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W16a

RECOMMENDED
REVISED CONDITION COMPLIANCE
FINDINGS

November 21, 2008

To:	To Commissioners and Interested Parties
From:	Peter Douglas, Executive Director Alison Dettmer, Deputy Director Tom Luster, Staff Environmental Scientist
Regarding:	**Condition Compliance for CDP No. E-06-013 –** Poseidon Resources (Channelside), LLC; **Special Condition 8**: Submittal of a Marine Life Mitigation Plan
Commissioners on Prevailing Side:	Commissioners Achadjian, Blank, Burke, Hueso, Kram, Lowenthal, Neely, Potter, Reilly, Shallenberger, and Chair Kruer
Exhibit 1:	Approved Marine Life Mitigation Plan (MLMP)
Exhibit 2:	Staff's Proposed Draft MLMP Conditions (June 2008)
Exhibit 3:	Poseidon's August 2, 2008 Proposed MLMP and attachments
Exhibit 4:	Transcript of August 6, 2008 hearing (Commission deliberations only)

STAFF NOTE

Staff prepared these recommended Revised Findings to reflect the Commission's August 6, 2008 decision approving a Marine Life Mitigation Plan for the Poseidon desalination facility in Carlsbad, San Diego County. The Plan is required pursuant to ***Special Condition 8*** of Coastal Development Permit #E-06-013. The Commission's approval at the August hearing included modifications to the Plan proposed by both staff and Poseidon. Because the Commission's action differed from staff's recommendation, revised findings are necessary. The recommended Revised Findings herein support the Plan as approved by the Commission and are based on staff's review of the August 6, 2008 hearing transcript and the record before the Commission. Recommended changes from the August 6th document are shown in ~~strikethrough~~ and **bold underline** text.

Please note that the Commission required Poseidon to submit within 60 days of Commission approval a revised Plan for Executive Director review and approval that incorporates the Commission's approved modifications. Poseidon submitted a plan in early October 2008, which has been reviewed and approved by the Executive Director, and is attached as Exhibit 1.

SUMMARY

On November 15, 2007, the Commission conditionally approved CDP E-06-013 for Poseidon Resources (Channelside), LLC (Poseidon) for construction and operation of a desalination facility to be located adjacent to the Encina Power Plant in Carlsbad, San Diego County. As part of the Adopted Findings for its approval, the Commission imposed **Special Condition 8**, which required Poseidon to submit for further Commission review and approval, a Marine Life Mitigation Plan **(MLMP, or the Plan)**.[1]

In June 2008, Commission staff provided to Poseidon recommended conditions to include in its Plan (see Exhibit 2). On July 7, 2008, Poseidon submitted to Commission staff ~~its~~ **a** proposed Marine Life Mitigation Plan (the Plan). **On August 2, Poseidon submitted a revised version of that Plan (see Exhibit 3).** ~~This report provides staff's analysis of the Plan, staff's evaluation of whether the Plan conforms to the Adopted Findings and **Special Condition 8**, and staff's recommendation as to whether the Commission should approve the Plan.~~

~~In brief, staff's analysis shows that the Plan as submitted does not conform to the Adopted Findings and ***Special Condition 8***. However, if modified as described herein, staff believes the modified Plan would conform to the applicable Findings and ***Special Condition 8***. Staff therefore recommends the Commission **approve** the Plan, as modified herein. The modifications staff has identified as being necessary for Plan approval are summarized below and are further detailed in Sections 1.1 and 4.0 of this memorandum.~~ **At its August 6, 2008 hearing, the Commission approved a modified Plan. Because the Commission's action differed from staff's recommendation, revised findings are necessary.**

~~Staff recommends the Plan be modified to include the following~~**The Commission modified the Plan as follows**:

1) Poseidon ~~shall~~ **is to** create or restore ~~between~~ **up to** 55.4 ~~and 68~~ acres of coastal estuarine wetland habitat within the Southern California Bight. **For Phase I, within 10 months of issuance of the desalination facility's coastal development permit (CDP), Poseidon must submit proposed site(s) and a Preliminary Restoration Plan for Commission review and approval. Within two years of issuance of the CDP for the desalination facility, Poseidon must submit a complete CDP application to restore at least 37**

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[1] The Commission's approval of this CDP also included **Special Condition 10**, which required Poseidon to submit for Commission review and approval an Energy Minimization and Greenhouse Gas Reduction Plan. ~~That Special Condition and Poseidon's submitted plan are evaluated in a separate staff report under Item W5a of the August 6, 2008 Commission hearing.~~ **The Commission approved the Energy Minimization and Greenhouse Gas Emission Reduction Plan at its August 6, 2008 hearing. The recommended Revised Findings for that Plan are on the Commission's December 2008 hearing agenda as Item W16b.**

<u>acres of estuarine wetlands. For Phase II, Poseidon must within five years of issuance of the Phase I CDP submit a complete CDP application either to restore an additional 18.4 acres of estuarine wetlands or to propose reducing or eliminating this Phase II restoration requirement by instead implementing technologies not currently available or feasible that would reduce entrainment levels below currently anticipated levels or by undertaking dredging in Agua Hedionda Lagoon in a manner that warrants mitigation credit. Poseidon may apply to do all 55.4 acres of restoration during Phase I.</u>

2) Poseidon shall implement its Marine Life Mitigation Plan in conformity to the conditions provided in Exhibit 2 of ~~this memorandum~~ **<u>these Findings</u>**.

3) Within 60 days of the Commission's approval of ~~this modified~~ **<u>the</u>** Plan **<u>(i.e., as approved at the August 6, 2008 hearing)</u>**, Poseidon shall submit for the Executive Director's review and approval a revised Plan that includes these modifications.

The first ~~recommendation~~ **<u>modification</u>** is based on a review of Poseidon's proposed Plan by staff and the Commission's independent scientific experts.[2] Poseidon's entrainment study identified impacts that these reviewers believe require more mitigation than Poseidon ~~has~~ **<u>had</u>** proposed. ~~Staff further believes that t~~<u>T</u>his amount of mitigation is necessary to ensure the project conforms to **Special Condition 8** and Sections 30230, 30231, and 30260 of the Coastal Act. Based on results from Poseidon's entrainment study, ~~this range in acreage – from 55 to 68 acres – represents the range in statistical confidence that would~~ **<u>55.4 acres of wetland restoration will</u>** provide the Commission with 80% ~~(i.e., 55 acres) to 95%~~ confidence ~~(i.e., 68 acres)~~ that the mitigation ~~would~~ **<u>will</u>** fully mitigate the impacts identified in the study. Section 4.2 of ~~this memorandum~~ **<u>these Findings</u>** provides a more detailed discussion.[3]

The second ~~recommendation is meant to~~ **<u>modification</u>** ensure<u>s</u> that mitigation is timely and successful. It ~~would~~ require<u>s</u> Poseidon to implement its mitigation subject to the conditions similar to those the Commission required of Southern California Edison at its San Dieguito Restoration Project (see, for example CDPs #183-73 and #6-04-88). Although Poseidon's current Plan does not commit to provide mitigation at a particular site, Poseidon had previously identified a mitigation site in San Dieguito Lagoon adjacent to Edison's as ~~the best~~ **<u>its preferred</u>** location to mitigate for its entrainment impacts. ~~Staff recommends the two projects be held to similar standards.~~ The Commission's scientific experts ~~concur with this recommendation~~ **<u>recommend that the two restoration projects be subject to similar standards (see Exhibit 1 – Approved Conditions for Marine Life Mitigation Plan)</u>**. Section 4.2 provides a more detailed discussion of this ~~recommendation~~ **<u>modification</u>**.

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[2] Staff consulted with members of the Commission's ~~Marine Review Committee~~ **<u>Scientific Advisory Panel (SAP)</u>**. Committee members are identified in Section 3.0 of this memorandum.

[3] ~~As an alternative to staff's recommendation, the Commission may wish to require mitigation in a manner similar to past decisions in which it applied a mitigation ratio to the identified level of impact. If the Commission selects this alternative approach, staff recommend mitigation be provided at between a 2:1 to 3:1 ratio, which would result in from 85 to 127.5 acres of coastal estuarine wetland habitat as mitigation.~~

The third ~~recommendation~~ **modification** is ~~meant~~ to help **ensure** Poseidon ~~and the Commission~~ implements the ~~approved~~ mitigation plan **as approved**. Additionally, the 60-day deadline in the recommendation ~~would be~~ is consistent with the requirement imposed by the San Diego Regional Water Quality Control Board that Poseidon provide a mitigation plan for Board approval by October 9, 2008.[4]

~~With these recommended modifications, staff believes Poseidon's Plan would conform to applicable provisions of *Special Condition 8*.~~

TABLE OF CONTENTS

1.0 MOTION & RESOLUTION

Motion:

> *"~~I move that the Commission approve the Marine Life Mitigation Plan attached to the staff recommendation as Exhibit 1 if modified as shown in Section 1.1 below and Exhibit 2 of this memorandum, as compliant with~~* ~~***Special Condition 8***~~ *~~of CDP E-06-013.~~* ***I move that the Commission adopt the revised findings in support of the Commission's action on August 6, 2008 to approve the Marine Life Mitigation Plan as compliant with Special Condition 8 of CDP E-06-013.****"*

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[4] The Regional Board's Order, adopted on April 9, 2008 requires, in part: "*Within six months of adoption of this resolution, Poseidon shall submit to the Regional Board Executive Officer, for approval by the Regional Board an amendment to the Plan that includes a specific proposal for mitigation of the impacts, by impingement and entrainment upon marine organisms resulting from the intake of seawater from Agua Hedionda Lagoon, as required by Section VI.C.2(e) of Order No. R9-2006-0065; and shall resolve the concerns identified in the Regional Board's February 19, 2008 letter to Poseidon Resources, and the following additional concerns:*

a) Identification of impacts from impingement and entrainment;
b) Adequate monitoring data to determine the impacts from impingement and entrainment;
c) Coordination among participating agencies for the amendment of the Plan as required by Section 13225 of the California Water Code;
d) Adequacy of mitigation; and
e) Commitment to fully implement the amendment to the Plan.

