,000 to 50,000	750 to 900
Combined-Cycle/Nat. Gas	7,000 to 12,000	175 to 250

Therefore, facilities with CCRS have already achieved flow reductions that significantly reduce impingement and entrainment as compared to facilities with once-through cooling. Further impingement or entrainment controls would provide only a minor incremental benefit that is not justified by the additional regulatory burdens and associated costs. Cooling water intakes servicing closed-cycle units should not be subject to any additional impingement controls (*e.g.*, improved screens, barrier nets, or requirements to avoid fish entrapment). To require any additional impingement or entrainment controls for these facilities penalizes the most protective existing facilities.

While EPA's proposal offers a limited exemption for CCRS facilities with an intake velocity of < 0.5 fps, not all CCRS facilities were designed to, or can achieve a < 0.5 fps intake velocity under all conditions. For Southern Company, only 4 of 12 in-scope facilities with CCRS have a design intake through-screen velocity of < 0.5 fps. Two of those existing facilities are newly constructed combined-cycle facilities that were built with cylindrical wedgewire screens at a design through-screen velocity < 0.5 fps. One facility already meets the proposed 0.5 fps standard with an underflow weir. Another facility is a recent CCRS retrofit that installed cylindrical wedgewire screens with a design through-screen velocity of < 0.5 fps. Of course, not

[3] EPRI. *Water Use for Electric Power Generation*, Palo Alto, CA: EPRI; 2008; 1014026

all facilities can retrofit cylindrical wedgewire screens. Submerged cylindrical wedgewire screens require a river depth and area that would impede barge and ship traffic at some locations. Therefore, cylindrical wedgewire screens are not an option for some intakes.

V. Impingement Numeric Standards Are Not Representative and Are Not Achievable

As previously discussed, Southern Company agrees with EPA that requiring existing facilities to retrofit closed-cycle cooling is not BTA for either entrainment or impingement mortality. We also agree that, to qualify as BTA for the industries covered, a technology must be shown to be technologically "available" to the great majority of the facilities in the industry category or subcategory to which it would be applied. We further agree that, at some locations, modified traveling screens have increased impingement survival. But we do not agree that the proposed impingement numeric standards reflect optimized performance of such screens at all facilities to which the proposal would apply.

Impingement mortality is species-specific, size-specific, and site-specific. Some regulatory flexibility is therefore necessary. In those cases where they can be used, modified traveling screens provide excellent protection for organisms that are impinged. But even at such sites, it may be impossible to meet the numeric standards EPA has proposed. Southern Company requests that EPA remove the numeric impingement mortality standards (31% monthly, 12% annual average) (proposed § 125.94(b)) from the rule. We have examined EPA's analysis that purports to justify these numeric standards and it is flawed for the reasons explained below and in UWAG's comments.

A. EPA Used Only a Limited Dataset to Derive the Standards

Assuming that the impingement mortality limits are potentially applicable to any and all species of fish, the proposed impingement mortality standards (12 percent mortality as an annual

average, 31 percent mortality as a monthly average) cannot be met reliably by the technology on which they are supposedly based.

In part, this is because impingement mortality depends more on what species are present than on any intake equipment. The major determinants of impingement mortality are the species (hardy or fragile), size of fish, temperature, and salinity.[4] Although proper design, operation, and maintenance of screens and fish returns are important, the hardiness of the species and life stages of the organisms primarily determine the survival rates achieved.

To calculate its 12 percent and 31 percent impingement mortality standards, EPA began with 60 studies in its Performance Study Database that contain impingement mortality data. EPA, 2011 Technical Development Document for the Proposed Section 316(b) Phase II Existing Facilities Rule, EPA-821-R-11-001 (DCN 10-0004) (TDD) Exhibit 11A-2. The data come from 42 documents, representing 35 facilities.

For 16 of the studies, EPA apparently examined only second-party reviews of studies, not the original study reports themselves. In reviewing the data, EPA made several errors. In one case, data for a study were identified as coming from a document that does not, in fact, contain data for that facility; there are no data from Roseton in Micheletti, W. and J. Burns, *Estimating Energy Penalties for Wet and Dry Cooling Systems at New Power Plants* (2003) (EPA Docket OW-2002-0049 DCN 6-5046H). There are also several errors in reporting impingement holding times in EPA's Exhibit 11A-2. As explained in Appendix 2 of UWAG's Comments:

> An independent review of the documents in Exhibit 11A-2 was undertaken, and several errors in the post-impingement holding times as noted in that exhibit were observed. For those studies that

[4] *See*, *e.g.*, EPRI Comments in the NODA for Phase II 316(b) Rule for Existing Facilities, June 2, 2003 (EPA-HQ-OW-2002-0049-Public Comment 3.006); EPRI, *Evaluating the Effects of Power Plant Operations on Aquatic Communities: Summary of Impingement Survival Studies* (2003).

> came from EPRI review documents, the original source documents were consulted, as needed, to determine holding durations. In some cases, when holding durations exceeding 48 hours were presented in Exhibit 11A-2, the original source report contained data for intermediate durations. For this reason, EPA should re-evaluate the data excluded from its analysis on the basis of holding times in excess of 48 hours.

UWAG Appendix 2 at 17-18.

UWAG Appendix 2 further discusses errors in EPA application of data exclusion criteria, particularly relating to data elimination based on holding periods:

> EPA applied a variety of exclusive criteria in order to refine its database and select data for use in calculating the performance standards. EPA did not identify which criterion was used to eliminate specified datasets, making it impossible to determine if the exclusion criteria were applied correctly. One *area where EPA clearly improperly applied the exclusion criteria relates to EPA's elimination of studies with no post-impingement holding periods or in which those holding periods exceed 48 hours.* In Exhibit 11A-2 of the TDD, EPA lists the duration of post-impingement holding times, many of which would meet EPA's exclusion criteria.

Id. at 17 (emphasis added).

B. Some of EPA's Criteria for Excluding Data are Inappropriate

EPA then applied seven criteria to narrow the database down to just eight data points: four monthly averages from Dunkirk, two monthly averages from Huntley, and two annual averages (one from each Unit) from Arthur Kill. Only one plant, Arthur Kill, was sampled over an entire year. The data used did not include all species impinged across the country or all months of the year. Two of the facilities are on freshwater rivers and one on an estuary. Four species of fish composed 93 percent of all fish tested at Dunkirk and Huntley, and only five species made up 74 percent of the fish sampled at Arthur Kill. EPA specifically excluded data evaluating species of concern, specifically weakfish studies at the Salem Generating Station. TDD at 11-5.

To eliminate most of the studies, EPA applied seven criteria:

1. The data must provide information about one of the candidate technologies.

2. The data must be a quantitative measure that relates to impingement mortality of some life form of aquatic organisms within cooling water intake structures under the given technology.

3. The data must reflect technology performance that is representative of conditions that may exist under actual facility operations.

4. When data were used in deriving proposed impingement limitations, the reported values must be actual measurements, rather than estimates.

5. The facility must have employed the selected BTA technology basis for impingement: modified traveling screens.

6. The study must have measured total mortality from the time of impingement to no later than 48 hours following impingement.

7. The study must have evaluated all species that are typical for that location.

EPA applied certain of these criteria in a manner patently inappropriate for deriving legally binding limits, which resulted in improper elimination of relevant data. First, EPA disregarded laboratory studies altogether, though they contain relevant information. Second, EPA considered insufficient data for numerous species. Third, EPA eliminated studies with less than 24 hours of holding time, even though studies of immediate (less than 24 hours) mortality provide useful information. Fourth, EPA excluded data from studies in which all species typical of the location were not evaluated; there is no logical reason to disregard studies because they targeted only a few species, especially if, as the Agency has said, it intends to focus on species of concern.

EPA did not identify which of its seven criteria it used to eliminate which particular studies, so it is impossible to determine if it applied the exclusion criteria correctly even by its own terms. There is reason to believe EPA did not apply them correctly. For example, as mentioned previously, UWAG's consultants looked at the original source documents for studies

cited in EPRI reviews and found that, in some cases when holding durations longer than 48 hours were presented in Exhibit 11A-2, the original source report contained data for intermediate durations that could have been used even by EPA's own criteria.

Furthermore, EPA eliminated data associated with a numerically abundant forage species, which also tend to be fragile and have low survival rates, stating that such species were not typical for that location. There is no basis for eliminating this data, which would likely have significant impacts on the proposed impingement mortality numbers (see further discussion of resulting numeric limitations below). As concluded by UWAG's consultants, "eliminating data for species that are 'not predominant' (*see* example of Salem and weakfish) is arbitrary." UWAG Appendix 2 at 17.

Also, EPA acknowledges the potential impossibility of facility compliance if such abundant, but fragile and low survival fish are subject to the proposed limitation, stating "[t]he mortality percentages were … 19.2 percent from Arthur Kill's Unit 20 … the mortality is partially associated with the relatively large numbers of bay anchovy … After excluding the bay anchovy counts from the calculations, the impingement mortality percentage drops to 14 percent which is only slightly greater than the 12 percent proposed as the annual average limitation." TDD at 11-10 – 11-11.

EPA explains its lack of concern for this apparent flaw in the proposed number by stating, "Because bay anchovy are feeder fish and highly prevalent, permit authorities are unlikely to designate them as a species of concern subject to the proposed limitations." TDD at 11-11. But rightly or wrongly, the New Jersey Department of Environmental Protection (NJDEP) and Delaware Department of Natural Resources & Environmental Control (DNREC) have selected

bay anchovy as a Representative Important Species (RIS) for the Salem Nuclear Generating Station. UWAG Appendix 2 at 17.

Unless EPA is willing to say that numerically abundant forage species, which also tend to be fragile and have low survival rates, need not be protected, then it must include data on the performance of the technology with respect to those species in calculating the impingement mortality standard.

In short, instead of using a database representative of power plants nationwide, EPA based the national impingement mortality standards on only eight sampling sets from three plants in New York, two on freshwater rivers, and one on an estuary, and then eliminated highly relevant data associated with numerically abundant forage species, which also tend to be fragile and have low survival rates. EPA appears to have recognized that this small selection of data might not accurately reflect other sites, as it expressed willingness to revise the limits if it receives new data. TDD 11-3. EPA must address these, and likely other, examples of improper data exclusion and eliminate, or at a minimum revise, its proposed impingement mortality limits.

C. EPA's Numeric Criteria Conceal a Wide Band of Variability

As a result of its analysis of the very small data set EPA used, UWAG has concluded – and Southern Company agrees – that the resulting numeric standards are not statistically or scientifically valid. As explained in UWAG Appendix 2, EPA's estimates of the 95th percentile of monthly average impingement mortality, and the mean of annual average impingement mortality, on which EPA based its proposed impingement mortality limitations, are overwhelmingly influenced by the dominant species represented in the data EPA chose for the analysis. If other species had been dominant in the data EPA chose, the estimates of the expected performance of BTA technology might have been very different.

Based on impingement survival data from four facilities with BTA technology, estimates of the 95th percentile of monthly average impingement mortality for the species examined ranged from less than 1 percent to 87 percent. Therefore, depending on the species composition of impingement at a facility properly operating BTA technology, the expected 95th percentile of monthly average impingement mortality would be as high as 87 percent.

Similarly, estimates of the average annual impingement mortality for the species examined ranged from less than 1 percent to 77 percent, depending on the array of species impinged. Therefore, the expected annual average impingement mortality for a facility properly operating BTA technology could be as high as 77 percent, depending on the species impinged.

EPA's analysis of impingement mortality data was far too limited and ignored species-specific differences that have profound implications.

For these reasons, EPA's estimates of the expected performance of the BTA technology (modified traveling screens) at reducing impingement mortality are fundamentally flawed. Accordingly, EPA's proposed impingement mortality limitations, which are based on EPA's estimates of the expected performance of the BTA technology, are not valid.

D. Compliance with Percentage Standards is Not Feasible in the Long Term at Plants with Small Impacts

Southern Company is very concerned about achieving compliance with the proposed numeric impingement mortality standards month after month and year after year. In our experience, the biological conditions on our rivers and lakes can change drastically due to droughts, floods, changes in land development, and other circumstances over which we have no control. Also, some of our facilities have recorded months – or years – of very low impingement, as described below.

- Plant McIntosh is located along the Savannah River in the Atlantic Coastal Plain at Savannah, Georgia. During 13 sampling events over a period of one year, only 68 fish

were impinged. Ten of the 13 events collected less than 10 impinged fish. During one month, July 2005, no fish were impinged.

Table 2. DISTRIBUTION OF FISH IMPINGED AT PLANT MCINTOSH, June 2005-May 2006[5]

	Total No.	% of Yearly Total
Jun-05	4	5.88%
Jul-05	0	0.00%
Aug-05	1	1.47%
Sep-05	16	23.53%
Oct-05	12	17.65%
Nov-05	4	5.88%
Dec-05	2	2.94%
Jan-06	3	4.41%
Feb-06	12	17.65%
Mar-06	4	5.88%
Apr-06	3	4.41%
May-06	3	4.41%
Jun-06	4	5.88%
Total	68	

- Plant Mitchell, located along the lower Flint River south of Albany, Georgia, impinged a total of 95 organisms during 24 sampling events during a period of one year. Twenty of the 24 sampling events collected less than 10 impinged fish. No fish were impinged during 5 sampling events and one fish was impinged during five sampling events.

Table 3. DISTRIBUTION OF FISH IMPINGED AT PLANT MITCHELL, November 2005- October 2006

	Total No.	% of Yearly Total
8-Nov-05	1	1%
22-Nov-05	1	1%
5-Dec-05	0	0%
19-Dec-05	0	0%
9-Jan-06	1	1%
30-Jan-06	0	0%
13-Feb-06	1	1%
27-Feb-06	3	3%
13-Mar-06	4	4%
27-Mar-06	10	11%

[5] During these sampling events, McIntosh also impinged 6 crayfish and 25 grass shrimp.

10-Apr-06	3	3%
24-Apr-06	5	5%
8-May-06	5	5%
22-May-06	1	1%
5-Jun-06	3	3%
19-Jun-06	6	6%
10-Jul-06	6	6%
24-Jul-06	11	12%
7-Aug-06	10	11%
21-Aug-06	3	3%
11-Sep-06	0	0%
25-Sep-06	4	4%
10-Oct-06	0	0%
23-Oct-06	17	18%
Total	95	

- Plant Crist, located in northeast Pensacola, Florida at the mouth of the Escambia River on Governor's Bayou, impinged a total of 133 fish during bimonthly sampling events over a period of one year. Sixteen of the 24 sampling events collected less than 10 impinged fish. No fish were impinged during two sampling events and one fish was impinged during six sampling events.

Table 4. DISTRIBUTION OF FISH IMPINGED AT PLANT CRIST, May 2005 - October 2007[6]

	Total No.	% of Yearly Total
5/18/2005	12	9%
6/16/2005	7	5%
7/22/2005	4	3%
8/18/2005	1	1%
9/16/2005	5	4%
10/20/2005	1	1%
11/15/2005	0	0%
12/13/2005	17	13%
1/23/2006	5	4%
2/16/2006	2	2%
3/14/2006	4	3%
4/10/2006	11	8%
5/16/2006	27	20%

[6] During these sampling events, Crist also impinged 846 shellfish, of which 546 were alive.

4/23/2007	1	1%
5/10/2007	1	1%
6/13/2007	6	5%
7/9/2007	6	5%
7/25/2007	0	0%
8/9/2007	10	8%
9/17/2007	1	1%
10/2/2007	1	1%
10/22/2007	11	8%
Total	133	

- Plant Vogtle: During 48 sampling events over a period of 12 consecutive months (four events per month), only 154 fish were impinged. Forty-four of the 48 sampling events collected less than 10 impinged fish. Sixteen of the events collected 0 impinged fish.

Table 5. DISTRIBUTION OF FISH IMPINGED AT PLANT VOGTLE, March 2008-February 2009[7]

	Total No.	% of Yearly Total
March-2008	12	7.79%
April-2008	8	5.19%
May-2008	4	2.60%
June-2008	5	3.25%
July-2008	21	13.63%
August-2008	10	6.49%
September-2008	1	0.65%
October-2008	2	1.30%
November-2008	11	7.14%
December-2008	72	46.75%
January-2009	7	4.55%
February-2009	1	0.65%
Total	154	

For all four plants, then, out of a total of 109 sampling events (24-hour duration), 93 (about 85%) resulted in less than 10 impinged fish.

[7] During these sampling events, Vogtle also impinged 11 brushnose crayfish and 3 shore shrimp.

Plants, such as McIntosh, Mitchell, Crist, and Vogtle with very low monthly impingement numbers, would be in danger of violating the proposed monthly impingement mortality standard on a regular basis. Even though their environmental impact is quite small, the risk of violations would be high, because of EPA's percentage-based numeric standard. For example, if a plant impinges 10 fish in December and four of those fish die, then the plant would be in violation of the proposed monthly standard. The cause of the mortalities could include a sudden cold snap which leads to fish stress and impingement, diseased fish which are too unhealthy to swim away, or some other factor which the plant has no control over. Nonetheless, the plant would be in violation.

Many of Southern Company's facilities, therefore, will not be able to comply through the numeric impingement mortality standards because of the high risk of permit violations for plants with low impingement numbers. We highly recommend that EPA include a *de minimis* exemption provision in the rule to prevent these unnecessary and unwarranted violations. More information about the need for a *de minimis* exemption is provided in the following section. In addition, there are better alternatives to ensuring the protectiveness of modified screens with fish handling and return systems. These alternatives are provided in Section XXV, Southern Company's Recommendations for Revisions to the Rule.

VI. EPA Should Provide a *De Minimis* Exemption for Small Impingement Rates

The proposed rule provides no opportunity for obtaining relief for facilities that can demonstrate the rate of impingement for species of concern is so low as to be considered *de minimis*. EPA should capitalize on information gained from industry resources expended during the Phase II rule assessments by exempting facilities that have clearly demonstrated *de minimis* impingement rates. Southern Company operates 16 facilities that use once-through cooling systems. These cooling systems and associated intake structures have been operating for decades

and in many cases have existing studies that clearly demonstrate that cooling system operations have only a *de minimis* impact on the aquatic community. In addition, the associated source waterbodies have never been listed as impaired due to effects from the cooling water intake structures.

Alabama Power Company (APC) conducted impingement monitoring from October 2004 through October 2005 during the Phase II rule assessments. A total of 75 eight-hour sampling events were performed at each of the seven cooling water intake structures (CWISs) for a total number of 525 sampling events. Threadfin shad were the most predominantly impinged species at these facilities; however, freshwater drum and blue catfish were the two most valuable species impinged. The percentage of sampling events with no fish impinged, less than 5 fish impinged, and less than 10 fish impinged are provided in Table 6 for freshwater drum and Table 7 for blue catfish. For freshwater drum, 436 out of the 525 sampling events (85%) showed impingement of less than 10 fish; 76% showed impingement of less than 5 fish; and 54% showed no impingement. The impingement data for blue catfish (Table 7) shows similar low levels of impingement. Also, three of the seven intake structures impinged no freshwater drum or blue catfish about 90% of the time, that is, 467 sampling events out of a total of 525 sampling events did not impinge a single freshwater drum or blue catfish.

Table 6. Low Impingement Rates of Freshwater Drum at Seven CWISs

Plant/Intake Structure	Percentage of Samples with No Fish Impinged	Percentage of Samples with < 5 Fish Impinged	Percentage of Samples with < 10 Fish Impinged
Barry 1-3	**28%**	**56%**	**65%**
Barry 4-5	**21%**	**48%**	**64%**
Greene Co. 1-2	**37%**	**81%**	**95%**
Gorgas 6-7	**97%**	**100%**	**100%**
Gorgas 8-10	**13%**	**47%**	**68%**
Gadsden 1-2	**100%**	**100%**	**100%**
Gaston 1-5	**83%**	**97%**	**100%**

Table 7. Low Impingement Rates of Blue Catfish at Seven CWISs

Plant/Intake Structure	Percentage of Samples with No Fish Impinged	Percentage of Samples with < 5 Fish Impinged	Percentage of Samples with < 10 Fish Impinged
Barry 1-3	**7%**	**45%**	**65%**
Barry 4-5	**5%**	**25%**	**33%**
Greene Co. 1-2	**44%**	**85%**	**93%**
Gorgas 6-7	**95%**	**100%**	**100%**
Gorgas 8-10	**67%**	**97%**	**99%**
Gadsden 1-2	**96%**	**100%**	**100%**
Gaston 1-5	**63%**	**84%**	**89%**

Even if 10 fish were impinged during an individual sampling event, this number would not provide enough statistical power to determine the survivability of fish at the CWIS. From this information, it is clear that future impingement mortality monitoring will encounter significant sample periods when there will not be enough impinged fish to determine the efficacy of the technology. Therefore, it is imperative that the rule include a *de minimis* exemption.

Other examples of *de minimis* impingement levels are provided for three facilities in Section V. D. A 13-month impingement study at Plant McIntosh during 2005-2006 yielded only 99 organisms comprised of 11 species weighing 594 grams, including 6 crayfish and 25 grass shrimp (Table 2). Hogchoker and bluegill were the most commonly captured species accounting for 50% of the impingement. No protected species were impinged. The extrapolated annual estimate is 2,989 organisms weighing approximately 17.8 kg (39.3 lbs.). A 12-month study at Plant Mitchell during the same time period yielded a total of 95 organisms comprised only of 12 species including two crayfish (Table 3). No protected species were collected. The extrapolated annual estimate is 1,030 organisms weighing only 1.04 kg (2.3 lbs.). The samples were numerically dominated by threadfin shad.

We believe that the level of impingement measured at these facilities is representative of a *de minimis* condition. In addition, we believe that low impingement rates do not provide

enough statistical power for accurate determination of the survivability of fish at cooling water intake structures. Therefore, we ask that EPA provide a *de minimis* exemption for facilities with demonstrated minimal impingement under typical operating and environmental circumstances. This would significantly reduce the costs and administrative burden of the rule without risk of adverse impact to the source waterbody.

VII. EPA's Proposed Compliance Monitoring is Overly Burdensome

EPA's proposed impingement monitoring is excessive. The requirements include monitoring at each intake through sample collection for each species over a 24-hour period no less than once per month. Proposed §§ 125.96(a)(1) and (2). This monitoring scheme fails to take into account practical challenges associated with biological monitoring and would result in unnecessary and excessively costly monitoring efforts.

A. Flaws in the Proposed Impingement Mortality Monitoring Scheme

1. Impingement sampling timing considerations

Impingement sampling should only occur during periods of representative flow and should be suspended during periods of non-peak flow, such as during scheduled outages at a facility. See UWAG Appendix 2 at 39. "Even the most carefully planned monitoring can be undermined by the natural variability in abundance within fish populations themselves. Natural events such as storms, floods, drought, and water temperature all can affect the distribution and relative abundance of fishes within a waterbody." *Id.*

Furthermore, the objective of impingement mortality monitoring in the proposed rule is to determine the percent survival of organisms, not to provide an accurate and precise impingement estimate. Thus, the efficacy of a traveling water screen with fish protection features or an exclusion technology is not predicated on time of day or tidal condition, but instead should be structured over a time period that would assure maximum probability of capturing adequate

numbers of fish to determine impingement mortality. Thus, there is no reason to specifically require diel or tidal (where applicable) cycle sampling. *Id.*

2. Proposed continuous monitoring is unjustified

As concluded in UWAG's Appendix 2, the proposed requirement for continuous monitoring is excessive and unnecessary. "Once the [BTA] technology is operational, relatively consistent performance should be expected. Thus, there is no reason to believe that the IM [impingement mortality] should be highly variable from year to year, as healthy individuals of a species should demonstrate relatively uniform responses to the system in operation." UWAG Appendix 2 at 36. While there is a possibility of variability throughout the year due to seasonal changes and relative size of organisms, "these also will show consistency over the long-term. Once performance has been verified over a reasonable period, there is no reason to believe that [impingement mortality] will not remain relatively consistent as long as the technology is responsibly operated and maintained." *Id.*

VIII. EPA's Intake Velocity Standard is Overly Protective and Not Supported by Science

One of the options proposed by EPA to reduce impingement mortality is to demonstrate that the facility's cooling water intake structure has a maximum actual or design intake velocity (through-screen) of 0.5 fps. This requirement is to be met *under all conditions*, "including during minimum ambient source water elevations (based on BPJ [best professional judgment] using hydrological data) and during periods of maximum head loss across the screens or other devices during normal operation of the intake structure." Proposed 40 C.F.R. § 125.94(b)(2)(i) and (ii), 76 Fed. Reg. at 22,283 col. 1.

Southern Company agrees with EPA that the rule should include a compliance alternative based on intake velocity. EPA is correct that lowering intake velocity is an effective way to reduce impingement, thereby reducing impingement mortality. However, the proposed intake

velocity standard is both unnecessarily low and unduly rigid, as well as technologically infeasible at many facilities.

A. Multiple Conservatisms Make the Standard Overly Protective

EPA applied too many conservative factors when developing its proposed intake velocity standard. These factors include the following.

- In the Phase I rule, EPA took a 1.0 fps *approach* velocity standard, halved it to provide a "safety factor," and then interpreted it as a 0.5 *through-screen* velocity. *See* 66 Fed, Reg. at 65,274-75.
- In this proposal, EPA added a requirement that the velocity standard be met "under all conditions."
- Also in this proposal, EPA added a requirement that there be no more than a 15% blockage of the screens.

As UWAG said in its Phase I Comments, there is no scientific basis for the 0.5 fps through-screen velocity standard, and changing the standard to 1.0 fps would better reflect the scientific data on fish swim speeds. The 0.5 fps standard has a long history, but its rigor is based on policy choices EPA made for new facilities, not science. See 40 C.F.R. § 125.84, 65 Fed. Reg. at 49,116-19. Moreover, EPA's justification for the proposed velocity limit blurs the significant distinction between approach and through-screen velocities, as discussed below.

The measurement of velocity relative to an intake can be computed in several different ways, and regulators have used a variety of measurements that all qualify as "velocity" but are quite distinct. A typical measurement of intake velocity is known as the "approach velocity." This term generally refers to the average water velocity measured a few inches in front of the screen and in the same direction as the general flow, which can be, but is not always, perpendicular to the screen. Approach velocity differs from through-screen velocity, which is apparently the basis of the velocity standards in the proposed rule. Through-screen velocity is

the velocity of water as it passes between the structural components of the screen. It is always greater than the approach velocity measured in front of the screen.