Resolution to Approve:

~~*The Commission hereby finds that the compliance plan titled "Marine Life Mitigation Plan" prepared and submitted by the permittee, Poseidon Resources (Channelside) LLC, dated July 3, 2008, if modified as shown in Section 1.1 and Exhibit 2 of the July 24, 2008 Commission staff report, is adequate, if fully implemented to comply with* ***Special Condition 8*** *of CDP E-06-013.*~~ ***The Commission hereby adopts the findings set forth below for the Commission's approval of the Marine Life Mitigation Plan as compliant with Special Condition 8 of CDP E-06-013 on the ground that the findings support the Commission's decision made on August 6, 2008 and accurately reflect the reasons for it.***

Staff Recommendation:

~~Staff recommends a **"YES"** vote, which will result in the **approval** of the modified plan as compliant with the Adopted Findings and **Special Condition 8** and adoption of the motion, resolution, and findings herein. The motion passes only by an affirmative vote of a majority of the Commissioners present. Staff's recommended modifications are provided in Section 1.1 below, and further detailed in Section 4.0 of this memorandum. If these recommended modifications are not incorporated into the Plan, staff recommends the Commission find the Plan, as submitted, does not conform to **Special Condition 8** and staff would therefore recommend the Plan be denied.~~ **Staff recommends a "YES" vote on the motion. Passage of the motion will result in the adoption of revised findings as set forth in this staff report. The motion requires a majority vote of the members from the prevailing side present at the revised findings hearing, with at least three of the prevailing members voting. Only those Commissioners on the prevailing side of the Commission's action are eligible to vote on the revised findings.**

1.1 ~~RECOMMENDED~~ MODIFICATIONS

1) Poseidon shall create or restore ~~between~~ **up to** 55**.4** ~~and 68~~ acres of coastal estuarine wetland habitat within the Southern California Bight. **For Phase I, within 10 months of issuance of the desalination facility's coastal development permit (CDP), Poseidon must submit proposed site(s) and a Preliminary Restoration Plan for Commission review and approval. Within two years of issuance of the CDP for the desalination facility, Poseidon must submit a complete CDP application to restore at least 37 acres of estuarine wetlands. For Phase II, Poseidon must within five years of issuance of the Phase I CDP submit a complete CDP application either to restore an additional 18.4 acres of estuarine wetlands or to propose reducing or eliminating this Phase II restoration requirement by instead implementing technologies not currently available or feasible that would reduce entrainment levels below currently anticipated levels or by undertaking dredging in Agua Hedionda Lagoon in a manner that warrants mitigation credit. Poseidon may apply to do all 55.4 acres of restoration during Phase I.**

2) Poseidon shall implement its Marine Life Mitigation Plan in conformity to the conditions provided in Exhibit 2 of ~~this memorandum~~ **these Findings**.

3) Within 60 days of the Commission's approval of ~~this modified~~ the Plan **(i.e., as approved at the August 6, 2008 hearing)**, Poseidon shall submit for the Executive Director's review and approval a revised Plan that includes these modifications.

2.0 STANDARD OF REVIEW

The ~~Commission must determine whether the~~ subject plan **must** conforms to **Special Condition 8 of CDP E-06-013**, which states:

> *"**Marine Life Mitigation Plan:** PRIOR TO ISSUANCE OF THE PERMIT, the Permittee shall submit to and obtain from the Commission approval of a Marine Life Mitigation Plan (the Plan) that complies with the following:*
>
> *a) Documentation of the project's expected impacts to marine life due to entrainment and impingement caused by the facility's intake of water from Agua Hedionda Lagoon. This requirement can be satisfied by submitting a full copy of the Permittee's Entrainment Study conducted in 2004-2005 for this project.*
> *b) To the maximum extent feasible, the mitigation shall take the form of creation, enhancement, or restoration of aquatic and wetland habitat.*
> *c) Goals, objectives and performance criteria for each of the proposed mitigation sites. It shall identify specific creation, restoration, or enhancement measures that will be used at each site, including grading and planting plans, the timing of the mitigation measures, monitoring that will be implemented to establish baseline conditions and to determine whether the sites are meeting performance criteria. The Plan shall also identify contingency measures that will be implemented should any of the mitigation sites not meet performance criteria.*
> *d) Requires submittals of "as-built" plans for each site and annual monitoring reports for no less than five years or until the sites meet performance criteria.*
> *e) Defines legal mechanism(s) proposed to ensure permanent protection of each site – e.g., conservation easements, deed restriction, or other methods.*
>
> *The Permittee shall comply with the approved Plan. Prior to implementing the Plan, the Permittee shall submit a proposed wetlands restoration project that complies with the Plan in the form of a separate coastal development permit application for the planned wetlands restoration project."*

The Commission's **Permit** Findings supporting **Special Condition 8** state that the Plan is **to** ensure that all project-related entrainment impacts will be fully mitigated and that marine resources and the biological productivity of coastal waters, wetlands, and estuaries, will be enhanced and restored in compliance with Coastal Act Sections 30230 and 30231. The **Permit** Findings further state that the Plan must provide mitigation to the maximum extent feasible through creating, enhancing, or restoring aquatic and wetland habitat and must include acceptable performance standards, monitoring, contingency measures, and legal mechanisms to ensure permanent protection of the proposed mitigation sites.

3.0 PLAN DEVELOPMENT AND REVIEW

On November 15, 2007, the Commission approved CDP No. E-06-013 for Poseidon's proposal to construct and operate a desalination facility in Carlsbad, San Diego County. As part of that approval, the Commission required Poseidon, through **Special Condition 8**, to submit for additional Commission review and approval a Marine Life Mitigation Plan addressing the impacts that will be caused by the facility's use of estuarine water and entrainment of marine organisms.

~~Since~~ **After** the Commission's project approval in November 2007, staff and Poseidon ~~have~~ worked to develop a Plan that would meet the requirements of ***Special Condition 8*** and would be consistent with the Commission's **Permit** Findings. In March 2008, and as required by ***Special Condition 8***, Poseidon provided a copy of its entrainment study for Commission staff review. Staff provided the study to Dr. Pete Raimondi, an independent scientist with expertise in evaluating entrainment studies, for his review and recommendations (described in more detail in Section 4.0 below).[5] Dr. Raimondi provided the initial results of his review and recommendations to Poseidon in April 2008. In May 2008, staff conducted with Poseidon an interagency meeting with representatives from state and local agencies to determine what mitigation options might be available and feasible for Poseidon to include as part of its Plan.

Attendees include**d** representatives from:

California Department of Fish and Game	City of Carlsbad
California Department of Transportation	City of Vista
California State Lands Commission	U.S. Fish and Wildlife Service
San Diego Regional Water Quality Control Board	

In June 2008, based in part on concerns Poseidon expressed about Dr. Raimondi's review and recommendations, staff asked the Commission's ~~Marine Review Committee (MRC)~~ **Scientific Advisory Panel (SAP)**[6] to review Dr. Raimondi's conclusions and make further

[5] Dr. Raimondi is Professor and Chair of Ecology and Evolutionary Biology at the University of California, Santa Cruz Center for Ocean Health, Long Marine Lab. Dr. Raimondi is considered by many to be California's leading expert on entrainment analysis. He has been a key participant and reviewer of most of the entrainment studies done along the California coast during the past decade, including those done for the Diablo Canyon Nuclear Power Plant, the Huntington Beach Generating Station, Morro Bay Power Plant, and Moss Landing Power Plant. He is also a member of the Coastal Commission's ~~Marine Review Committee~~ **Scientific Advisory Panel (SAP)** responsible for determining mitigation needed for the San Onofre Nuclear Generating Station (SONGS) and providing review and oversight for the SONGS mitigation work at San Dieguito Lagoon.

[6] The ~~Marine Review Committee~~ **SAP** is a team of independent scientists that provides guidance and oversight to the Commission on ecological issues associated with the San Dieguito Restoration Project. That Project is being implemented by Southern California Edison pursuant to requirements of coastal development permits issued by the Commission and is meant to mitigate for marine resources losses caused by the San Onofre Nuclear Generating Station (SONGS). The ~~Marine Review Committee~~ **SAP currently** consists of ***Dr. Richard Ambrose***, Professor and Director of Environmental Science & Engineering Program, Department of Environmental Health Sciences, University of California Los Angeles; ***Dr. John Dixon***, Senior Ecologist, California Coastal Commission; ***Dr. Mark Page***, Marine Science Institute, University of California at Santa Barbara; ***Dr. Pete Raimondi***, Professor and Chair of Ecology and Evolutionary Biology, University of California at Santa Cruz; ***Dr. Dan Reed***, Marine Science Institute, University of California at Santa Barbara; ***Dr. Steve Schroeter***, Marine Science Institute, University of

recommendations for Poseidon to include in its proposed Plan. The ~~MRC~~ **SAP** review is described in more detail in Section 4.0.

Also in June 2008, staff provided Poseidon a copy of the conditions the Commission had required of Southern California Edison (Edison) for its wetland restoration project at San Dieguito Lagoon **(see Exhibit 2)**. Until June, Poseidon had been proposing a site adjacent to Edison's as ~~the best~~ **its preferred** site for ~~its~~ mitigation. Based on the Commission's **Permit** Findings and discussion at the November 2007 hearing, staff recommended to Poseidon that it incorporate modified versions of the Edison conditions into its proposed Plan to ensure the two adjacent mitigation sites would be subject to compatible and consistent mitigation requirements. These conditions are in Exhibit 2~~1~~.

On July 7, 2008, staff received Poseidon's ~~currently~~ proposed Plan for review by the Commission ~~(see Exhibit 1)~~. On July 14, 2008, staff again consulted with the ~~MRC~~ **SAP** to evaluate changes Poseidon had proposed in this most recent submittal. **On August 2, 2008, Poseidon submitted a revised** ~~Poseidon's current~~ proposed Plan~~,~~ **(see Exhibit 3).** ~~and t~~The results of reviews by staff, Dr. Raimondi, and the ~~MRC~~ **SAP** are described in Section 4.0 below.

4.0 ANALYSIS FOR CONFORMITY TO SPECIAL CONDITION 8

~~Staff's evaluation of the proposed Plan shows that the~~**Poseidon's proposed** Plan, as submitted, ~~does~~ **did** not ensure conformity to ***Special Condition 8***. ~~Staff recommends the Plan be modified~~ **The Commission therefore required modifications to the Plan** to address two main areas in which the Plan ~~does not yet~~ **did not** conform to the condition: 1) the adequacy of mitigation proposed in the Plan; and, 2) assurances that the Plan will result in successful mitigation being implemented in a timely manner.

Section 4.1 below describes the submitted Plan's key elements **and the Commission's adopted modifications (shown in Exhibit 1)**. Sections 4.2 and 4.3 evaluate elements of the Plan that ~~staff believes~~ require modification. ~~Staff's recommendations~~ **The modifications** are based on review by staff and by members of the Commission's ~~Marine Review Committee (MRC)~~ **Scientific Advisory Panel (SAP)**, as described in Section 3.0. They also reflect comments received from other agencies, including the U.S. Fish and Wildlife Service and the California State Lands Commission. ~~The discussions below also identify concerns Poseidon expressed about staff's recommendations and staff's response to those concerns. Staff believes its third recommendation~~ **The third modification**, which ~~would~~ require**s** Poseidon to submit a revised Plan that incorporates these modifications, ~~would~~ help**s ensure** ~~the Commission and~~ Poseidon ~~in implementing~~ **implements** the modified Plan.

California at Santa Barbara; and, ***Dr. Russ Schmitt***, Director of Coastal Research Center, University of California at Santa Barbara.

4.1 PLAN DESCRIPTION

Poseidon's proposed Plan includesd the following main elements:

- **Phased Mitigation Approach:** Poseidon proposesd that it implement necessary mitigation in two phases. Phase I would result in 37 acres of wetland restoration or creation within the Southern California Bight. During this phase, Poseidon would also conduct technology review to determine whether new or developing technologies would be reasonably feasible to reduce entrainment. It would also conduct a new entrainment study ten years after beginning operations to determine whether additional mitigation is needed for the facility's entrainment impacts. Phase I would apply during the time Poseidon's desalination facility operations are concurrent with operations of the power plant's cooling water system.

  Phase II would occur if the power plant stops operating or, for three consecutive years, operates at a level that provides less than 15% of the water Poseidon needs to operate the desalination facility (i.e., about 16.6 billion gallons per year)[7]. This amount would be based on the power plant's average water use over any three-year period. Under Phase II, Poseidon would conduct a new entrainment analysis and evaluate potential new technologies, similar to the review described in Phase I. Poseidon would then provide the results of those analyses to the Commission for review. If the Commission determines the analyses show a need for additional mitigation or the evaluations show certain technologies might reduce entrainment impacts, Poseidon would request its Plan be amended to require those changes. If additional mitigation is needed, Poseidon would propose one of the following:
  - Assume dredging obligations for Agua Hedionda Lagoon from the power plant and obtain mitigation credit of up to 81 acres of restoration credit for conducting dredging; or,
  - Provide additional wetland mitigation of up to 5.5 acres.

- **Suggested Conditions:** ~~The~~ Poseidon's proposed Plan includesd suggested conditions that Poseidon would use to implement further studies, evaluate new technologies, select its mitigation site(s), and implement mitigation options. Many of these are modified versions of conditions the Commission required Edison use to implement its mitigation measures for the impacts to marine life from the San Onofre Nuclear Generating Station. These are discussed in Section 4.3 below.

In adopting the final MLMP, the Commission incorporated several concepts from Poseidon's proposed Plan with a number of modifications, including:

- **Entrainment impacts: The Commission determined that Poseidon's entrainment impacts resulted in a loss of marine organisms equivalent to that produced in a 55.4-acre area of estuarine and nearshore habitat (see Sections 4.2.1 & 4.2.2 below for details).**

[7] Poseidon's average withdrawal of 304 million gallons per day would equal almost 111 billion gallons per year. 15% of that amount is about 16.6 billion gallons, or about 45 million gallons per day.

- **Phased mitigation: The Commission required mitigation in up to two phases:**
  - **During Phase I, Poseidon is to create or restore at least 37 acres of coastal estuarine wetland habitat in one or two sites within the Southern California Bight. Within 10 months of issuance of the CDP for the desalination facility, Poseidon is to submit a preliminary site selection and restoration plan for Commission approval, and with 24 months of issuance of that CDP, Poseidon is to submit a complete CDP application for restoration of at least 37 acres of estuarine wetlands. Poseidon may choose to restore the full 55.4 acres of wetlands during Phase I.**
  - **For Phase II, Poseidon must within five years of issuance of the Phase I CDP submit a complete CDP application to restore an additional 18.4 acres of estuarine wetlands, or as part of that application may request to reduce or eliminate this Phase II restoration requirement by instead implementing technologies that are not currently available or feasible to reduce entrainment impacts below currently anticipated levels or undertaking dredging in Agua Hedionda lagoon in a manner that warrants mitigation credit.**

- **Required conditions: Poseidon is to implement its Marine Life Mitigation Plan as modified by the Commission and in conformity to the conditions provided in Exhibit 1 of these Findings. Those modifications require Poseidon to submit within sixty days of the Commission's August 6, 2008 approval a revised Plan that includes all required conditions and modifications for the Executive Director's review and approval.**

4.2 ANALYSIS – ADEQUACY OF MITIGATION

This section evaluates the following elements of Poseidon's proposed Plan:

Section 4.2.1: Analysis of Poseidon's entrainment study
Section 4.2.2: Determining the mitigation needed to address identified impacts
Section 4.2.3: Analysis of Poseidon's phased approach
Section 4.2.4: Analysis of dredging as proposed mitigation

4.2.1 Analysis of Poseidon's Entrainment Study

Special Condition 8 required Poseidon to submit its entrainment study for Commission staff review. In March 2008, Poseidon submitted data and modeling results from its study. The study was conducted using the Empirical Transport Model (ETM), which is used to identify the level of adverse effect caused by entrainment. The model compares the portion of a population at risk of entrainment to the portion of that population actually entrained. It calculates this proportional mortality for each of the main species subject to entrainment, and uses the source water area of each species – that is, the total volume or area of water in which species are at risk of being entrained – to calculate the Area of Production Foregone (APF), which provides an estimate of the average area of habitat that would be needed to produce the organisms lost to entrainment. As shown below, this APF provides the basis for determining the amount of mitigation needed to address entrainment impacts.

As described in Section 3 above, staff provided Poseidon's data and study results to Dr. Raimondi for review. In reviewing the study, Dr. Raimondi concluded the following:

- **Adequacy of Study:** Dr. Raimondi found that, as submitted, Poseidon's study could not be evaluated for its technical merits or its estimates of impacts. However, by reviewing additional relevant Poseidon documents and documents from the associated power plant's entrainment study, and by working with the consultants that had conducted Poseidon's study (Tenera Consultants), Dr. Raimondi was able to determine that the study's sampling and data collection methods were consistent with those used in other recent studies conducted in California pursuant to the protocols and guidelines used by the U.S. EPA, Regional Water Quality Control Boards, California Energy Commission, and Coastal Commission.

  Dr. Raimondi also found that the study provided adequate data to determine the types and numbers of organisms that would be subject to entrainment and to determine the area of the source water bodies – that is, the area of Agua Hedionda and nearshore ocean waters where entrainable organisms would be subject to entrainment. The study identified a source water area within Agua Hedionda of 302 acres and a nearshore source water area of about 22,000 acres. Poseidon's calculations were generally consistent with those used in other recent studies, although the calculations Poseidon used to determine its source water areas differed from those used in other recent studies to reflect the tidal exchange between Agua Hedionda Lagoon and the nearshore ocean environment.