In the Phase I rule, EPA adopted a 0.5 fps *through-screen* velocity on the basis of literature which recommends a 1.0 fps *approach* velocity. To justify its choice of a 0.5 fps standard design intake (*i.e.*, through-screen) velocity, EPA cited three 1970s-era government publications.[8] While none of the three specifically states that the velocity values suggested are approach velocities, it was common practice at that time to use a simple approach velocity. Further, EPA's own memorandum[9] justifying its velocity requirement quoted another early guidance document that stated "'[m]aximum acceptable *approach* velocities are on the order of 0.5 fps.'" EPA 2000_ (DCN:1-1054-TC) at 3 (emphasis added). To justify the reduction from a 1.0 fps *approach* velocity to a 0.5 *through-screen* velocity, EPA simply said it was applying a "safety factor." 66 Fed. Reg. at 65,274 col. 2-3.

In the current proposal, rather than just applying a 0.5 fps through-screen velocity standard, EPA has made it even more stringent.[10] EPA requires that "the maximum velocity

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[8] Those publications are: John Boreman, *Impacts of Power Plant Intake Velocities on Fish,* Power Plant Team, U.S. Fish and Wildlife Services, 1977; A. G. Christianson, F. H. Rainwater, M.A. Shirazi, and B. A. Tichenor, *Reviewing Environmental Impact Statements: Power Plant Cooling Systems, Engineering Aspects,* U.S. Environmental Protection Agency (EPA), Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon, Technical Series Report EPA-660/2-73-016, October 1973; Willis King, "Instructional Memorandum RB-44: Review of NPDES (National Pollutant Discharge Elimination System) Permit Applications processed by the EPA (Environmental Protection Agency) or by the State with EPA oversight," *Navigable Waters Handbook*, U.S. Fish and Wildlife Service, February 1973.

[9] United States Environmental Protection Agency (EPA), *Background and Justification for Using a Through-Screen Velocity of 0.5 Foot per Second as a Threshold Criterion Value for the Section 316(b) Rulemaking*, Draft, June 2000 (DCN:1-1054-TC).

[10] EPA's confusion of through-screen and approach velocities continues in the current proposal. In the preamble (76 Fed. Reg. at 22,204), EPA incorrectly interprets its own Phase I preamble stating, "a design *through-screen* velocity of 0.5 feet per second would be protective of 96% of motile fish." 76 Fed. Reg. at 22,204 col. 3 (emphasis added). The Phase I preamble

limit must be achieved under all conditions, including during minimum ambient source water surface elevations (based on BPJ using hydrological data) and during period of maximum head loss across the screens or other devices during normal operation of the intake structure." Proposed § 125.94(b)(2)(ii). Imposing a maximum intake velocity of 0.5 fps under all conditions makes the standard an "instantaneous maximum" limit, and thus even more stringent. This is inconsistent with how EPA has treated the 0.5 fps velocity in the past. For the purposes of the Phase I and Phase II rules, EPA treated the through-screen velocity limit as an *average* of 0.5 fps as a design criterion. *See* 40 C.F.R. § 125.83 (2010); Phase II Response to Comments at 4890-91. EPA did not intend to require facilities to monitor the intake velocity at every slot on a screen face but rather to ensure that the intake configurations are equipped to handle an intake velocity averaging 0.5 fps. EPA recognized that a 0.5 fps through-screen velocity would effectively reduce approach velocities to lower than 0.5 fps, providing an additional safety margin.

But even applying the criterion "under all conditions" is not enough, according to EPA. The proposal further requires that "each intake must be operated and maintained to keep any debris blocking the intake at no more than 15 percent of the opening of the intake." Proposed § 125.94(b)(2)(iii). Again, new facilities subject to the Phase I rule do not have any similar requirement. That is because EPA *already accounted for* partial screen occlusion in the 0.5 fps through-screen standard it adopted in the Phase I rule. EPA justified its intake velocity threshold at a 0.5 fps through-screen velocity (rather than the 1.0 fps approach velocity suggested by a review of fish swim speed literature) by calling it a "safety factor." EPA then states "this safety

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actually says, "The data suggest that a 0.5 ft/s velocity would protect 96 percent of the tested fish." 66 Fed. Reg. at 65,274 col. 3. But the Phase I preamble is referring to *approach* velocities and not *through-screen* velocities.

factor, in part, is meant to ensure protection when screens become partly occluded by debris and velocity increases through portions of the screen that remain open." 66 Fed. Reg. at 65,274 col. 3. Since EPA's intake velocity standard was designed to take into account debris loading on screens, it is inappropriate to add on an additional requirement for reducing screen blockage.[11] Southern Company urges EPA to delete § 125.94(b)(2)(iii) from the rule.

B. There is No Scientific Basis for the 0.5 fps Standard

Although EPA acknowledged that through-screen velocity is always higher than approach velocity,[12] it provided no explanation as to why it believed a through-screen velocity value was necessary for fish protection. Its 0.5 fps through-screen velocity is unsupported by any of the literature cited and significantly more stringent than a 0.5 fps approach velocity criterion. See UWAG's comments for a further discussion of the lack of scientific support for a 0.5 fps through-screen velocity standard.

Also, fish swim speed research by EPRI indicates that the proposed standard is too stringent. As a general rule, based on screen open area, approach velocity is roughly one-half of the through-screen velocity. Therefore, a 0.5 fps through-screen velocity is equivalent to a 0.25 fps approach velocity. Critical swim speed, typically reported in cm/s, is the criteria used to determine fish ability to avoid impingement. The 0.5 fps through-screen velocity converts to 15

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[11] Additionally, in the Phase I rule EPA in essence defines through-screen velocity to include debris loading. EPA states: "The design through-screen velocity is defined as the value assigned during the design phase of a cooling water intake structure to the average speed at which intake water passes through the open area of the intake screen (*taking fouling into account*) or other device against which organisms might be impinged or through which they might be entrained." 66 Fed. Reg. at 65,274 col. 2. If EPA keeps the no more than 15% blockage requirement in the rule, it is being inconsistent in how it defines through-screen velocity.

[12] EPA stated "[t]his [through-screen] velocity is always greater than the approach velocity because the net open area is smaller." 65 Fed. Reg. at 49,088 col. 1.

cm/s and an approach velocity of 7.5 cm/s. Within EPRI's swim speed database, which includes 557 group observations of thousands of different species, only four observations occurred where fish had critical swim speeds less than 15 cm/s and there were none less than 7.5 cm/s. Thus, less than 1% of the species in the EPRI database have critical swim speeds less than EPA's standard of 15 cm/s.

C. For Many Facilities, Compliance through Expanding the Intake is Infeasible

Meeting the design or actual intake velocity standard of 0.5 fps under all conditions would require substantial expansion of many existing intake structures. In a preliminary analysis, Southern Company has evaluated its existing intakes to determine whether it is possible to expand the existing intakes and thereby reduce the intake velocity to the proposed standard.

Our engineers estimated the number of intake bays (screens) necessary at each facility to meet the proposed velocity standard,[13] and then assessed whether it was feasible to expand the intake based on available space within our facility boundaries. As shown below, Plant Barry currently has two intakes with a total of 11 intake bays. To meet the velocity standard, Plant Barry would have to add a staggering 46 additional intake bays. This is technically infeasible because the facility does not have enough adjacent flow collecting area behind the screens due to

[13] Southern engineers described their work as follows. The design of the intake structure must take into account two conditions in setting the floor elevation: (1) minimum water level expected from the source waterbody and (2) minimum submergence required by the circulating water pumps and any other cooling water pumps withdrawing water from the intake system. The existing intake structure floors were set so that the pump suction conditions were met at minimum low water level. We calculated the number of screens by setting the velocity at 0.5 fps to determine the flow per screen at minimum low water level (flow that passes through the bay using screen width, water depth and screen open area). The total flow required divided by the flow per screen gives the number of screens required to meet the proposed 0.5 fps intake velocity "under all conditions." The screen flow rate (SFR) scenarios were calculated using existing screen width (SW), scenario water level (WL), existing screen open area efficiency (SE), and scenario intake velocity in feet per second (IV) as follows: SW*WL*SE*7.48 gallons/ft^3*60 seconds/minute*IV= SFR (gpm). The number of screens required for each scenario was calculated as follows: current screen flow/SFR*current number of screens.

the positioning of existing air quality control devices, specifically the precipitators, SCRs, and associated fans in that area. Even if the expansion was possible, the cost of expansion is estimated at approximately $2 million[14] per intake bay, so the total for Plant Barry would be $92 million, not including costs of environmental permitting and any special engineering costs (*e.g.*, costs for construction of pilings, if necessary).

Plant Barry is not the only Southern Company facility that will not be able to comply through meeting the velocity standard. As the table below shows, we have identified 13 intakes that cannot be expanded to meet the requirement.

Table 8. Feasibility Assessment of Meeting the Proposed Intake Velocity Standard - Southern Company Plants with Once-through Cooling Systems

Facility	No. of Existing Through-Flow Screens & Available Bays	No. of Additional Through-Flow Screens Feasible	No. of Additional Through-Flow Screens Needed to Meet Proposed Velocity Standard (1)	Total No. of Through-Flow Screens Needed to Meet Proposed Velocity Standard (1)	Feasible to Expand? (2)
Barry	11	25	46	57	No
Gadsden	3	5	0	3	Yes
Gaston	10	15	10	20	No
Gorgas	8	12	17	25	No
Greene Co.	3	12	13	16	No
Branch	7	20	38	45	No
Hammond	6	12	10	16	No
Kraft	6	6	19	25	No
McIntosh	2	6	4	6	Yes
McManus	2	6	10	12	No
Mitchell	3	6	5	8	No
Scholz	3	6	3	6	Yes
Smith	4	4	21	25	No
Eaton	4	4	14	18	No
Watson	5	5	19	24	No
Crist	5	8	8	13	No

[14] The estimate of $2 million per intake bay is based on an engineering study for a Southern Company facility.

(1) Design at 0.5 fps at lowest water level achievable (LWL). This is the proposed intake velocity standard.
(2) Feasibility to expand the intake structure is based on best professional judgment and the configuration of intake structures.

There are two plant/intake structure configurations that do not lend themselves to massive expansion of the intake structures: (1) the close coupled configuration and (2) the constructed inlet configuration. Of the facilities in Table 8, most fall into one of these two configurations.

Where the plant is situated close to the bank of the source waterbody (that is, "close coupled"), the space between the plant and the bank is usually occupied with air quality control devices (precipitators, SCRs, etc.), large draft system fans, ash piping, roadways, conveyor support steel, or other plant equipment, or the plant is directly adjacent to the intake structure itself. Even if shoreline is available, excavation to add water passages behind the screens would undermine existing deep foundations, putting the facility at risk and being cost-and schedule-prohibitive.

A "constructed inlet" configuration has a waterbody excavated to provide either barge access or water access to multiple intake structures, or both. Intake structures at the end of a barge canal are limited to 175 feet in width. An excavated inlet having multiple intake structures is arranged for the specific units under construction. The typical placement of plant environmental and auxiliary equipment, such as air pollution controls, ID fans, etc., for those units effectively prohibit any meaningful enlargement of the inlet.

D. The Impact of the "Under All Conditions" Velocity Requirement is Substantial

EPA's decision to require compliance with the 0.5 fps through-screen velocity "under all conditions" is very significant, and greatly increases the number of intake bays and screens required to comply with the rule. The table below summarizes the analysis of four different velocity scenarios for 16 plants with once-through cooling systems. The four scenarios are:

- 0.5 fps at lowest achievable water level (*i.e.*, what the proposed rule requires);
- 0.5 fps at normal water level (*i.e.*, a compliance level equivalent to what the Phase I rule requires for new facilities);
- 1.0 fps at lowest achievable water level; and
- 1.0 fps at normal water level.

Comparison of the first two scenarios demonstrates the impact of the "under all conditions" provision. For Plant Barry, meeting 0.5 fps at low water level requires 27 more screens than meeting 0.5 fps at normal water level. At Plant Branch, the "under all conditions" provision results in an additional 20 screens to ensure compliance. Overall, the "under all conditions" provision, as opposed to meeting 0.5 fps at normal water level, would require Southern Company to install an additional 117 screens for these 16 once-through facilities at a cost of $234 million.

Table 9. Intake Velocity Standard Impact Analysis for Plants with Once-through Condenser Cooling Systems (5)

Facility	Number of Existing Screens	Total No. of Screens Needed at LWL[15] for 0.5 fps (1)	Total No. of Screens Needed at NWL[16] for 0.5 fps (2)	Total No. of Screens Needed at LWL for 1.0 fps (3)	Total No. of Screens Needed at NWL for 1.0 fps (4)
Barry	11	57	30	30	15
Gadsden	3	3	4	3	3
Gaston	10	20	18	11	10
Gorgas	8	25	20	13	9
Greene Co. (5)	3	16	12	8	6
Branch	7	45	25	23	11
Hammond	6	16	11	8	7
Kraft	6	25	11	13	6

[15] The low water level (LWL) was established during the intake structure engineering design phase prior to the original construction. The LWL design included the minimum water level expected from the source waterbody based on historic water levels and the minimum submergence level required by the circulating and other water pumps withdrawing water from the intake system.

[16] The normal water level (NWL) was also established during the original engineering design phase based on typical historical source waterbody levels or updated using current USGS lake levels, where applicable.