- **Determining the Effects of Poseidon's Entrainment:** Poseidon concluded that the entrainment caused by 302 MGD of water withdrawal by the desalination facility would result in an APF of 37 acres in Agua Hedionda Lagoon. Dr. Raimondi's review revealed that Poseidon's APF calculation was accurate, albeit at the 50% confidence level – that is, the 37-acre APF represented the area for which the study could assure **with** at least 50% confidence that the area reflected the full extent of Poseidon's entrainment impacts in the Lagoon. This calculation is based on applying standard statistical techniques to the error rates Poseidon generated in its study. Dr. Raimondi also used those error rates to calculate APFs at the 80% and 95% confidence levels – that is, the number of acres for which the area of full entrainment impacts could be described with at least 80% or 95% confidence. This resulted in APFs of 49 and 61 acres, respectively.

  Poseidon's study did not include an APF for the area of nearshore ocean waters that would be affected by entrainment; therefore, using Poseidon's data, Dr. Raimondi calculated an APF for the entrainment effects Poseidon would cause in these nearshore waters. At the same 50%, 80%, and 95% confidence levels, the APFs would be 55, 64, and 72 acres, respectively. The APFs for both source water areas and each confidence level are shown in Table 1 below.

Table 1: APF Totals

Source water areas:	**APF (in acres) at three levels of confidence:**		
	50%	***80%***	***95%***
Estuarine: 302 acres of source water	37	49	61
Nearshore: 22,000 acres of source water	55	64	72
Total APF	**92 acres**	**113 acres**	**133 acres**

In its July 3, 2008 proposed MLMP submittal, Poseidon raised a number of concerns with staff's and Dr. Raimondi's review (see **also** Exhibit B of **Poseidon's August 2, 2008 submittal in Exhibit 3** ~~of the MLMP~~). In response, and to supplement Dr. Raimondi's review, Commission staff requested that the ~~MRC~~ **SAP** assess the review and respond to Poseidon's concerns.

Poseidon stated its study made a number of conservative assumptions that result in an overestimate of the mitigation needed**.** ~~and that t~~**T**hose ~~conservative~~ assumptions**, and the SAP's response,** include:

- *The study overestimated the number of larvae in the lagoon and assumed a greater amount of entrainable larvae than are actually present.* In response, Dr. Raimondi and the ~~MRC~~ **SAP** noted that this type of study is based on actual sampling data, not estimates. The data reviewed were those Poseidon provided from its sampling efforts, so there should be no overestimate or assumption of a greater number of larvae than were actually sampled. If Poseidon believes the data are incorrect, that would suggest either that the raw data should be re-evaluated or the study should be run again. Further, if Poseidon's contention were true – that is, if the study overstated the number of larvae in the Lagoon – this would result in a higher APF and would therefore result in a need for *more* mitigation.[8]

- *The study assumes the project will render all affected acreage (i.e., the APF) non-functional, even though that acreage would only be partially affected and would continue to allow numerous other species to function.* In response, the ~~MRC~~ **SAP** reiterated that these entrainment studies do not assume the complete loss of ecosystem function within an area of APF; instead, they identify only the area that would be needed to replace the numbers and types of species identified in the study as subject to entrainment. The APF is used to determine impacts to only those species most affected by entrainment, and the mitigation resulting from the APF is meant to account only for those effects.

[8] To provide a simple example, the APF is based in part on proportional mortality, which is the ratio of the number of organisms entrained compared to those at risk of being entrained. Assuming the number of entrained organisms remains the same, the fewer organisms in the Lagoon, the higher the proportion of those organisms entrained – therefore, Poseidon's contention results in a higher proportional impact area.

- *The study protocols assume 100% mortality for entrained organisms; however, Poseidon believes actual mortality will be significantly lower. Poseidon also contends that it should be required to provide less mitigation based on its contention of a lower mortality rate.* In response, the ~~MRC~~ **SAP** noted that the protocols used in these entrainment studies include an assumption of 100% mortality based on guidance from the U.S. EPA and reflecting the practice of California's State and Regional Water Boards, the California Energy Commission, and the Coastal Commission in conducting and evaluating these studies. This assumption applies to these studies regardless of the type of intake and discharge system being evaluated. For example, although each power plant or desalination facility may use different water volumes, have different and variable water velocities and levels of turbulence, use different types of screens, pumps, and other equipment, and draw in a different mix of organisms, all entrainment studies similar to Poseidon's have used this same 100% mortality rate. Further, there are no peer-reviewed scientific studies that support using a lower mortality rate for different types of power plant or desalination systems that cause entrainment. In the case of Poseidon's desalination facility, entrained organisms will be subject to a number of stressors – including high pressures, significant changes in salinity, possible high temperature differences if the power plant is operating, etc. – and they will then be discharged to a different environment than is found in Agua Hedionda. Any one or a combination of these stressors could result in mortality.

  Poseidon's proposed phased mitigation approach, which is based in part on its contention of lower mortality rates, is evaluated in more detail below. One element of this approach, however, is that Poseidon states it might use alternative screening systems to reduce entrainment or entrainment mortality. ~~However, staff considers this only speculative at this time, and notes that screening systems that have been tested for reducing entrainment have not been found effective in the marine environment. The current scientific understanding is that entrainment impacts are based on an assumption of 100% mortality of organisms present in the full volume of water drawn into an intake system, and that is the basis of the analysis herein.~~ **Pursuant to the Commission's action, if Poseidon proposes to adopt alternative technologies that are not currently available or feasible to reduce entrainment, it may apply for reduced mitigation requirements as part of its Phase II CDP application.**

Based on the above, and on the reviews conducted by Dr. Raimondi and the SAP, the Commission concurs with the conclusions of the scientific reviews showing that the facility's expected entrainment impacts result in the above-referenced APFs and incorporates those conclusions into its approval of the Plan.

4.2.2 Determining the mitigation needed to address identified impacts

The APFs generated from the study and shown in Table 1 identify the extent of expected entrainment impacts, and also serve as the basis for identifying the type and amount of mitigation needed to address those impacts. Past entrainment studies have generally used the 50% confidence level APF as the basis for mitigation and applied a mitigation ratio (e.g., 1:1, 2:1, 3:1, etc.) to compensate for mitigation occurring at a distance from the affected area, to reflect a temporal loss of habitat functions caused by the impact, to reflect mitigation that provides a different type of habitat than the affected area, or other concerns. This option is described briefly later in this Section.

For this review, however, Dr. Raimondi provided an alternative approach to determine the amount of mitigation needed, based on two main assumptions:

- First, that any mitigation provided would be in the form of restored habitat similar to the types of habitat that produced or supported the affected entrained organisms – that is, that mitigation would consist of tidally-influence salt marsh or shallow water areas similar to those found in Agua Hedionda Lagoon.

- Second, that the mitigation provided would be fully successful – that is, the mitigation site would provide fully functioning habitat that would meet required performance standards, contingency plans, etc., required for such projects to ensure success. This was based on an additional assumption – that Poseidon would be providing mitigation at a site in San Dieguito Lagoon adjacent to Edison's restoration site and would be subject to the same conditions the Commission required of Edison. Dr. Raimondi and the ~~MRC~~ **SAP** believe the conditions required of Edison provide a high level of certainty that Edison's restoration efforts will be successful and that they would provide a similar level of certainty for Poseidon's mitigation at this location.

Using the above assumptions, and using the APF figures noted above, Dr. Raimondi concluded with at least 50% confidence that creating or restoring 37 acres of suitable and fully functioning estuarine habitat would fully replace the lost productivity of Agua Hedionda Lagoon, that 49 acres would be needed to provide an 80% level of certainty, and that 61 acres would be needed to reach a 95% level of certainty. By applying the same approach to the nearshore APFs, Dr. Raimondi concluded that creating or restoring 55 acres of open water habitat would be needed to provide at least 50% certainty that that entrainment effects in that source water area would be fully mitigated, that 64 acres were needed to provide 80% certainty, and 72 acres would provide 95% certainty. However, in recognition of the impracticality of creating 55 to 72 acres of offshore open water habitat and recognizing the relatively greater productivity rates per acre of estuarine wetland habitats, Dr. Raimondi suggested that these offshore impacts be "converted" to estuarine mitigation areas. That is, by assuming that successfully restored wetland habitat would be ten times more productive than a similar area of nearshore ocean waters, every ten acres of nearshore impacts could be mitigated by creating or restoring one acre of estuarine habitat.[9] Applying this 10:1 ratio to the nearshore APFs results in 5.5, 6.4, and 7.2 acres, respectively. Although this approach would result in "out of kind" mitigation, it is also expected to produce overall better mitigation – not only is it not practicable to create nearshore, open water habitat, that habitat type is already well-represented along the shoreline, whereas creating or restoring coastal estuarine habitat types would support a long-recognized need to increase the amount of those habitat types in Southern California.[10] These totals are shown Table 2 below.

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[9] This approach – converting offshore entrainment impacts to areas of wetland mitigation – has been used to help determine mitigation in several recent California power plant siting cases, including Huntington Beach (00-AFC-13), Morro Bay (00-AFC-12), and others.

[10] See, for example, the Southern California Wetlands Recovery Project at http://www.scwrp.org/index.htm

Table 2: Adjusted APF Totals

Habitat Type	APF (in acres) at three levels of confidence			Conversion ratio	Resulting APF (in acres) at three levels of confidence		
	50%	*80%*	*95%*		*50%*	*80%*	*95%*
Estuarine	37	49	61	1:1	37	49	61
Nearshore	55	64	72	10:1	5.5	6.4	7.2
Total Mitigation					**42.5**	**55.4**	**68.2**

In sum, Dr. Raimondi concluded that creating 55.4 to 68.2 acres of fully functioning estuarine habitat similar to habitat in Agua Hedionda Lagoon would provide between 80 to 95% confidence that Poseidon's entrainment impacts would be fully mitigated. This conclusion is also based on Poseidon's mitigation being subject to conditions similar to Edison's, which is discussed in more detail in Section 4.2.3 below.

Poseidon contends that ~~Dr. Raimondi's~~ **staff's** recommendation to apply an 80-95% level of certainty for mitigation is "extraordinary and unprecedented" and would result in excess mitigation for the project's expected impacts. In response, Dr. Raimondi and the ~~MRC~~ **SAP** state that ~~the confidence levels used are based on the error rates Poseidon calculated as part of its study, and generating these calculations is a standard practice for this type of entrainment study~~ **considering uncertainty is a standard practice in data analysis and that such consideration provides a context for understanding the likelihood that a particular amount of mitigation will provide full compensation for identified impacts. Staff notes that Poseidon's entrainment study included error rates that Dr. Raimondi used initially to calculate a higher estuarine APF of 87 acres at the 80% confidence level. Dr. Raimondi then used a different error rate, which he considered more appropriate for this study, to calculate an APF of 49 acres at the 80% confidence level**.[11]

Dr. Raimondi's recommendation of using the 80-95% confidence level is "unprecedented" only in that past studies have used the 50% confidence level **to describe the expected impact** and then applied a mitigation ratio, such as 2:1 or 3:1, to reflect the lower confidence level**,** ~~and~~ to include consideration of mitigation that may be "out of kind"**,** ~~or~~ provided at some distance from the affected area**, or may not be fully successful**. Dr. Raimondi's proposal, as supported by the ~~MRC~~ **SAP** and Commission staff, would actually result in less mitigation acreage than that standard mitigation approach, but it would have higher certainty of success.

~~Staff recognizes that the Commission could apply a mitigation ratio to the identified level of impact, consistent with past mitigation determinations for wetland impacts. For example, applying a 2:1 ratio to the 50% 42.5 acre total APF would yield 85 acres of restored coastal wetland habitat, and applying a 3:1 ratio would yield 127.5 acres of habitat. If the Commission selects this approach, staff believes these ratios would be appropriate minimums to apply to reflect that the Plan does not identify specific mitigation sites and the site(s) selected could be more than a hundred miles from the impact site at and near Agua Hedionda.~~

[11] **Poseidon's study included error rates based on source water sampling, which Dr. Raimondi believed were unreasonably high. He instead calculated an error rate based on the proportional mortality of each species being an independent replicate, which he believes better meshes with the logic behind the use of the APF to determine impacts.**

~~However, as described previously, Commission staff believes that Dr. Raimondi's proposed approach of creating 55.4 to 68.2 acres would be an adequate and preferable approach – if Poseidon's proposed Plan is also modified to include staff's other recommended modifications, including the one described in the next section of this memorandum.~~

Based on the discussion above and on the record, the Commission finds that requiring 55.4 acres of estuarine wetland restoration in the Southern California Bight subject to the conditions shown in Exhibit 1 provides a sufficient degree of certainty that the facility's entrainment impacts will be fully mitigated and brings the Plan into conformity to Special Condition 8 and the Coastal Act's marine life protection policies.

4.2.3 Analysis of Proposed Mitigation Phasing

As noted above, Poseidon's Plan includes a proposed phased approach to mitigation, which would be based on changes in power plant operations or possible changes in technology. **Because of the possibility that Poseidon might in the future adopt technologies that are not currently available or feasible to reduce entrainment and because of uncertainty regarding future power plant operations, the Commission finds that it is appropriate to allow phasing of the mitigation. *For the first phase,* Poseidon must submit within two years of the issuance of the CDP for the desalination facility a complete CDP application for wetland restoration of at least 37 acres. Poseidon may apply during Phase I to implement the entire 55.4 acres of wetland restoration. For the second phase, Poseidon must within five years of issuance of the Phase I CDP submit a complete CDP application to restore the additional 18.4 acres of restoration, or as part of that application request the Commission reduce or eliminate the amount of required restoration if Poseidon implements the above-referenced technologies that result in reduced entrainment or if, as explained below, Poseidon performs dredging in Agua Hedionda Lagoon in a manner that warrants mitigation credit.** ~~For several reasons, staff recommends the Commission not accept this aspect of the Plan and instead require a specific type and amount of mitigation as described above. The entrainment impacts described in the Commission's Findings were based on Poseidon application to withdraw 304 million gallons per day of estuarine water to operate its desalination facility, and staff recommends the Commission use this as the basis for its decision on the amount of mitigation needed to address this impact.~~

~~Staff believes this phasing approach is speculative in that it is tied to unknown future operations of the power plant. Additionally, information in the record shows that the power plant owner expects to replace the existing power plant within the next few years and to operate the existing plant only at very low levels or on a back-up basis until it is no longer needed to support the regional electrical power grid. More recently, the power plant owner announced that it would consider constructing its own desalination facility to provide water for its proposed new power plant. If built, this facility would use only about one percent of the water Poseidon proposes to use, and so would likely have a relatively minor affect on the overall mitigation needed to adequately address the impacts of both facilities.~~

~~Staff also believes that tying Poseidon's mitigation to power plant operations would be inappropriate for purposes of the coastal development permit and the Commission's Findings. Poseidon's coastal development permit application did not include the power plant owner as a co-applicant, and the Commission has made no determinations about how the power plant should or may operate.~~

4.2.4 Analysis of dredging as project mitigation

~~Similarly, staff recommends the Commission not approve Poseidon's proposal to allow it to use as mitigation during Phase II the dredging activities now being conducted by the power plant owner.~~ Poseidon proposes a formula by which it could obtain up to 81 acres of credit for conducting dredging in Agua Hedionda Lagoon. <u>**The Commission does not accept this formula because it does not currently have sufficient information to evaluate the purpose, nature, or extent of potential dredging, or whether Poseidon would be able to conduct the proposed dredging. It is possible, however, that Poseidon might carry out future dredging in a manner that warrants mitigation credit. Poseidon may therefore apply as part of its Phase II mitigation CDP application for a reduction in restoration requirements in exchange for mitigation credits that the Commission may consider for Poseidon's dredging activities.**</u> ~~However, the Commission has not considered dredging in and of itself to be mitigation. Dredging that the power plant has conducted in the past has been done to maintain its intake channel, and similarly, Poseidon's main purpose for dredging would be to maintain that channel. The Commission has considered habitat benefits resulting from dredging for that primary purpose as merely incidental to the primary purpose of the dredging activities rather than mitigation. Had those dredging activities instead been considered mitigation, the power plant owner may have been required to continue dredging to maintain the area of mitigation, regardless of the need for an intake structure.~~

~~Further, as noted in the Findings, the power plant owner also owns the Lagoon and has expressed its intentions to maintain the Lagoon for the foreseeable future. Additionally, the power plant owner is not a permit co-applicant with Poseidon, and the permit record includes no agreement between Poseidon and the owner regarding dredging, so staff believes it would not be appropriate for the Commission to approve a plan that may create an expectation that Poseidon would take on these activities on the owner's property without landowner approval.~~

~~As Poseidon notes in its Plan, the Commission accepted as part of Edison's San Dieguito restoration project a commitment by Edison to maintain the San Dieguito tidal inlet in an open condition in perpetuity. However, in that instance, dredging was necessary for that project to support the more than 100 acres of restored tidal wetlands Edison had created as a substantial portion of the mitigation required pursuant to its SONGS coastal development permit. The Commission's acceptance of that mitigation element was also based on multiple years of study by the MRC, whose recommendation the Commission used in its decision. The MRC has not made a similar recommendation for Poseidon's proposal. Further, Poseidon has not proposed mitigation within Agua Hedionda that would require dredging.~~

~~Finally, Poseidon's proposal would not meet the provision of **Special Condition 8** requiring mitigation to be in the form of creation, enhancement, or restoration of aquatic and wetland habitat, to the maximum extent feasible. As noted above, there are wetland mitigation opportunities within the Southern California Bight well in excess of the amount needed to mitigate for this project's impacts, and Poseidon has not shown that it would be infeasible to provide the required type of mitigation.~~

4.3 ANALYSIS – ASSURANCE THAT MITIGATION WILL SUCCEED

Until recently, Poseidon had proposed that it provide wetland restoration at a site in San Dieguito Lagoon, adjacent to Edison's restoration project. Review by staff, Dr. Raimondi, and the ~~MRC~~ **SAP** had been based on determining whether that site would provide suitable mitigation. In April 2008, Dr. Raimondi concluded that Poseidon's proposed San Dieguito site would likely provide suitable habitat for the losses of estuarine larvae at Agua Hedionda if the restored habitat was similar to the habitat affected at Agua Hedionda. In June 2008, Dr. Raimondi and the ~~MRC~~ **SAP** also concluded that the San Dieguito site would also provide at least partial mitigation for some species affected in Poseidon's nearshore impact area. Also in June, staff provided Poseidon with a modified version of the conditions the Commission required Edison to meet for conducting its site selection, construction, monitoring, and other aspects of its restoration plan, and recommended that Poseidon include these conditions as part of its proposed Plan. These are provided in Exhibit 2.

~~Since then,~~ **Several weeks before the August 2008 hearing,** Poseidon altered its Plan so that San Dieguito ~~is~~ **was** no longer necessarily Poseidon's preferred site. The Plan instead proposes that Poseidon select a site or sites somewhere within the Southern California Bight that meet conditions shown in Sections 3.1 and 3.2 of the Plan. Those conditions included further modifications to the conditions staff provided in June.