Facility	Number of Existing Screens	Total No. of Screens Needed at LWL[15] for 0.5 fps (1)	Total No. of Screens Needed at NWL[16] for 0.5 fps (2)	Total No. of Screens Needed at LWL for 1.0 fps (3)	Total No. of Screens Needed at NWL for 1.0 fps (4)
McIntosh	2	6	3	3	2
McManus	2	12	6	6	2
Mitchell	3	8	6	4	3
Scholz	3	6	4	3	3
Smith	4	25	12	12	6
Eaton	4	18	13	9	7
Watson	5	24	16	11	9
Crist	5	13	9	8	5
TOTAL	**82**	**319**	**202**	**165**	**104**
Additional Screens		**237**	**120**	**83**	**22**
Scenario Costs		**$474 million**	**$240 million**	**$166 million**	**$44 million**

(1) Design at 0.5 fps at lowest water level achievable (LWL). This is the proposed intake velocity standard.
(2) Design at 0.5 fps intake velocity at normal water levels (NWL).
(3) Design at 1.0 fps intake velocity at LWL.
(4) Design at 1.0 fps intake velocity at NWL.
(5) Evaluation included fine mesh screens to meet potential entrainment requirements.

Although EPA assumed that closed-cycle facilities typically meet the 0.5 fps intake velocity standard, that is not the case. Southern Company has at least three closed-cycle cooling facilities, and likely an additional five facilities (Vogtle, Hatch, Farley, Wansley, and Daniel), that cannot reliably meet the proposed velocity standard. The table below shows how many additional screens would be needed to comply with the rule at the three facilities.

Table 10. Intake Velocity Standard Impact Analysis for Plants with Closed-Cycle Recirculating Cooling Systems

Facility	Number of Existing Screens	Total No. of Screens Needed at LWL for 0.5 fps (1)	Total No. of Screens Needed at NWL for 0.5 fps (2)	Total No. of Screens Needed at LWL for 1.0 fps (3)	Total No. of Screens Needed at NWL for 1.0 fps (4)
Bowen	4	20	16	8	4
Scherer	3	12	6	6	6
Yates	2	4	4	2	2
TOTAL	**9**	**36**	**26**	**16**	**12**

Facility	Number of Existing Screens	Total No. of Screens Needed at LWL for 0.5 fps (1)	Total No. of Screens Needed at NWL for 0.5 fps (2)	Total No. of Screens Needed at LWL for 1.0 fps (3)	Total No. of Screens Needed at NWL for 1.0 fps (4)
Additional Screens		**27**	**17**	**7**	**3**
Scenario Costs		**$54 million**	**$34 million**	**$14 million**	**$6 million**

(1) Design at 0.5 fps at lowest water level achievable (LWL). This is the proposed intake velocity standard.
(2) Design at 0.5 fps intake velocity at normal water levels (NWL).
(3) Design at 1.0 fps intake velocity at lowest water level achievable.
(4) Design at 1.0 fps intake velocity at normal water levels.

If it were feasible for the Southern Company facilities listed in these two tables to comply by expanding their intakes to meet the proposed 0.5 fps standard, the total costs would be $528 million, not including any required existing screen modifications. But, as noted above, there are engineering constraints which prevent many of these plants from expanding their intakes. The cost information simply demonstrates the potential financial impact of making the 0.5 fps velocity standard even more stringent by adding the "under all conditions" provision.

IX. Compliance With the Velocity Standard is Extremely Expensive for Some Facilities

While some of our facilities may be able to comply by expanding their intakes, preliminary estimates indicate that the costs will be very high, especially in relation to the anticipated environmental benefits. Our preliminary estimates range from $5 million to $37 million to expand intakes and modify existing screens at locations where it may be feasible to do so. For example, at Plant McIntosh, intake expansion would cost approximately $10.5 million. Based on a year of impingement data, we estimate that Plant McIntosh impinges about 2,989 fish per year, an average of a little over 8 fish per day. Southern Company does not believe that an expenditure of $10.5 million, plus continued operations and maintenance costs, are justified by

the environmental impact of this facility. This facility should be exempted from the regulation through a *de minimis* exemption.

Southern urges EPA to adopt a 1.0 fps approach velocity standard, which is supported by existing science. This standard would provide uniformity but would not be irrationally stringent. Alternatively, if EPA will not accept the 1.0 fps approach velocity standard, it should adopt a site-specific determination of intake velocity standard based on the type of impingeable fish in the vicinity of the intake structure. Identification of "species of concern" along with documented swim speeds will allow an intake velocity to be set to protect the species of concern.

X. Barrier Nets are Not Feasible for All Marine Facilities

In addition to the impingement mortality requirements, facilities that withdraw water from ocean or tidal waters must "reduce impingement mortality of shellfish to a level comparable to that achieved by properly deployed and maintained barrier nets." Proposed 40 C.F.R. § 125.94(b)(1)(ii),(b)(2)(iv). The proposed rule says further that "passive screens such as cylindrical wedgewire screens, and through-flow or carry-over free intake screens such as dual-flow and drum screens, will meet this requirement." *Id.* EPA says this additional requirement is needed because "[s]hellfish such as crustaceans may pose a unique issue for traveling screens because the shellfish are not impinged, but rather they may grab hold of the traveling screen surface and are not removed from the traveling screen by pressure wash sprays." 76 Fed. Reg. at 22,201 col. 2. EPA selected "the seasonal deployment of barrier nets on estuaries and oceans as the best performing technology for minimizing impingement mortality of shellfish (crustaceans) because no other technology has been identified that is available, demonstrated, and feasible." 76 Fed. Reg. at 22,203 col. 3.

Barrier nets have been used successfully at several large power plants, but their success depends on a variety of site-specific conditions. For example: (1) the intake must be on a source

waterbody large enough to deploy a large net; (2) navigation, such as coal barge traffic, on the waterbody must be limited so as not to interfere with the net; (3) the waterbody must have limited debris so that the net is not damaged, and (4) biofouling associated with brackish and salt waters is a significant problem which adds greatly to increased labor and O&M costs. In short, barrier nets have sizing and physical limitations as well as the potential to interfere with other uses of the source waterbody.

Southern Company has five facilities located on oceans or tidal waters. Site-specific conditions at these facilities are very illustrative of why barrier nets may be difficult if not impossible to operate and maintain at certain locations. The following table provides a summary of these facilities and their potential impediments to use of barrier nets.

Table 11. Impediments to Use of Barrier Nets at Southern Company Facilities

Facility	Waterbody	Potential Difficulties with Barrier Nets
Kraft	Savannah River	Intake structure doubles as a coal barge unloading pier; located near the Savannah Harbor shipping channel; presence of manatees
McManus	Turtle River	High spring tides – Water could potentially flow around a barrier net
Watson	Back Bay, Biloxi River	Intake structure located at the end of a barge canal; heavy biofouling; debris loading
Smith	North Bay	Navigational issues (barge traffic); biofouling
Crist	Escambia River	Limited in size and space (small basin); navigational issues (barge traffic)

In 2004, Southern Company participated in a tailored collaboration project with EPRI (Alden Research Laboratory, Inc. as the contractor) to study the feasibility of fish protection technologies for reducing impingement and entrainment at four of Southern Company facilities. Two of the four facilities (Watson and Smith) are located on oceans or tidal waters. Alden concluded that heavy biofouling and debris loading could present difficulties at both facilities due to the characteristics of the waterbodies.

In addition, at Mississippi Power's Plant Watson, barge traffic in the vicinity of the intake structure makes barrier nets infeasible. Plant Watson has an intake structure located at the end of the coal barge canal. It would be impossible to install a barrier net without interfering with the coal barge unloading activities. Even if navigation was not an issue, the potential for heavy biofouling of the net due to the warm waters of the Gulf Coast coupled with the nutrient-rich outflows of the Biloxi River could make operating and maintaining a barrier net very difficult.

For Plant Smith, Alden concluded that a barrier net may not be a feasible due to the barge traffic close to the vicinity of the intake structure. A detailed engineering study would have to be conducted to determine if the net could be designed close enough to the intake structure to avoid barge traffic. In addition, biofouling is a potential issue due to the salt water environment of North Bay.

The proposed rule allows facilities to use alternative technologies "comparable" to barrier nets to address shellfish impingement. The proposal specifically says that passive screens, such as cylindrical wedgewire screens, and carry-over free intake screens, such as dual-flow screens and drum screens, meet the requirement. However, there are also limitations to these technologies which make them unavailable at some sites. For example, submerged cylindrical wedgewire screens are not feasible at Plant Watson due to shallow waters. Submerged cylindrical wedgewire screens require substantial water depth and area to allow navigation across the waterway. In addition, dual-flow screens have limitations too. Facilities that have through-flow screens cannot install an equivalent dual-flow screen in the bay without making significant structural modifications, if it can be done at all.

In summary, barrier nets are infeasible at some locations and very difficult to operate and maintain at other locations. Alternative technologies "comparable to" barrier nets may be

feasible at some sites, but whether they are feasible requires a site-specific engineering evaluation. Therefore, Southern Company recommends that EPA eliminate this requirement and instead allow permit writers to decide case-by-case whether further controls are warranted. Alternatively, EPA should provide a mechanism by which facilities can request relief if they can show that the technologies EPA identified as compliant are environmentally unnecessary, technically infeasible, or cost significantly more than EPA estimated.

XI. The "No Entrapment" Provision is Infeasible for Some Locations

In addition to meeting the numeric impingement standards or the velocity standard, and in addition to the barrier net provision applicable to ocean and tidal water plants, the proposal requires that all facilities avoid entrapping organisms in their cooling water intake systems. Facilities must:

> ensure that there is a means for impingeable fish or shellfish to escape the cooling water intake system or be returned to the waterbody through a fish return system. Passive screens such as cylindrical wedgewire screens, and through-flow or carry-over free intake screens such as dual-flow screens and drum screens, will meet this requirement...

Proposed § 125.94(b)(1)(vi), (b)(2)(vi). If a facility cannot document full compliance with the "no entrapment" provision, then it must count all entrapment of organisms as mortality. Proposed § 122.21(r)(6)(vii). Any facility choosing to comply with the velocity standard must submit "[a] description of technologies or operational measures to prevent entrapment of impingeable fish or shellfish by the cooling water intake system." Proposed § 122.21(r)(6)(v)(C).

There are numerous problems with this requirement, as discussed in UWAG's comments. From Southern's perspective, the most significant problem with this requirement is that it is not always feasible to return organisms to the original source waterbody. For example, Plant Daniel

uses a cooling pond as part of a closed-cycle recirculating system. Even if Plant Daniel constructs a fish return and handling system, it is impossible to build such a system that will return the organisms to the source waterbody without causing some mortality from transport of the organisms (about 0.5 miles) to the river. Because preventing entrapment will be inordinately expensive, with very limited benefit, Southern urges EPA to eliminate these provisions.

XII. EPA's Definition of Closed-Cycle Recirculating Systems Is Too Restrictive

The proposed rule provides a narrow definition of closed-cycle recirculating systems (CCRS). That definition is as follows:

> Closed-cycle recirculating system means a system designed, using minimized make-up and blowdown flows, to withdraw water from a natural or other water source to support contact or noncontact cooling uses within a facility, or a system designed to include cooling ponds that are not themselves a waters of the U.S. and that does not rely upon continuous intake flows of water. New source water (make-up water) is added to the system to replenish losses that have occurred due to blowdown, drift, and evaporation. Closed-cycle recirculating system includes, but is not limited to, wet or dry cooling towers. For cooling towers where the source for make-up water is freshwater or has a salinity equal to or less than 0.5 parts per thousand, minimized make-up and blowdown means operating at a minimum cycles of concentration of 3.0. For cooling towers where the source for make-up water is saltwater, brackish water, or has a salinity of 0.5 parts per thousand, minimized make-up and blowdown means operating at a minimum cycles of concentration of 1.5. For facilities with a closed-cycle recirculating system other than a cooling tower, minimized make-up and blowdown flows means a reduction in actual intake flow of 97.5 percent for freshwater, and 94.9 percent for salt water or brackish water.

Proposed § 125.92.

This narrow definition unreasonably restricts the flexibility of plant operations by requiring cooling towers to be operated within a specified range of cycles of concentration (COC) and flow reductions in order to qualify as CCRS.

A. Uniform Industry COCs are Infeasible

The COCs for cooling towers are site-specific. Cooling towers must be treated to prevent biological growth, corrosion, scaling, foaming, and sludge build-up, as well as to inhibit the presence of legionella and other organisms. Not all plants need to treat for all things, and all sites are different in terms of source water, system materials, temperatures, water velocities, sunlight, and other factors. Therefore, water treatment is extremely site-specific, and a single COC limit – whether that limit is 1.5, 3.0, or some other number – for all plants simply is not feasible.

EPA's memo on cooling tower optimization (authored by TetraTech, (DCN 10-6673)) discusses striking a balance between chemicals and problems with scaling and fouling:

> This optimal COC will usually involve financial and operating considerations that strike a balance between the variations in treatment chemical dosage and cost, the limits of the ability of treatment chemicals to prevent problems associated with scale formation, corrosion and biofouling, and the benefits of using less water. In cases where there are significant costs associated with obtaining source water and disposing of blowdown, these costs may provide additional incentive to set the optimal COC to high values and thus reduce make-up water volumes.

Tetra Tech memo, p. 4.

Contrary to what this passage implies, it is not possible to solve all treatment problems by adding more chemicals. Also, more chemicals mean higher concentrations of pollutants in the cooling tower blowdown. Therefore, the cooling tower blowdown stream may require additional wastewater treatment prior to discharge to meet water quality standards.

In addition, higher COCs potentially could lead to the fouling of the cooling tower fill materials. Fill fouling leads to unit performance degradation as well as forced outages. If fill fouling continues unchecked, eventually the fill will need to be replaced, which is extremely costly and affects reliability. Southern Company has been engaged in a fill anti-fouling in-situ

test program for more than a decade with successful results. From this program, we learned that fill fouling is dependent on numerous factors including, but not limited to:

1. water analysis, specifically TSS and TDS;
2. level of organics and potential for biofouling;
3. geometry of fill, dimples, flute size, water loading/velocity;
4. water treatment/chemistry program; and
5. plant operation (COC).