Staff asked the ~~MRC~~ **SAP** to review Poseidon's two proposed changes – that is, its proposal to consider sites other than San Dieguito and the modifications in its Plan to staff's previously recommended conditions. Regarding, staff's proposed conditions, the ~~MRC~~ **SAP** believes those conditions – i.e., Exhibit 2 – would generally provide adequate assurance of success for a restoration project to be implemented in most coastal estuarine areas of Southern California, although a higher degree of assurance would result if specific sites were identified. The ~~MRC~~ **SAP** also determined that the changes Poseidon proposed to staff's conditions and included in its Plan would result in lesser mitigation standards than those required of Edison and would not provide equal assurance of mitigation success. The changes Poseidon proposed include the following:[12]

- Staff recommended that Poseidon submit a complete coastal development permit application for its Final Restoration Plan within 24 months of Commission approval of its Preliminary Plan (i.e., the Plan being reviewed herein). Poseidon **proposed** modif~~ied~~**ying** that recommendation in Section 4 of its Plan to allow submittal of that application either 24 months after issuance of the project coastal development permit or commencement of

[12] For a full comparison, see **Exhibit 3,** ~~Section 3 of~~ Poseidon's **proposed** Plan, and Exhibit 2 showing staff's originally recommended conditions.

commercial operations of the desalination facility, whichever is later. This could substantially delay the implementation of mitigation and could result in several years of impacts occurring without mitigation.

- A proposed change to Poseidon's Plan at Section 3.1(d) and at Section 3.2(c) would **allow the Executive Director or Commission to** reduce the required buffer zone at its mitigation sites from ~~no less than~~ **at least** 100 feet wide to an average that could be ~~much~~ less than 100 feet **wide**.
- ~~A proposed change at Section 3.1(i) would allow the Plan to affect endangered species in a way not allowed under the Edison requirements.~~
- Poseidon proposes to change Section 3.3(c) to allow mitigation to occur in up to four sites, rather than up to two sites, as required of Edison, which could fragment the mitigation and reduce its overall value.
- ~~Poseidon also proposed deleting a requirement at Section 5.4 that would require a designed tidal prism be maintained to ensure the wetland mitigation site has adequate tidal action.~~
- ~~Poseidon proposes that any fees it pays for coastal development permits or amendments be credited against the budget needed to implement the mitigation plan.~~

Staff and the ~~MRC~~ **SAP** reviewed these proposed changes and believe they would result in inadequate assurance that successful mitigation would be conducted in a timely manner**, and the Commission did not include those proposed revisions in its Plan approval**. ~~Staff's recommendation, therefore, is~~ **The Commission finds** that the Plan be modified to include the conditions in Exhibit 2.

CONCLUSION

The Commission finds that, as modified as described above and with the conditions in Exhibit 1, the Marine Life Mitigation Plan complies with *Special Condition 8* and the marine life protection policies of the Coastal Act. The Commission further finds that implementation of the Plan will ensure the project's entrainment-related impacts will be fully mitigated and will enhance and restore the marine resources and biological productivity of coastal waters in conformity to Coastal Acts Sections 30230 and 30231.

Item W16a
Exhibit 1

Approved Marine Life Mitigation Plan (MLMP)

Item W16a – Exhibit 1
Special Condition 8 of E-06-013 – Poseidon Resources
November 21, 2008

APPROVED MARINE LIFE MITIGATION PLAN

INTRODUCTION

Poseidon's Carlsbad desalination facility will be co-located with the Encina Power Station and will use the power plant's once-through cooling intake and outfall structures. The desalination facility is expected to use about 304 million gallons per day (mgd) of estuarine water drawn through the structure. The facility will operate both when the power plant is using its once-through cooling system and when it is not.

This Marine Life Mitigation Plan (the Plan) will result in mitigation necessary to address the entrainment impacts caused by the facility's use of estuarine water. The Plan includes two phases of mitigation – Poseidon is required during Phase I to provide at least 37 acres of estuarine wetland restoration, as described below. In Phase II, Poseidon is required to provide an additional 18.4 acres of estuarine wetland restoration. However, as described below, Poseidon may choose to provide all 55.4 acres of restoration during Phase I. Poseidon may also choose during Phase II to apply for a CDP to reduce or eliminate the required 18.4 acres of mitigation and instead conduct alternative mitigation by implementing new entrainment reduction technology or obtaining mitigation credit for conducting dredging.

CONDITION A: WETLAND RESTORATION MITIGATION

The permittee shall develop, implement and fund a wetland restoration project that compensates for marine life impacts from Poseidon's Carlsbad desalination facility.

1.0 PHASED IMPLEMENTATION

Phase I: Poseidon is to provide at least 37 acres of estuarine wetland restoration. Within two years of issuance of the desalination facility's coastal development permit (CDP), Poseidon is to submit a complete CDP application for a proposed restoration project, as described below.

Phase II: Within five years of issuance of the Phase I CDP, Poseidon is to submit a complete CDP application proposing up to 18.4 acres of additional estuarine wetland restoration, subject to reduction as described in Section 6.0 below.

2.0 SITE SELECTION

In consultation with Commission staff, the permittee shall select a wetland restoration site or sites for mitigation in accordance with the following process and terms.

Within 10 months of the effective date of this permit, the permittee shall submit the proposed site(s) and preliminary wetland restoration plan to the Commission for its review and approval or disapproval.

The location of the wetland restoration project(s) shall be within the Southern California Bight. The permittee shall select from sites including, but not limited to, the following eleven sites: Tijuana Estuary in San Diego County; San Dieguito River Valley in San Diego County; Agua Hedionda Lagoon in San Diego County; San Elijo Lagoon in San Diego County; Buena Vista Lagoon in San Diego County; Huntington Beach Wetland in Orange County, Anaheim Bay in Orange County, Santa Ana River in Orange County, Los Cerritos Wetland in Los Angeles County, Ballona Wetland in Los Angeles County, and Ormond Beach in Ventura County. The permittee may also consider any sites that may be recommended by the California Department of Fish & Game as high priority wetlands restoration projects. Other sites proposed by the permittee may be added to this list with the Executive Director's approval.

The basis for the selection shall be an evaluation of the site(s) against the minimum standards and objectives set forth in subsections 3.1 and 3.2 below. The permittee shall take into account and give serious consideration to the advice and recommendations of the Scientific Advisory Panel (SAP) established and convened by the Executive Director pursuant to Condition B.1.0. The permittee shall select the site(s) that meet the minimum standards and best meet the objectives.

3.0 PLAN REQUIREMENTS

In consultation with Commission staff, the permittee shall develop a wetland restoration plan for the wetland site(s) identified through the site selection process. The wetland restoration plan shall meet the minimum standards and incorporate as many as feasible of the objectives in subsections 3.1 and 3.2, respectively.

3.1 Minimum Standards

The wetland restoration project site(s) and preliminary plan(s) must meet the following minimum standards:

a. Location within Southern California Bight;

b. Potential for restoration as tidal wetland, with extensive intertidal and subtidal areas;

c. Creates or substantially restores a minimum of 37 acres and up to at least 55.4 acres of habitat similar to the affected habitats in Agua Hedionda Lagoon, excluding buffer zone and upland transition area;

d. Provides a buffer zone of a size adequate to ensure protection of wetland values, and at least 100 feet wide, as measured from the upland edge of the transition area.

e. Any existing site contamination problems would be controlled or remediated and would not hinder restoration;

f. Site preservation is guaranteed in perpetuity (through appropriate public agency or nonprofit ownership, or other means approved by the Executive Director), to protect against future degradation or incompatible land use;

g. Feasible methods are available to protect the long-term wetland values on the site(s), in perpetuity;

h. Does not result in a net loss of existing wetlands; and

i. Does not result in an adverse impact on endangered animal species or an adverse unmitigated impact on endangered plant species.

3.2 Objectives

The following objectives represent the factors that will contribute to the overall value of the wetland. The selected site(s) shall be determined to achieve these objectives. These objectives shall also guide preparation of the restoration plan.

a. Provides maximum overall ecosystem benefits, e.g. maximum upland buffer, enhancement of downstream fish values, provides regionally scarce habitat, potential for local ecosystem diversity;

b. Provides substantial fish habitat compatible with other wetland values at the site(s);

c. Provides a buffer zone of an average of at least 300 feet wide, and not less than 100 feet wide, as measured from the upland edge of the transition area.

d. Provides maximum upland transition areas (in addition to buffer zones);

e. Restoration involves minimum adverse impacts on existing functioning wetlands and other sensitive habitats;

f. Site selection and restoration plan reflect a consideration of site specific and regional wetland restoration goals;

g. Restoration design is that most likely to produce and support wetland-dependent resources;

h. Provides rare or endangered species habitat;

i. Provides for restoration of reproductively isolated populations of native California species;

j. Results in an increase in the aggregate acreage of wetland in the Southern California Bight;

k. Requires minimum maintenance;

l. Restoration project can be accomplished in a reasonably timely fashion; and,

m. Site(s) in proximity to the Carlsbad desalination facility.

3.3 Restrictions

a. The permittee may propose a wetland restoration project larger than the minimum necessary size specified in subsection 3.1(c) above, if biologically appropriate for the site(s), but the additional acreage must (1) be clearly identified, and (2) must not be the portion of the project best satisfying the standards and objectives listed above.

b. If the permittee jointly enters into a restoration project with another party: (1) the permittee's portion of the project must be clearly specified, (2) any other party involved cannot gain mitigation credit for the permittee's portion of the project, and (3) the permittee may not receive mitigation credit for the other party's portion of the project.

c. The permittee may propose to divide the mitigation requirement between a maximum of two wetland restoration sites, unless there is a compelling argument, approved by the Executive Director, that the standards and objectives of subsections 3.1 and 3.2 will be better met at more than two sites.

4.0 PLAN IMPLEMENTATION

4.1 Coastal Development Permit Applications

The permittee shall submit complete Coastal Development Permit applications for the Phase I and Phase II restoration plan(s) that include CEQA documentation and local or other state agency approvals. The CDP application for Phase I shall be submitted within 24 months following the issuance of the Coastal Development Permit for the Carlsbad desalination facility. The CDP application for Phase II shall be submitted within 5 years of issuance of the CDP for Phase I. The Executive Director may grant an extension to these time periods at the request of and upon a demonstration of good cause by the permittee. The restoration plans shall substantially conform to Section 3.0 above and shall include, but not be limited to the following elements:

a. Detailed review of existing physical, biological, and hydrological conditions; ownership, land use and regulation;

b. Evaluation of site-specific and regional restoration goals and compatibility with the goal of mitigating for Poseidon's marine life impacts;

c. Identification of site opportunities and constraints;

d. Schematic restoration design, including:

   1. Proposed cut and fill, water control structures, control measures for stormwater, buffers and transition areas, management and maintenance requirements;
   2. Planting program, including removal of exotic species, sources of plants and or seeds (local, if possible), protection of existing salt marsh plants, methods for preserving top soil and augmenting soils with nitrogen and other necessary soil amendments before planting, timing of planting, plans for irrigation until established, and location of planting and elevations on the topographic drawings;
   3. Proposed habitat types (including approximate size and location);
   4. Assessment of significant impacts of design (especially on existing habitat values) and net habitat benefits;
   5. Location, alignment and specifications for public access facilities, if feasible;
   6. Evaluation of steps for implementation e.g. permits and approvals, development agreements, acquisition of property rights;
   7. Cost estimates;
   8. Topographic drawings for final restoration plan at 1" = 100 foot scale, one foot contour interval; and
   9. Drawings shall be directly translatable into final working drawings.

e. Detailed information about how monitoring and maintenance will be implemented;

f. Detailed information about construction methods to be used;

g. Defined final success criteria for each habitat type and methods to be used to determine success;

h. Detailed information about how Poseidon will coordinate with the Scientific Advisory Panel including its role in independent monitoring, contingency planning review, cost recovery, etc.;

i. Detailed information about contingency measures that will be implemented if mitigation does not meet the approved goals, objectives, performance standards, or other criteria; and,

j. Submittal of "as-built" plans showing final grading, planting, hydrological features, etc. within 60 days of completing initial mitigation site construction.

4.2 Wetland Construction Phase

Within 6 months of approval of the Phase I restoration plan, subject to the permittee's obtaining the necessary permits, the permittee shall commence the construction phase of the wetland restoration project. The permittee shall be responsible for ensuring that construction is carried out in accordance with the specifications and within the timeframes specified in the approved final restoration plan and shall be responsible for any remedial work or other intervention necessary to comply with final plan requirements.

4.3 Timeframe for Resubmittal of Project Elements

If the Commission does not approve any element of the project (i.e. site selection, restoration plan), the Commission will specify the time limits for compliance relative to selection of another site or revisions to the restoration plan.

5.0 WETLAND MONITORING, MANAGEMENT AND REMEDIATION

Monitoring, management (including maintenance), and remediation shall be conducted over the "full operating life" of Poseidon's desalination facility, which shall be 30 years from the date "as-built" plans are submitted pursuant to subsection 4.1(l).

The following section describes the basic tasks required for monitoring, management and remediation. Condition B specifies the administrative structure for carrying out these tasks, including the roles of the permittee and Commission staff.

5.1 Monitoring and Management Plan

A monitoring and management plan will be developed in consultation with the permittee and appropriate wildlife agencies, concurrently with the preparation of the restoration plan to provide an overall framework to guide the monitoring work. It will include an overall description of the studies to be conducted over the course of the monitoring program and a description of management tasks that are anticipated, such as trash removal. Details of the monitoring studies and management tasks will be set forth in a work program (see Condition B).

5.2 Pre-restoration site monitoring

Pre-restoration site monitoring shall be conducted to collect baseline data on the wetland attributes to be monitored. This information will be incorporated into and may result in modification to the overall monitoring plan.

5.3 Construction Monitoring

Monitoring shall be conducted during and immediately after each stage of construction of the wetland restoration project to ensure that the work is conducted according to plans.

5.4 Post-Restoration Monitoring and Remediation

Upon completion of construction of the wetland(s), monitoring shall be conducted to measure the success of the wetland(s) in achieving stated restoration goals (as specified in the restoration plan(s)) and in achieving performance standards, specified below. The permittee shall be fully responsible for any failure to meet these goals and standards during the facility's full operational years. Upon determining that the goals or standards are not achieved, the Executive Director shall prescribe remedial measures, after consultation with the permittee, which shall be immediately implemented by the permittee with Commission staff direction. If the permittee does not agree that remediation is necessary, the matter may be set for hearing and disposition by the Commission.

Successful achievement of the performance standards shall (in some cases) be measured relative to approximately four reference sites, which shall be relatively undisturbed, natural tidal wetlands within the Southern California Bight. The Executive Director shall select the reference sites. The standard of comparison, i.e., the measure of similarity to be used (e.g., within the range, or within the 95% confidence interval) shall be specified in the work program.

In measuring the performance of the wetland project, the following physical and biological performance standards will be used:

a. **Longterm Physical Standards.** The following long-term standards shall be maintained over the full operative life of the desalination facility:

   1. ***Topography.*** The wetland(s) shall not undergo major topographic degradation (such as excessive erosion or sedimentation);
   2. ***Water Quality.*** Water quality variables [to be specified] shall be similar to reference wetlands;
   3. ***Tidal prism.*** If the mitigation site(s) require dredging, the tidal prism shall be maintained and tidal flushing shall not be interrupted; and,
   4. ***Habitat Areas.*** The area of different habitats shall not vary by more than 10% from the areas indicated in the restoration plan(s).

b. **Biological Performance Standards.** The following biological performance standards shall be used to determine whether the restoration project is successful. Table 1, below, indicates suggested sampling locations for each of the following biological attributes; actual locations will be specified in the work program:

   1. ***Biological Communities.*** Within 4 years of construction, the total densities and number of species of fish, macroinvertebrates and birds (see Table 1) shall be similar to the densities and number of species in similar habitats in the reference wetlands;
   2. ***Vegetation.*** The proportion of total vegetation cover and open space in the marsh shall be similar to those proportions found in the reference sites. The percent cover of algae shall be similar to the percent cover found in the reference sites;
   3. ***Spartina Canopy Architecture.*** The restored wetland shall have a canopy architecture that is similar in distribution to the reference sites, with an equivalent proportion of stems over 3 feet tall;

4. ***Reproductive Success.*** Certain plant species, as specified by in the work program, shall have demonstrated reproduction (i.e. seed set) at least once in three years;
5. ***Food Chain Support.*** The food chain support provided to birds shall be similar to that provided by the reference sites, as determined by feeding activity of the birds; and,
6. ***Exotics.*** The important functions of the wetland shall not be impaired by exotic species.

Table 1: Suggested Sampling Locations

	Salt Marsh			Open Water			Tidal
	Spartina	Salicornia	Upper	Lagoon	Eelgrass	Mudflat	Creeks
1) Density/spp:							
– Fish				X	X	X	X
– Macroinvert-ebrates				X	X	X	X
– Birds	X	X	X	X		X	X
2) % Cover							
Vegetation	X	X	X		X		
algae	X	X				X	
3) Spartina architecture	X						
4) Reproductive success	X	X	X				
5) Bird feeding				X		X	X
6) Exotics	X	X	X	X	X	X	X

6.0 ALTERNATIVE MITIGATION

As part of Phase II, Poseidon may propose in its CDP application alternatives to reduce or eliminate the required 18.4 acres of mitigation. The alternative mitigation proposed may be in the form of implementing new entrainment reduction technology or may be mitigation credits for conducting dredging, either of which could reduce or eliminate the 18.4 acres of mitigation.

CONDITION B: ADMINISTRATIVE STRUCTURE

1.0 ADMINISTRATION

Personnel with appropriate scientific or technical training and skills will, under the direction of the Executive Director, oversee the mitigation and monitoring functions identified and required by Condition A. The Executive Director will retain scientific and administrative support staff needed to perform this function, as specified in the work program.

This technical staff will oversee the preconstruction and post-construction site assessments, mitigation project design and implementation (conducted by permittee), and monitoring activities (including plan preparation); the field work will be done by contractors under the Executive Director's direction. The contractors will be responsible for collecting the data, analyzing and interpreting it, and reporting to the Executive Director.

The Executive Director shall convene a Scientific Advisory Panel to provide the Executive Director with scientific advice on the design, implementation and monitoring of the wetland restoration. The panel shall consist of recognized scientists, including a marine biologist, an ecologist, a statistician and a physical scientist.