Biocides typically are used to clean condenser tubes. The biocides circulate through the system and decay in potency by the time they reach the tower. But the tower fill area is usually so massive that very high levels of biocide are needed to effectively mitigate biofouling. As such, the first line of defense for mitigating fill fouling is fill design and geometry. Water treatment is the second line of defense, along with plant operations. Although we can keep adding chemicals in an effort to mitigate fill fouling, at some point the chemical addition provides no additional antifouling effect. At that point, it is very likely that the addition of chemicals only increases the level of pollutants in the blowdown without increasing the cooling efficiency of the tower.

EPA's proposed COC criteria do not include consideration of the potential impact on tower fill fouling or the limitation of anti-fouling fill technology. EPA apparently believes that facilities can just keep adding chemicals (*i.e.*, biocides) so that the prescribed COC can be met. But EPA's approach ignores the consequences of fill fouling, unit degradation, and lost generation. It would also require a complete change in water chemistry programs including pH, biocides, dispersants, and corrosion inhibitors which may not yield desired results (regardless of metallurgy) in certain water chemistries.

COCs can vary at each facility due to the source water characteristics or due to the recycling of cooling tower blowdown for other purposes. In general, when salinity or conductivity of the source water increases, the plant reduces the COC to prevent scaling and corrosion of the equipment and/or fouling of the cooling tower fill. For plants located on tidally

influenced rivers, fluctuation of the COC is the norm. In order for plants to maintain the proposed COC criteria, beneficial recycling of cooling tower blowdown would have to be discontinued, and for some types of source water, chemical treatment may not be feasible or effective. In addition, increasing the COC will cause pollutant concentrations to increase which could impact the potential to exceed water quality criteria. If this happens, the cooling tower blowdown will have to be treated prior to discharge.

B. No Facility Can Maintain a Single COC Limit Under All Conditions, At All Times

If EPA agrees, after considering these comments, that uniform, industry-wide COC standards are not appropriate, it should also acknowledge that no facility can maintain any COC limit 100 percent of the time. No Southern Company facility with CCRS could comply with a set COC limit during start-up conditions. Water chemistry must stabilize during start-up. In addition, if a unit experiences a condenser leak, cooling tower blowdown is increased to reduce the TDS in the cooling water so the impact on unit chemistry and corrosion is reduced. This increase in cooling tower blowdown decreases the COC until the condenser leak is remediated. Therefore, it is impossible to operate 100% of the time at EPA's proposed COC criteria.

C. Costs and Environmental Impact of Additional Cooling Tower Treatment Chemicals

EPA says that it accounted for the costs of cooling tower optimization by increasing the O&M cost factor for cooling towers. There are two problems with this explanation. First, it is not clear that EPA made any attempt to account for the increased cost of requiring optimization for existing closed-cycle systems, as opposed to projected retrofits. The TDD suggests that EPA only considered such costs in evaluating options requiring facilities to retrofit closed-cycle cooling. *See* TDD pp. 8-17 through 8-24. Second, EPA's estimate of the O&M costs of meeting the COC requirement is far too low. According to the TDD, EPA assumed that annual O&M

costs for optimized COCs would amount to $1.25 per gpm. By Southern's calculations, at one of its facilities that achieves COCs between 2.5-3.0, the annual cost of chlorine alone is roughly $3.80 per gpm, and adding dispersants raises the cost to $6.00 gpm. At a minimum, EPA should reconsider its cooling tower optimization costs, and also consider the costs of additional water treatment that may be necessary for cooling tower blowdown at facilities that are forced to add additional chemicals.

Southern Company recommends that EPA revise the definition of "closed cycle recirculating system" to delete the required cycles of concentration and percentage flow reductions for both saltwater and freshwater facilities.[17]

XIII. EPA Should Clarify That There is Only One Compliance Point

The proposed definition of "cooling water intake structure" includes "the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States." Proposed § 125.92. Through this definition, the intake structure can include a number of waterbodies, such as a series of ponds or channels through which cooling water is routed after the initial point of withdrawal. For example, some plants withdraw water from a river or lake to a cooling pond, and then withdraw water from the pond to a once-through cooling system or a cooling tower. In these cases, the point of compliance is unclear. Is the point of compliance the river intake or the intake to the cooling system?

Unless this issue is dealt with in the rule, a plant using a cooling pond might have to comply with the impingement mortality standards twice – once from the pond into the plant and once at the makeup from the river to the pond (if both intakes are > 2 MGD).

[17] Additionally, EPA should amend the definition to correct the implication that new source water can be added to the system only to replenish losses that have occurred due to blowdown, drift, and evaporation. Closed-cycle systems occasionally need to add water for other purposes.

EPA should allow flexibility for States to determine the compliance point based on site-specific features and impacts. Also, holding or storage lakes used for intermediate storage should be clearly distinguished from cooling ponds. The definition of "cooling water intake structure" appears to include intakes used for direct make-up to cooling towers or cooling ponds, and excludes intakes that supply water from one water of the U.S. to another for the purpose of maintaining levels in storage lakes or basins.

In meetings with EPA on the proposed rule, UWAG counsel questioned EPA about this issue and was assured that EPA agrees there should be only one point of compliance. Therefore, Southern Company requests that the proposed rule be amended as follows.

- EPA should clarify that there is only a single compliance point.
- Given the many different configurations of intake canals, basins, lakes and ponds, the rule should allow flexibility for the State to determine the most appropriate compliance point.
- A unit that reuses condenser cooling water that otherwise would be discharged from a separate unit at the same facility should not be considered a use of a "cooling water intake structure." See also Section XV below.
- Intake structures that withdraw only water used for non-cooling purposes should be excluded from the rule.

XIV. The Rule Rightly Provides an Exemption for Use of Reclaimed Water But Needs to Go Farther

Southern Company supports the proposed rule's exemption for cooling water obtained from using reclaimed water. Proposed § 125.91(c) states:

> Notwithstanding paragraph (b) of this section, obtaining cooling water from a public water system, using reclaimed water from wastewater treatment facilities or desalination plants, or recycling treated effluent as cooling water does not constitute use of a cooling water intake structure for purposes of this subpart.

This exemption encourages water reuse and is an important feature of the rule. However, it should be revised to allow facilities that primarily use recycled or reclaimed water to occasionally operate back-up or emergency intakes that would be exempt from the rule.

An excellent example of reclaimed water use is Gulf Power's Plant Crist partnership with the Escambia Coastal Utilities Authority (ECUA). ECUA supplies Plant Crist with discharge from its wastewater treatment facility for cooling water and other purposes. Plant Crist wanted to secure a reliable, high quality, and low-chloride water source to (1) produce market-quality gypsum and eliminate long-term storage of products generated on-site, (2) meet current water discharge limits and future water permit limits, and (3) reduce intake water flows. ECUA's discharge water is cleaner than raw river water and its low-chloride content helps Plant Crist produce marketable gypsum.

The partnership helped ECUA construct a new wastewater treatment plant. The former plant, which was located in downtown Pensacola, disposed of millions gallons of treated effluent a day into Pensacola Bay. The former plant was also located in a storm-surge flood plain and was damaged during Hurricane Ivan in 2004. The benefits of this partnership are as follows.

- Plant Crist began using millions of gallons a day of treated wastewater from the plant. This helped establish the ECUA advanced wastewater treatment plant as a zero-discharge facility.
- Plant Crist was able to reduce its use of Escambia River water by 12-14 million gallons per day.
- The new plant, by replacing the former ECUA plant, eliminated millions of gallons a day of effluent discharged into Pensacola Bay and is now located outside of the flood plain.
- The new plant provided a high-quality industrial water source, while allowing Plant Crist to reduce chemicals and on-site treatment of river water.
- Wastewater from the new ECUA plant meets advanced wastewater treatment standards.

Plant Crist has used a total of 1.9 billion gallons of reclaimed water since November 2010 in Units 6 and 7 for cooling purposes.

However, there are situations where the reclaimed water source could be interrupted (*e.g.*, by-passes or upsets that result in the cessation of supply) and during these times Plant Crist will need a back-up source of intake water so operations can continue. The only back-up source available to Plant Crist is surface water. Requiring Plant Crist, which relies primarily on reclaimed water for cooling, to meet the new intake requirements during these brief interruptions would provide minimal environmental benefits while requiring significant expenses. Therefore, Southern Company recommends that EPA exempt back-up or emergency intakes for plants that obtain 85% or more of their cooling water from reclaimed water sources, desalination plants, or reuse of any effluent, whether treated or untreated.

XV. EPA Should Clarify That All Effluents from Power Plants Are Exempt

At some facilities, the cooling water intake structure is located on the discharge canal or otherwise in the discharge of another unit. Of course, this configuration is highly protective as the cooling water used for one unit is then reused in another unit, greatly reducing the amount of source water used by the facility overall.

In proposed § 125.91(c), EPA provides an exemption for "treated" effluent, but not for untreated effluent. Southern Company recommends that EPA delete the word "treated" from the exemption, and explicitly apply the exemption to intake structures that reuse cooling water that would otherwise be discharged by other units. If an effluent can be recycled, it should be recycled, whether it has been treated or not.

XVI. The Proposed Rule Will Cause Special Problems for Nuclear Plants

Modifications to cooling water intake structures – and ongoing impingement mortality sampling requirements – pose special security and safety problems at nuclear units. EPA has attempted to accommodate the special problems of nuclear units with the following provision:

> If the owner or operator of a nuclear facility demonstrates to the Director, upon the Director's consultation with the Nuclear Regulatory Commission, that compliance with this subpart would result in a conflict with a safety requirement established by the Commission, the Director must make a site-specific determination of best technology available for minimizing adverse environmental impact that would not result in a conflict with the Commission's safety requirement.

Proposed 40 C.F.R. § 125.94(e).

But this special "nuclear" provision is insufficient given unique security, cost, and timing considerations associated with nuclear facilities.

A. Security Considerations

1. Security barrier considerations

Nuclear stations have size and configuration requirements for piping and culverts that cross security barriers, and any fish return trough or pipe that crossed a barrier would have to meet those requirements. For Southern Nuclear, this obligation would be a potential problem for at least one of its three nuclear plants, and additional security measures may be required.

Penetrations across a Protected Area boundary for piping and equipment pathways generally require structural or surveillance and detection strategies, or both, to ensure they are not used to infiltrate the facility. A fish return trough passing through the boundary would likely require robust grating installed directly in or across the trough and routine direct inspection by the security organization to ensure that the grating remained intact and in good condition. Equipment configurations across the security boundary create additional initial costs and an

ongoing burden for surveillance, but they can be accomplished. However, installed in-line grating in a return trough would increase the potential for equipment surface contact during fish transit through the system, increasing potential injury or mortality to the fish and reducing the effectiveness of the return system.

2. Sampling challenges

Personnel sampling close to or outside nuclear station security barriers and fences create security issues. The proposed rule would require a great deal of sampling for impingement mortality. Sampling work performed near security features may require compensatory measures (such as the posting of additional security officers) to ensure that detection capabilities and physical barriers are maintained in accordance with NRC and station security plan requirements.

B. Cost Implications

Having a fish return system or barrier net itself may not present a nuclear safety issue, provided it is properly designed and the cooling water system is modified to satisfy nuclear design criteria. But an additional burden is imposed on nuclear facilities because, to make the modifications and ensure compliance with nuclear design criteria, there will be higher engineering and construction costs and longer downtime for construction, compared to fossil plants. Having to address security concerns, seismic criteria, missile protection, and other NRC requirements will add to design and construction costs. It does not appear EPA has recognized these costs in its economic analyses.

C. Unworkable Timing Implications for Nuclear Facilities

EPA's attempt to provide a site-specific exemption (proposed § 125.94(e)) to avoid conflict with NRC requirements is well-intentioned but does not go far enough. The site-specific exemption is not available until the NRC has been consulted. Even assuming the Director (state permit writer) consults the NRC promptly, there is no assurance that the NRC will respond

quickly enough to meet the § 316(b) rule's schedule. If complying with the EPA rule would violate an NRC safety rule and if the NRC did not "consult" the Director in time, the facility might well have to either violate the § 316(b) rule or shut down. We believe the NRC will take a long time reviewing a proposed State requirement that would violate NRC safety requirements, and the priority that NRC would give such requests is unknown.

D. Recommendations for § 316(b) Nuclear Provisions

Southern Company recommends three solutions to the problems with the proposed rule as related to nuclear facilities, as described below.

1. Eliminate unnecessary requirements given other regulatory protections

For nuclear units, which have undergone NEPA review, the § 316(b) rule is largely unnecessary. Since the NRC's licensing of nuclear units falls under the NEPA, operating nuclear units in the United States have had thorough environmental impact evaluations (including the impacts of impingement and entrainment) performed by the NRC in accordance with NEPA requirements, which are designed to avoid or minimize environmental impacts.

Also, in issuing (or maintaining) an operating license to a nuclear facility, the NRC considers environmental impacts, public health and safety impacts, site security requirements, and a host of other issues to ensure that the facility is operated safely with no significant impact on the environment or public health. This over-arching licensing process amounts to a facility-specific BTA determination that takes into account the unique aspects of a nuclear unit.

Accordingly, the § 316(b) rule should acknowledge the NEPA process and the nuclear facility licensing process and provide that either review establishes "best technology available" for the facility, absent evidence to the contrary.

2. Extended entrainment timeline for nuclear facilities

The proposed § 316(b) rule should be amended to include a categorical extension for entrainment study and implementation in order to maximize the environmental benefits of the proposed rule. For nuclear facilities, entrainment study deadlines could be extended to 10 years and entrainment implementation to 15 years from the effective date of the rule. This extension of time for the nuclear baseload is particularly important in light of the impact current and pending air regulations will have on the price of electricity. In order to minimize the economic shock of these cumulative price increases, the § 316(b) rule should facilitate operation of generating units with the lowest emissions.

Nuclear power stations provide reliable, low-cost, baseload electricity without emitting greenhouse gases or other air emissions. Nuclear facilities also require extended periods of time for design, licensing, and construction of plant modifications. Extending the entrainment study and implementation timeline ensures that all applicable nuclear safety aspects are fully vetted and in compliance with all NRC-required codes and standards. Otherwise, the extended outage times associated with multiple nuclear retrofits in a region could result in short-term increases in air emissions, including greenhouse gases, and in some cases place considerable stress on electricity supplies that threaten reliability.

XVII. EPA Should Grandfather Any Facilities Already Obtaining Cooling Water from Independent Suppliers

According to the proposal, if a facility receives its cooling water from an independent supplier, the intake of the supplier becomes subject to the rule. Proposed § 125.91(b) provides as follows:

> Use of a cooling water intake structure includes obtaining cooling water by any sort of contract or arrangement with one or more independent suppliers of cooling water if the independent supplier withdraws water from waters of the United States but is not itself a

> new or existing facility . . . .An owner or operator of an existing facility may not circumvent these requirements by creating arrangements to receive cooling water from an entity that is not itself a facility subject to subparts I or J of this part.

EPA also applied this requirement in the Phase I rule. Phase I new facilities could plan their water supplies to fit the rule. But for existing facilities that are already receiving their water from independent suppliers this provision is a significant hardship. Mississippi Power's Plant Daniel was constructed in the 1970s with a design to obtain water from the Jackson County Port Authority's Black Creek Cooling Pond. Jackson County Port Authority is an independent supplier that is not within the scope of the rule. Under the proposed rule, Plant Daniel either has to engage in extended contract negotiations with the Port Authority over the construction and management of its intake or build a separate new intake.

Under the first option, even if various intake requirements were written into a contract between Plant Daniel and the Port Authority, actual compliance with those terms would be the responsibility of the Port Authority. Leaving compliance up to a third party is not an acceptable mode of operation for Southern Company.

The second option – building a new intake – would be extremely difficult because the most logical water supply would be the East Pascagoula River. If Plant Daniel constructed a new intake on the River, the entire pipeline from the intake to the plant would have to be permitted and constructed through a highly productive wetlands area.

Southern Company recommends that EPA "grandfather" all facilities that can demonstrate they were receiving cooling water from independent suppliers at least two years before the effective date of the rule. The recommended two-year provision will prevent plants from circumventing the rule in the future by obtaining water from independent suppliers. Thus, EPA's concerns regarding circumvention of the rule would be addressed. But at the same time

the handful of facilities with current, longstanding contracts for water from independent suppliers would not be penalized by having to find another source of water or face the risk of noncompliance due to acts or omissions of a third party.

XVIII. Facilities Withdrawing Less than 5% of the Mean Annual Flow of the Source Water Should be Exempt from Entrainment Requirements

EPA should not require permit writers to evaluate entrainment controls for facilities situated (1) on lakes or reservoirs or (2) on freshwater rivers or streams from which the facilities' actual intake withdrawal is less than 5 percent of the mean annual flow.

EPA's Phase II rule recognized that the life history characteristics of freshwater species make the risk of significant entrainment occurring in these settings much lower. Recognizing the role that location (waterbody type) plays with regard to adverse environmental impact (69 Fed. Reg. 41,375, 41,614 col. 2 (July 9, 2004)), EPA concluded that entrainment standards should not apply to facilities that withdraw cooling water from lakes or reservoirs or from freshwater rivers and streams (if the flow withdrawn amounts to less than 5 percent of the mean annual flow), because such facilities "have a low propensity for causing significant entrainment impacts" 69 Fed. Reg. at 41,598 col. 3.[18] Screening out low-risk facilities/waterbodies at the outset is appropriate, and allows for resources to address areas of potentially higher risk.

[18] As EPA explained in the preamble to the Phase II rule:

> The Agency considers location, one aspect of which is waterbody type, to be an important factor in addressing adverse environmental impact caused by cooling water intake structures. Because different waterbody types have the potential for different adverse environmental impacts, the requirements to minimize adverse environmental impact vary by waterbody type.

69 Fed. Reg. at 41,599 col. 1-2.

EPA now disclaims its earlier decision that waterbodies differ. It says its re-analysis of impingement and entrainment data

> does not support the premise that the difference in the density of organisms between marine and fresh waters justifies different standards. More specifically, the average density of organisms in fresh waters may be less than that found on average in marine waters, but the actual density of aquatic organisms in some specific fresh water systems exceeds that found in some marine waters. EPA also believes the different reproduction strategies of freshwater versus marine species make broad characterizations regarding the density less valid a rationale for establishing different standards for minimizing adverse environmental impact.

76 Fed. Reg. at 22,274 col. 1.

As explained in further detail in UWAG's comments, EPA's sole support for its reversal of opinion is six graphs which EPA interprets as demonstrating that organisms are present "in all waterbody types in similar situations." See TetraTech Memorandum, DCN 10-6701 and DNC 10-6701A. The graphs illustrate the relative density of organisms in six different waterbody types (Estuary/Tidal River, Freshwater River < 5%, Freshwater River > 5%, Great Lakes, Other Lake/Reservoir, and Ocean). Industry experts studied these graphs and asked EPA to provide the data underlying the graphs. But when our experts reviewed the data, they found several inconsistencies between the graphs and the data. These inconsistencies have not been resolved, although our experts requested a conference call with EPA's technical experts more than six weeks ago. Therefore, the validity of EPA's evidence for determining that the density of organisms is similar across waterbody types.

Retaining the waterbody type and proportional flow provisions of the 2004 Phase II rule in the final rule for existing facilities would reduce the burden on state permit writers while preserving the effectiveness of the rule in minimizing entrainment-related impacts. Reinstating these distinctions would not significantly change the compliance framework EPA put forth in the

proposed rule, would be consistent with EPA's proposal to focus evaluations of entrainment controls on situations involving greater likelihood of appreciable entrainment, and could be accomplished on the schedule EPA has set for completing the final rule. Southern Company continues to believe that entrainment controls should not be required for facilities with actual intake withdrawals less than 5 percent of the mean annual flow of a stream or river, or fresh water lake. Any environmental impact from these facilities would be minimal.

XIX. Facilities With Capacity Utilization Rates Less Than 15 Percent Should be Exempt

In the Phase II rule, EPA sensibly applied its entrainment performance standards to facilities only if they had a capacity utilization rate of 15 percent or greater. See 40 C.F.R. § 125.94(b)(2)(i) (since withdrawn), 69 Fed. Reg. at 41,686 col. 1.

Likewise, the rule for existing facilities should make an exception for facilities that withdraw water only infrequently or as a back-up. We understand that EPA is concerned that facilities may run their pumps even when they are not generating electricity. See 76 Fed. Reg. at 22,188 col. 2-3. But this could be handled by allowing the permit writer to develop case-by-case entrainment standards for low-utilization facilities where power generation does not closely track water withdrawal.

Southern Company has several peaking plants with low utilization rates. For example, Mississippi Power's Plant Eaton is a peaking facility with a design intake flow of 112 MGD. It has operated on average 283 hours per year over the past three years. This translates to 12 days of operation per year with an average net capacity factor of 0.40. The plant does not operate its intake pumps when the units are off, except infrequently when maintenance is necessary. As shown in the table below, the three-year average annual intake flow is 1.3 million gallons per day.

Table 12. MPC Plant Eaton Capacity Factor and Intake Flows

Year	Service Hours	Net Capacity Factor	Annual Intake Flows Million gallons/day
2008	352	0.49	1.7
2009	0	0	0
2010	496	0.71	2.3
3-yr avg.	**283**	**0.40**	**1.3**

Because of budgeting constraints, low utilization plants generally are careful to minimize the running of their pumps when not generating power. When it is not generating power, Georgia Power's Plant McManus only runs its pumps 10 to 12 times per month for about an hour as a basic maintenance step. During each one-hour period the cooling system is treated with chlorine for biofouling control.

Because the impact of low-utilization power plants is very small, neither impingement nor entrainment limits should apply – except, as we say, where the facts are that a particular plant withdraws significantly more water than its capacity utilization would suggest. In fact, many plants such as Plants Eaton and McManus continue to operate, albeit infrequently, because they provide voltage support when the transmission system is at capacity and they provide needed power during periods of critical demand.

XX. EPA Should Revise the Application Requirements to Reduce Burdens for Facilities with Closed-Cycle Recirculating Cooling Systems that Use Some Water for Other Purposes

Proposed 40 C.F.R. § 122.21(r)(1)(ii)(A) provides as follows:

> The owner or operator of an existing facility…with a cooling water intake structure that supplies cooling water *exclusively* for operation of a wet or dry cooling system and that meets the definition of closed cycle recirculating system at 40 C.F.R. 125.92 must submit to the Director for review the information required under paragraphs (r)(2), (3), and (6) of this section. [All other existing facilities] must submit to the Director for review the information required under paragraphs (r)(5), (7), and (8) of this section.

(Emphasis added.)

This provision allows those facilities operating wet or dry cooling towers to submit only the source water physical data, cooling water intake structure data, and the impingement reduction mortality plan portions of the application materials. See 122.21(r)(2), (3), and (6). But if the intake structure servicing the towers also withdraws *any* water for other purposes, then the application requirements are much increased. In that case, the facility also has to prepare and submit the cooling water system data, performance studies, and operational status data portions of the application materials. See 122.21(r)(5), (7), and (8).

Many plants use their existing intakes to obtain water for purposes other than cooling. Because cooling water usage is almost always the great majority of water used, it makes no sense to build separate intakes to obtain relatively small amounts of water for other purposes. Under the provision as drafted, a great majority of facilities with wet or dry cooling towers would have to complete the additional portions of the application materials because their intakes are not "exclusively" used to obtain cooling water. This increase in paperwork is not justified. Existing facilities with wet or dry cooling towers have greatly reduced flows which minimize impingement and entrainment. Permittees and permit writers should not be burdened with extra application requirements merely because the intake for the cooling towers also draws up minor amounts of water for other purposes. Southern Company recommends replacing the word "exclusively" in 122.21(r)(1)(ii)(A) with the word "primarily."

Also, Southern Company recommends similar changes to proposed § 125.95(a)(1) and (2). According to § 125.95(a)(2), the Director may waive some or all of the information requirements of 122.21(r)(8), (9), (10), (11), and (12) if "[t]he owner or operator of the facility uses cooling water *exclusively* for operation of a wet or dry cooling system that meets the

definition of closed cycle recirculating system." Southern Company recommends deleting "exclusively" from this section and adding an "or" between § 125.95(a)(1) and (a)(2).

XXI. EPA Should Revise the Proposed Definition of "Cooling Pond"

The rule's definition of "cooling pond" should be revised. It reads as follows:

> Cooling pond means a man-made canal, channel, lake, pond, or other impoundment designed and constructed to provide cooling for a nearby electric generating or manufacturing unit. A cooling pond may comprise a closed-cycle recirculating system when waters of the U.S. are withdrawn *only* for the purpose of replenishing losses of cooling water due to blowdown, drift, and evaporation.

Proposed § 125.92 (emphasis added).

Under the proposed definition, if there is any use of the cooling pond's waters other than for blowdown, drift and evaporation, the pond cannot be a closed-cycle recirculating system. This definition is too restrictive and does not even allow for make-up sufficient to maintain levels in the cooling pond associated with permitted withdrawals or discharges. Most facilities using cooling ponds draw water from the pond for a variety of uses in their processes. These uses might include: (1) service water; (2) water for emergency back-up and fire protection systems; and (3) water for facility maintenance systems and sanitary uses. This stringent definition would also preclude the beneficial reuse of the condenser discharge or cooling tower blowdown for other plant processes. Southern Company recommends that EPA revise the proposed definition by replacing the word "only" with the word "primarily" and adding "or losses associated with permitted withdrawals or discharges" after "evaporation." This change would allow the Director to evaluate site-specific water uses during the permitting process.

XXII. The Requirement for New Units Should be Re-Thought, Particularly as to How Reductions in Flow and Entrainment Mortality Are Determined

EPA proposes to treat modifications of existing units (*i.e.*, "rebuilt, repowered, and replacement units") the same as unmodified existing units but to impose stricter presumptive standards on new units built on existing sites. *See* proposed 40 §§ 125.93(c), 125.92 (definition of "new unit"). EPA proposes to subject all existing facilities to the same impingement requirements but would require new units to meet closed-cycle cooling flow reductions or 90 percent of closed-cycle cooling mortality reductions unless the cost of doing so would be wholly out of proportion to the costs EPA considered in setting the requirement or would cause significant adverse impacts on local air or water quality or energy markets. Proposed § 125.94(d)(1).

A. Closed-Cycle Cooling Should not be Required at Rebuilt, Repowered, or Replacement Units at an Existing Facility

Southern Company agrees that "rebuilt, repowered, and replacement units" should be treated as part of the existing facility and not be subject to more stringent requirements. In the Phase II rulemaking, EPA gave careful thought to whether new or modified power generating units at existing facilities should be subject to requirements more stringent than requirements for other units at the same facility. The Agency rejected that approach, instead concluding that all changes to existing facilities for purposes of the same industrial operation should be treated as part of the existing facility and subject to the same regulatory requirements, unless the new unit or modified unit qualified as a "new facility" (which includes a free-standing unit built at an existing site) subject to EPA's Phase I § 316(b) rule. 69 Fed. Reg. at 41,579 col. 3.

In making this determination, EPA recognized that imposing more stringent controls on new or modified units at existing facilities might not be technically feasible for a variety of site-specific reasons, would discourage or preclude projects to improve energy efficiency and supply,

and would lead to urban sprawl. 69 Fed. Reg. at 41,580 col. 1. EPA reached this conclusion based on much of the same record that it has for the development of this rule.

More stringent requirements, especially for modified units, would jeopardize many environmentally and economically beneficial projects. These include nuclear power upgrades, fuel conversions, and repowering projects that increase operating efficiency, thereby reducing air emissions per megawatt of electricity generated. Additionally, imposing more stringent requirements that may not be technologically or economically achievable for new units would discourage power companies from constructing new, more efficient, less polluting units at old power plants. The United States will need both new and modified units if it is to satisfy anticipated demand for electricity. Furthermore, major modifications may be required in order to comply with regulations under the Clean Air Act or the Resource Conservation and Recovery Act. If those changes were to trigger more stringent § 316(b) requirements, virtually all existing fossil fuel-fired plants could be subject to more stringent intake structure controls.

Therefore, EPA's final rule should not have more stringent requirements for modified units at existing facilities. Ideally, there should not be more stringent requirements for new units. Instead, the rule should apply the same requirements to all units at an "existing facility," consistent with EPA's Phase I determination.

B. The Closed-Cycle Cooling Requirement for New Units is not Flexible Enough

EPA proposes a requirement that new units (1) "reduce actual intake flow … commensurate with that which can be attained by the use of a closed-cycle recirculating system," or (2) reduce entrainment mortality equivalent to at least 90 percent as much as closed-cycle cooling. Proposed § 125.94(d)(1) and (2). Alternative requirements can be set, but only where costs are "wholly out of proportion" to the costs EPA considered or where closed-cycle cooling would have significant adverse impacts on local air, water, or energy markets. 76 Fed. Reg. at

22,283 col. 3. If EPA rejects our recommendations to delete the more stringent requirements for new units, it should at least make them flexible enough to address sites where meeting the requirements is not technically feasible.

The proposed rule provides that the "commensurate with closed-cycle" requirement is met by an intake structure that supplies cooling water "exclusively for operation of a wet or dry cooling tower(s)." Proposed 40 C.F.R. § 125.94(d)(1), 76 Fed. Reg. at 22,283 col. 2. (Similarly, the definition of "cooling pond" in § 125.92 makes a pond a closed-cycle system when waters are withdrawn "only for the purpose of replenishing losses of cooling water due to blowdown, drift, and evaporation." See 76 Fed. Reg. at 22,281 col. 2.)

But many cooling water intake structures – perhaps most – in addition to providing cooling water for the plant or for a cooling tower – also withdraw service water. Some of the service water may be used not to cool the condenser but to cool bearings or for other purposes. These uses require only a small amount of water (less than one percent of the water withdrawn). Even so, they may disqualify a pond as a "closed-cycle system" for new units under (d)(1), or else force the operator to construct a separate intake for the small amount of service water.

The language "exclusively for operation of a wet or dry cooling tower" in § 125.94(d)(1) and the phrase "only for replenishing losses of cooling water due to blowdown drift, and evaporation in the definitions of "closed-cycle recirculating system" and "cooling pond" are needlessly restrictive. This language could cause resources to be wasted constructing new intakes with little or no benefit to the environment.

XXIII. The Proposed Application Requirements Are Unreasonable

A. Permit Writers Should Evaluate Impingement and Entrainment Options At the Same Time

For more than thirty years, permit writers have evaluated impingement and entrainment jointly during permit renewals. It is unclear why EPA now wants permit writers to assess impingement first, and then turn to entrainment. The inflexible 8-year deadline for compliance with impingement controls means that some facilities will be forced to choose and install impingement controls before they know whether and, if so, what entrainment controls are required.

Southern Company supports UWAG's recommendation that EPA eliminate the uniform impingement standards for facilities with actual intake flow (AIF) greater than 125 MGD and instead have the permit writer determine BTA on a site-specific basis for both impingement and entrainment mortality. This revision is particularly necessary because the proposal specifies that both impingement and entrainment are to be considered in the Entrainment Characterization Study (§ 122.21(r)(9)) through its incorporation of the Source Water Baseline Biological Characterization Data (§ 122.21(r)(4)).

Alternatively, EPA could allow for extension of impingement compliance deadlines where the entrainment determination has not yet been made or where the compliance option selected for entrainment will also address impingement but will take additional time to implement.

B. EPA Should Waive Certain Application Requirements for All Facilities with Closed-Cycle Recirculating Systems

For a closed-cycle facility, EPA should streamline all application processes. As discussed above, closed-cycle facilities have greatly reduced intake flow and therefore are very protective. During the first permit cycle after promulgation of the rule, a closed-cycle facility

(whether it has cooling towers or cooling ponds) should certify that it is closed-cycle and describe its cooling system. Once the permit writer has that information, no further § 316(b)-related application requirements should apply. Closed-cycle facilities should be exempt from the majority of 122.21(r) application requirements as well as all impingement/entrainment related studies and reports.

If the permit writer believes that the facility, despite its closed-cycle system, is causing adverse environmental impact, the permit writer would always have the right to seek further information. But as a matter of course requiring additional application materials from closed-cycle facilities is overly burdensome and not likely to improve environmental protection.

C. EPA Should Allow At Least One Year for Submittal of the Impingement Mortality Reduction Plan and the Entrainment Mortality Data Collection Plan

According to § 125.95(b)(1)(i), facilities with a DIF of 50 MGD or above must submit information required in 40 C.F.R. 122.21(r)(2)-(8) to the Director no later than *six months* after the effective date of the final rule. This includes a Impingement Mortality Reduction Plan (IMRP) that identifies the approach the owner or operator of the facility will use to meet the BTA standards for impingement mortality at 40 C.F.R. 125.94(b). In addition, power producers with an AIF greater than 125 MGD must submit their entrainment mortality data collection plan (EMDCP) no later than *six months* after the effective date of the final rule. Proposed § 125.95(b)(2)(i). The EMDCP must be peer reviewed no later than *6 months* after submission to the Director. Proposed § 125.95(b)(2)(ii). All of these requirements are a very heavy burden for permittees in a short amount of time, particularly if a company has multiple facilities.

In discussions with EPA, UWAG counsel learned that EPA actually intends to require the permittee to submit the IMRP within six months, and then have three and a half years to decide

on and commit to a plan for achieving compliance with its IMRP. If this is EPA's intent, then it should clarify the rule by modifying § 125.95(b)(1)(ii).

Southern Company submits that six months is not enough time to research, develop and submit an IMRP and an EMDCP. We recommend that EPA allow at least *one year* from the effective date of the final rule for submittal of the IMRP and the EMDCP.

D. Completing the Required Studies on Time Will be Difficult for Facilities with Low Capacity Utilization

Low capacity units may have trouble meeting timeframes for the impingement characterization studies (proposed § 122.21(r)(6)) because they do not operate all the time. As noted above, a facility subject to impingement requirements must submit its impingement mortality reduction plan no later than six months after the effective date of the rule. See Exhibit IX-1, 76 Fed. Reg. at 22,255. The results of impingement mortality reduction plan must be submitted to the Director no later than 3.5 years after the effective date of the final rule. Proposed § 125.95(b)(1)(ii). But if the units are not running consistently during this time period (*e.g.*, only several weeks per year), it will be impossible to perform impingement characterization studies. Requiring them to run either the intake pumps or the entire unit for the sake of the required demonstration is hugely wasteful, from both an economical and environmental perspective. It is estimated that a forced plant operation of Plant Eaton, solely for purposes of performing monthly impingement studies, would result in a cost exceeding $1 million.

Rigid submittal deadlines and implementation are simply infeasible for many plants, including low capacity utilization plants. EPA should allow permit writers, working in coordination with the individual permittees, to set compliance schedules that make sense for the

individual plants. This would allow for sufficient flexibility to link application requirements to permit renewals, where appropriate.

E. Peer Review Requirements are Onerous

The requirements to obtain peer review of all four components of the site-specific entrainment study are overly broad and unduly burdensome. The permit writer should have authority to require peer review of some or all sections of the entrainment study. The number of peer reviewers that can be required should be limited to one for each study component. Also it should be recognized that a peer reviewer could potentially review several study components. The rule should specify that all peer reviewers must possess specific credentials in the areas of expertise required for the review.

F. Permit Renewal Processes Should be Streamlined Where There Have Been No Significant Changes

After the initial assessment of "best technology available" in the first permit cycle under the new rule, the permittee should not be required to do additional studies and submit further documentation unless there is a significant change in the facility's cooling system. The proposed rule requires the § 122.21(r) application materials for each permit cycle, regardless of whether or not the facility has been modified. The preamble states: "As proposed, the permit application studies at § 122.21(r) would be required for each permit renewal." 76 Fed. Reg. at 22,258 col. 2. See also Proposed § 125.98(a). If there have been no major changes to the facility's cooling systems, the permittee should not have to prepare and submit the § 122.21(r) application materials. Preparation of the application materials by the plant for each permit cycle and review of the materials by the state permit writer would be a waste of time and resources.

XXIV. Estimated Compliance Costs for Southern Company Facilities

To assess compliance costs for the proposed rule, Southern Company conducted a conceptual engineering assessment of each of its in-scope facilities. As explained in Sections V and VIII above, the proposed numeric impingement mortality standards are not achievable, and for many of our facilities, the intake velocity standard is technically infeasible. Therefore, we must resort to building large capital projects, including closed-cycle cooling, to reduce the intake flow and associated velocity to meet impingement requirements. In addition, facilities with existing closed-cycle cooling that do not meet the proposed intake velocity standard must make necessary modifications to the intake structure to meet the standard. Based on our preliminary assessment, total system-wide capital costs for compliance will be in excess of $1.5 billion in 2011 dollars.

A. Application and Study Costs

The initial application and study requirements of the proposal rule are unduly burdensome and expensive. Southern Company estimates its system-wide application and study costs for 28 in-scope facilities will exceed $16 million in 2011 dollars. To generate this estimate, we assumed that all 28 facilities will be required to provide certain parts of the information specified in § 122.21(r)(2)-(8). This estimate also includes the comprehensive engineering studies and peer review requirements of § 122.21(r)(9)-(12) for 11 facilities with AIF > 125 MGD. While the rule provides that the Director has the discretion to exempt permittees from some of these studies, we must assume that all of our facilities will be required to perform these studies. Furthermore, the rule requires the Director to submit a detailed decision document for each site-specific entrainment BTA determination, including those facilities with AIF < 125 MGD; therefore, we expect some level of study will be required by all facilities. We anticipate

the cost of these studies and the required peer reviews will be increased by the high demand and low supply of regional consultants in the years following promulgation of the rule.

These system-wide application and study costs do not include preliminary engineering studies to evaluate potential technology options at each facility. These studies will be required prior to the application and study requirements to eliminate technology options due to site-specific limitations. For example, submerged cylindrical wedgewire screens to address impingement requirements may not be feasible due to limited water depth and area.

B. Impingement Control Costs

EPA has proposed two alternatives for impingement controls: (1) impingement mortality limitations (numeric standards) for all life stages of fish that are collected in a 3/8 inch sieve and held for a period of 24 to 48 hours to assess latent mortality; or (2) demonstration that the cooling water intake has a maximum intake velocity of 0.5 fps (through-screen) under all conditions, including minimum ambient source water surface elevations and maximum head loss across the screens during normal operation of the intake structure. In addition to the above standards, facilities on oceans or tidal waters must reduce impingement mortality of shellfish to a level comparable to that achieved by proper deployment of barrier nets or passive screens. Also, facilities must ensure that there is a means for impingeable fish or shellfish to escape the cooling water intake system or be returned to the waterbody through a fish return system (*i.e.*, no entrapment provision). Additionally, existing traveling screens must be modified to include collection buckets with guard rails, smooth woven mesh screen materials, a low pressure wash, and a fish handling and return system with sufficient water flow to return fish to the source water in a manner that does not promote predation or re-impingement of the fish.

During our study, 23 of the 28 in-scope facilities were evaluated. Of the 23 facilities, three are newer facilities designed with closed-cycle cooling and cylindrical wedgewire screens

to meet the < 0.5 fps intake velocity. One facility with closed-cycle cooling currently meets the proposed intake velocity standard with an underflow weir. The remaining 19 facilities will need significant capital investments to comply with the proposal's impingement requirements. As discussed in Section V, EPA's proposed numeric impingement mortality standards are not valid or achievable; therefore, only the intake velocity standard was considered. Section VIII.C. provides an evaluation of existing intake structure(s) at each facility to determine whether it is possible to expand them to reduce the velocity to the proposed standard. Only 6 of the 19 facilities evaluated have the ability to expand their intake structures to comply with this alternative. Capital costs for the 6 facilities to comply with the proposed intake velocity standard are based on the addition of 34 new intake screens and modification of 18 existing screens at a capital cost of $91 million in 2011 dollars. This estimate includes intake expansions for three facilities with closed-cycle cooling, which EPA apparently has assumed will meet the velocity standard.

For two of the remaining 13 facilities, newly constructed intake structures at different locations on the waterbody is a potential option to meet the proposed intake velocity standard. In these cases, the plant owns the property and the location would be conducive to building a larger intake structure without interfering with navigation or other plant operations. The total estimated capital costs for these two intake structures are on the order of $85 million in 2011 dollars.

For the remaining 11 facilities, we assume that closed-cycle cooling would be required to meet the proposed intake velocity standard. Therefore, as a result of impingement requirements alone, 11 out of the 16 facilities that do not currently have closed-cycle cooling will be forced to retrofit closed-cycle cooling or retire units. Capital costs to retrofit to closed-cycle cooling for these facilities were estimated using EPRI's costs coefficients (dollars per GPM) based on four

degrees of difficulty for fossil plant retrofits[19]. We estimated total capital costs for cooling towers at these 11 facilities at $1.3 billion in 2011 dollars.

The capital costs for barrier nets on oceans and tidal waters to minimize impingement of shellfish were estimated by Southern Company from existing water flow at $4,000 per cfs. The costs include use of two barrier nets per intake to allow for the cleaning and maintenance of one net at a time. The total capital costs for barrier nets at five Southern Company facilities are estimated to be $6 million in 2011 dollars. However, it should be noted that it will be very difficult if not impossible to install barrier nets or passive screens at these five facilities due to coal barge traffic in the vicinity of the intake structure and/or heavy debris loading.

Three nuclear and two fossil plants were not included in this preliminary evaluation due to time constraints. It is very likely that all five of these plants will require intake expansions/modifications; however, capital cost estimates for these facilities are not included in the total costs for Southern Company.

C. Entrainment Control Costs

Best Technology Available (BTA) standards for entrainment mortality for existing facilities must be established by the Director on a case-by-case basis and must reflect the maximum reduction in entrainment mortality warranted after consideration of all factors relevant for determining the BTA at each facility. Although EPA's proposed rule does not mandate closed-cycle cooling, the rule's unachievable numeric impingement mortality standards, inflexible and restrictive intake velocity standard, and the determination of entrainment controls means 11 facilities with once-through cooling will be required to retrofit closed-cycle cooling to

[19] *Closed-Cycle Cooling System Retrofit Study: Capital and Performance Cost Estimates*. EPRI, Palo Alto, CA: 2011. 1022491

meet the proposed rule. As provided in the previous section, the capital costs for these cooling towers are estimated at $1.3 billion in 2011 dollars.

Several factors could significantly increase these costs. For example, our preliminary cost estimates do not include land acquisition costs that might be necessary at some sites for cooling tower construction. In addition, our estimates do not include any unanticipated difficulties with the retrofits, such as site geological conditions which may result in unusually high site preparation or system installation costs. Considering these unknown factors, our cost estimates should be considered conceptual and not detailed design quality.

Also, the cycle of concentration (COC) portion of the definition of "closed-cycle recirculating system" may require some facilities to significantly increase their O&M costs for additional water treatment, maintenance, and chemicals, in order to meet the proposed COC criteria. If the proposed COC criteria cannot be met, it is not known at this time what capital expenditures may be required.

D. EPA's Capital Costs for Proposed Rule

Southern Company projects total capital costs in excess of $1.5 billion in 2011 dollars for 20 facilities to meet the proposed rule. This estimate does not include capital costs for five additional in-scope facilities. In contrast, EPA projects total capital costs on the order of $60 million for 25 Southern Company facilities (Letter from Paul Shriner, EPA, containing a CD with 34 files, dated July 7, 2011). To develop these costs, EPA assigned a cost module for impingement mortality reduction requirements to each facility using the flow chart provided in Exhibit 8-1 of the TDD and site-specific information collected from the Industry Questionnaire (January 2000). EPA did not attempt to estimate entrainment mortality reduction requirements and the associated capital costs for facilities that have an actual intake flow (AIF) > 125 MGD,

even though entrainment studies will be imposed and a written decision by the Directors of the permitting authority will be required.

The cost modules selected by EPA for impingement reduction requirements and their associated capital costs for each facility are provided Table 13.

Table 13: EPA Plant Descriptions and Projected Capital Costs for Southern Company Facilities

Plant Name	Cooling System Description	AIF (MGD)	*EPA Cost Module	EPA Capital Costs
Barry	Once-Through	985	1	$2,439,576
Gadsden	Once-Through	133	1	$950,760
Gorgas	Once-Through	876	1	$1,386,992
Greene Co.	Once-Through	310	1	$4,486,375
EC Gaston	Combination	757	1	$9,910,614
Crist	Combination	203	10.3	$1,819,338
Scholz	Once-Through	63	1	$464,011
Smith	Once-Through	255	10.3	$1,876,784
Vogtle	Rec High Velocity	64	1	$1,103,962
Bowen	Recirculating	38	0	$0
Hammond	Once-Through	467	0	$0
Branch	Once-Through	918	1	$11,761,430
McDonough	Recirculating*	327	1	$0
McManus	Once-Through	28	0	$0
Mitchell	Once-Through	370	1	$5,256,010
Yates	Combination	431	1	$10,208,979
Kraft	Once-Through	1	1	$1,646,959
Eaton	Once-Through	75	1	$0
Watson	Combination	303	1	$4,535,384
Farley	Rec High Velocity	99	1	$1,167,728
Miller	Recirculating	22	0	$0
Hatch	Rec High Velocity	57	1	$998,807
Wansley	Recirculating-Pond	84	0	$0
McIntosh	Once-Through	108	1	$560,316
Scherer	Once-Through	91	0	$0
Daniel	Combination-Pond	4	-	-
TOTAL COSTS:				**$60,574,026**

*** Cost Module – technology selected by EPA based on site-specific information**
Cost Module 0 = No technology requirements
Cost Module 1 = Fish Handling & Return System (screen replacement)
Cost Module 10.3 = Module 1 plus Add Fish Barrier Net

After a review of EPA's technology assessment for our facilities, we have determined that EPA's projected capital costs for Southern Company's facilities are grossly underestimated for the following reasons:

1. EPA provides no costs for impingement controls for 8 of the 25 facilities. EPA assumed that two of these facilities would be retired and the other six facilities currently meet the proposed intake velocity standard. However, three of these facilities have closed-cycle recirculating cooling systems (CCRS) but do not meet the proposed intake velocity standard. EPA mistakenly assumed that most facilities with CCRS meet the proposed intake velocity standard.

2. EPA assigned Cost Module 1 (Fish Handling and Return System) to 17 facilities. Cost Module 1 is the replacement of existing screens with modified Ristroph traveling screens and a fish return system. Each facility would have to demonstrate compliance by meeting the proposed numeric impingement standards on at least a monthly basis. EPA selected the cheapest impingement option proposed; however, the numeric impingement standards are not achievable as discussed in Section V.

3. EPA provides no capital costs for Plant Daniel which obtains cooling water from an independent supplier that withdraws water from waters of the U.S. but is not itself a new or existing facility as defined by this rule. This scenario is included in the scope of the proposal in order to prevent facilities from circumventing the requirements. See proposed § 125.91(b). Plant Daniel will incur capital costs to build a new intake unless EPA "grandfathers" in existing facilities that were receiving their intake water from an independent supplier at least two years before the effective date of the rule. See Section XVII.

4. EPA provides no costs for barrier nets or passive screens for some facilities located on tidal waters. EPA provided barrier net costs for only 2 of 5 facilities that must meet the barrier net requirement.

5. EPA provides no costs for any potential site-specific entrainment mortality reduction controls, particularly for those plants with actual intake flows greater than 125 MGD. EPA says that it cannot predict the BTA determination to be made by the Director. However, it is the responsibility of EPA to provide better capital cost estimates for each facility impacted by rule and for the industry as a whole in order to justify the costs.

In the Industry Questionnaire administered in January 2000, EPA did not specifically ask for the design through-screen intake velocity "under all conditions, including during minimum ambient source water surface elevations (based on BPJ using hydrological data) and during periods of maximum head loss across the screens or other devices during normal operation of the

intake structure." Proposed § 125.94(b)(2)(ii). Instead, EPA asked for "design through-screen intake velocity" and the basis of the velocity (critical low flow, mean flow, or don't know). These questions do not provide enough specific information for EPA to accurately determine an appropriate cost module for a facility, particularly if the response provided an average intake velocity across the screens or an intake velocity during mean flow or if the basis of the velocity was not known. Therefore, EPA's assigned cost module may not be an appropriate module for providing capital costs to meet the impingement requirements of the proposed rule. For example, five of Southern Company's 25 facilities evaluated by EPA were assigned cost module "0" because EPA assumed the proposed intake velocity standard could be met. But, the proposed intake velocity standard cannot be met by these five facilities.

Also, the Detailed Questionnaire did not differentiate between a tidal river and a non-tidal river for the source waterbody. Since the proposed rule requires barrier nets or passive screens to minimize shellfish impingement, this information is essential in selecting the appropriate cost module for a given facility. Only two of five Southern facilities located on estuaries or tidal waters were assigned cost module 10.3 (Module 1 plus Fish Barrier Net). Because of this lack of appropriate information, EPA did not project appropriate capital costs for barrier net requirements for some of Southern's facilities. In addition, EPA has assumed that these facilities can successfully install and operate a barrier net or passive screens. But in fact, Southern Company's facilities cannot use barrier nets due to barge traffic, heavy debris loading, and/or size limitations. Passive screens, such as cylindrical wedgewire screens, cannot be located in shallow waters to due to ship and barge traffic, and retrofit of dual-flow screens may not be feasible on intake structures designed for through-flow screens.

In conclusion, EPA's assessment of technologies required to comply with the proposed rule is incomplete and in many cases wrong. In addition, EPA projected the lowest cost option for many facilities and provided no projected costs for entrainment mortality reduction requirements for facilities with > 125 MGD actual intake flows. Therefore, EPA's projected capital costs are grossly underestimated. Southern Company's projected capital cost estimates, based on a conceptual engineering assessment, are 24 times higher than EPA's projected estimates. For this reason, Southern Company urges EPA to collect more updated information on each facility and to re-evaluate technology requirements, including the potential for entrainment mortality controls, for each facility prior to finalizing the rule.

Also, EPA disregards the cumulative cost, energy, and reliability impacts of the proposed rule and other EPA regulatory initiatives – such as the EGU MACT rule – on the nation's electric system and the public, which are substantial. EPA is currently developing or implementing a series of environmental regulations that have independent and overlapping requirements with anticipated costs to Southern of between $13 and $18 billion. Southern and other electric utilities cannot ignore the cumulative impacts of these multiple, overlapping, and sometimes contradictory, regulatory regimes. The industry must instead consider all such requirements in concert when making technology investments or retirement decision.

It is incumbent on EPA to develop more realistic costs projections for implementation of the proposed rule for each facility and for the entire industry.

XXV. Southern's Recommendations for Revisions to the Rule

The rule as written has many flaws, but it can be modified to provide appropriate environmental protection while lessening burdens to permittees. Below, Southern provides its major recommendations for the rule.

1) For facilities with actual intake flow (AIF) greater than 125 MGD, the permit writer should make a site-specific determination of BTA for controlling both impingement and entrainment mortality. A joint study and evaluation of impingement and entrainment mortality and the technologies to address the mortality conserves administrative resources for both the permittee and the state regulator. A joint determination also removes the risk that the permittee will have to apply technologies for impingement mortality control that later prove unnecessary as a result of technologies applied for entrainment mortality control.

   In the alternative, for impingement mortality, EPA should adopt pre-approved technologies (including modified Ristroph screens, wedgewire screens, and Geiger or Beaudrey or Hydrolox screens). Under this alternative, no impingement monitoring would be required. The permittee would be required, through permit conditions, to ensure the proper installation, operation, and maintenance of the pre-approved technologies. Additionally, as an alternative to installing pre-approved technologies, a facility would be deemed in compliance with the rule if it demonstrated an intake approach velocity of 1.0 fps or less. Entrainment controls would still be determined based on a site-specific approach. In each permit proceeding, impingement and entrainment controls would be considered – and decided upon – at the same time.

2) For facilities with actual intake flows equal to or less than 125 MGD, Southern recommends that they not be subject to entrainment controls, because they present a very low risk of adverse environmental impact through entrainment. For impingement control, these facilities should choose from the pre-approved technologies listed above, or demonstrate an approach velocity of 1.0 fps or less.

3) For all facilities, EPA should remove the following requirements:

   a. the numeric impingement standards (*i.e.*, 12 percent annual average, 31 percent monthly average);

   b. the barrier net provision intended for protection of shellfish; and

   c. the no entrapment provision.

   If a regulator believes that actions beyond the pre-approved technologies or the velocity standard need to be taken, it should be decided on a case-by-case basis.

4) For all closed-cycle facilities, there should be no additional impingement or entrainment requirements. Units with existing closed-cycle cooling should not have to comply with any § 316(b) provisions beyond the application requirements unless the permit writer determines, based on credible information, that some further requirements are necessary to prevent significant adverse environmental impact to important aquatic populations, communities, or ecosystems. As discussed earlier, closed-cycle facilities have reduced their use of condenser cooling water by more than 95%, thereby significantly reducing impingement and entrainment.

5) Finally, EPA should provide a mechanism through which any facility can seek alternative requirements if site-specific circumstances make EPA's specified technologies environmentally unnecessary, technically unavailable, or more economically burdensome than the Agency anticipates.