2.0 BUDGET AND WORK PROGRAM

The funding necessary for the Commission and the Executive Director to perform their responsibilities pursuant to these conditions will be provided by the permittee in a form and manner reasonably determined by the Executive Director to be consistent with requirements of State law, and which will ensure efficiency and minimize total costs to the permittee. The amount of funding will be determined by the Commission on a biennial basis and will be based on a proposed budget and work program, which will be prepared by the Executive Director in consultation with the permittee, and reviewed and approved by the Commission in conjunction with its review of the restoration plan. If the permittee and the Executive Director cannot agree on the budget or work program, the disagreement will be submitted to the Commission for resolution.

The budget to be funded by the permittee will be for the purpose of reasonable and necessary costs to retain personnel with appropriate scientific or technical training and skills needed to assist the Commission and the Executive Director in carrying out the mitigation and lost resource compensation conditions. In addition, reasonable funding will be included in this budget for necessary support personnel, equipment, overhead, consultants, the retention of contractors needed to conduct identified studies, and to defray the costs of members of any scientific advisory panel(s) convened by the Executive Director for the purpose of implementing these conditions.

Costs for participation on any advisory panel shall be limited to travel, per diem, meeting time and reasonable preparation time and shall only be paid to the extent the participant is not otherwise entitled to reimbursement for such participation and preparation. The amount of funding will be determined by the Commission on a biennial basis and will be based on a proposed budget and work program, which will be prepared by the Executive Director in consultation with the permittee, and reviewed and approved by the Commission in conjunction with its review of the restoration plan. If the permittee and the Executive Director cannot agree on the budget or work program, the disagreement will be submitted to the Commission for resolution. Total costs for such advisory panel shall not exceed $100,000 per year adjusted annually by any increase in the consumer price index applicable to California.

The work program will include:

a. A description of the studies to be conducted over the subsequent two year period, including the number and distribution of sampling stations and samples per station, methodology and statistical analysis (including the standard of comparison to be used in comparing the mitigation project to the reference sites);

b. A description of the status of the mitigation projects, and a summary of the results of the monitoring studies to that point;

c. A description of four reference sites;

d. A description of the performance standards that have been met, and those that have yet to be achieved;

e. A description of remedial measures or other necessary site interventions;

f. A description of staffing and contracting requirements; and,

g. A description of the Scientific Advisory Panel's role and time requirements in the two year period.

The Executive Director may amend the work program at any time, subject to appeal to the Commission.

3.0 ANNUAL REVIEW AND PUBLIC WORKSHOP REVIEW

The permittee shall submit a written review of the status of the mitigation project to the Executive Director no later than April 30 each year for the prior calendar year. The written review will discuss the previous year's activities and overall status of the mitigation project, identify problems and make recommendations for solving them, and review the next year's program.

To review the status of the mitigation project, the Executive Director will convene and conduct a duly noticed public workshop during the first year of the project and every other year thereafter unless the Executive Director deems it unnecessary. The meeting will be attended by the contractors who are conducting the monitoring, appropriate members of the Scientific Advisory Panel, the permittee, Commission staff, representatives of the resource agencies (CDFG, NMFS, USFWS), and the public. Commission staff and the contractors will give presentations on the previous biennial work program's activities, overall status of the mitigation project, identify problems and make recommendations for solving them, and review the next upcoming period's biennial work program.

The public review will include discussions on whether the wetland mitigation project has met the performance standards, identified problems, and recommendations relative to corrective measures necessary to meet the performance standards. The Executive Director will use information presented at the public review, as well as any other relevant information, to determine whether any or all of the performance standards have been met, whether revisions to the standards are necessary, and whether remediation is required. Major revisions shall be subject to the Commission's review and approval.

The mitigation project will be successful when all performance standards have been met each year for a three-year period. The Executive Director shall report to the Commission upon determining that all of the performance standards have been met for three years and that the project is deemed successful. If the Commission determines that the performance standards have been met and the project is successful, the monitoring program will be scaled down, as recommended by the Executive Director and approved by the Commission. A public review shall thereafter occur every five years, or sooner if called for by the Executive Director. The work program shall reflect the lower level of monitoring required. If subsequent monitoring shows that a standard is no longer being met, monitoring may be increased to previous levels, as determined necessary by the Executive Director.

The Executive Director may make a determination on the success or failure to meet the performance standards or necessary remediation and related monitoring at any time, not just at the time of the workshop review.

4.0 ADDITIONAL PROCEDURES

4.1 Dispute Resolution

In the event that the permittee and the Executive Director cannot reach agreement regarding the terms contained in or the implementation of any part of this Plan, the matter may be set for hearing and disposition by the Commission.

4.2 Extensions

Any of the time limits established under this Plan may be extended by the Executive Director at the request of the permittee and upon a showing of good cause.

CONDITION C: SAP DATA MAINTENANCE

The permittee shall make available on a publicly-accessible website all scientific data collected as part of the project. The website and the presentation of data shall be subject to Executive Director review and approval.

Item W16a
Exhibit 2

Staff's Proposed Draft MLMP Conditions (June 2008)

CDP E-06-013
Condition Compliance
Special Condition 8

EXHIBIT NO. 2
APPLICATION NO. E-06-013
Condition Compliance
Special Condition 8

Exhibit 2

July 24, 2008

Staff's Proposed Draft MLMP Conditions

This is a modified version of conditions the Commission required of Southern California Edison in implementing its wetland restoration project at San Dieguito Lagoon pursuant to Coastal Development Permit xx

Staff provided these conditions to Poseidon on June 20, 2008 and recommended Poseidon include them in its Marine Life Mitigation Plan to present to the Commission. The modifications shown in ~~strikethrough~~ and underline reflect differences between Poseidon's proposal and Edison's and provide updated wetland mitigation standards since the Commission's approval of Edison's project. Staff's notes to Poseidon are shown in [***brackets and bold italics***].

CONDITION A: WETLAND RESTORATION MITIGATION

The permittee shall develop, implement and fund a wetland restoration project that compensates for ~~past, present and future fish~~ marine life impacts from ~~SONGS Units 2 and 3, as identified by the Marine Review Committee~~ Poseidon's Carlsbad desalination facility.

1.0 SITE SELECTION AND PRELIMINARY PLAN

In consultation with Commission staff, the permittee shall select a wetland restoration site and develop a preliminary plan in accordance with the following process and terms.

Within 9 months of the effective date of this permit, the permittee shall submit the proposed site and preliminary wetland restoration plan to the Commission for its review and approval or disapproval.

1.1 Site Selection

The location of the wetland restoration project shall be within the Southern California Bight. The permittee shall evaluate and select from sites including, but not limited to, the following eight sites: Tijuana Estuary in San Diego County, San Dieguito River Valley in San Diego County, Huntington Beach Wetland in Orange County, Anaheim Bay in Orange County, Santa Ana River in Orange County, Los Cerritos Wetland in Los Angeles County, Ballona Wetland in Los Angeles County, and Ormond Beach in Ventura County. Other sites proposed by the permittee may be added to this list with the Executive Director's approval.

The basis for the selection shall be an evaluation of the sites against the minimum standards and objectives set forth in subsections 1.3 and 1.4 below. The permittee shall take into account and give serious consideration to the advice and recommendations of an Interagency Wetland Advisory Panel, established and convened by the Executive Director. The permittee shall select the site that meets the minimum standards and best meets the objectives.

1.2 Preliminary Restoration Plan

[***Note: This is the type of Preliminary Plan we anticipate you'll provide for the August hearing. The Plan should include the elements in Sections 1.2 – 1.4 below.***]

In consultation with Commission staff, the permittee shall develop a preliminary wetland restoration plan for the wetland site identified through the site selection process. The preliminary wetland restoration plan shall meet the minimum standards and incorporate as many as possible of the objectives in subsections 1.3 and 1.4, respectively.

The preliminary wetland restoration plan shall include the following elements:

a. Review of existing physical, biological, and hydrological conditions; ownership, land use and regulation.

b. Site-specific and regional restoration goals and compatibility with the goal of mitigating for ~~SONGS impact to fish~~ Poseidon's marine life impacts.

c. Identification of site opportunities and constraints.

d. Conceptual restoration design, including:

   1. Proposed grading and excavation; water control structures; planting; integration of public access, if feasible; buffers and transition areas; management and maintenance requirements.

   2. Proposed habitat types (including approximate size and location).

3. Preliminary assessment of significant impacts of design (especially on existing habitat values) and net habitat benefits.

4. Evaluation of steps for implementation e.g. permits and approvals, development agreements, acquisition of property interests.

5. A graphic depiction of proposed plan.

[***Note: As part of the elements above, the Preliminary Plan should describe the current and anticipated relationship between Poseidon's proposed mitigation and Edison's, including applicable conditions of the MOA and any written agreements between Poseidon, Edison, and/or the JPA, measures included that will ensure Poseidon's mitigation will not adversely affect Edison's mitigation, coordination with Edison's Scientific Advisory Panel, etc.***]

1.3 Minimum Standards

The wetland restoration project site and preliminary plan must meet the following minimum standards:

a. Location within Southern California Bight.

b. Potential for restoration as tidal wetland, with extensive intertidal and subtidal areas;

c. Creates or substantially restores a minimum of ~~150 acres (60 hectares)~~ 55.4 to 68.2 acres of ~~wetlands~~ habitat similar to the affected habitats in Agua Hedionda Lagoon, excluding buffer zone and upland transition area; [***Note: the acreage figures are from Pete Raimondi's evaluation at the 80% and 95% confidence levels.***]

d. Provides a buffer zone of a size adequate to ensure protection of wetland values, and not less than at least 100 feet wide, as measured from the upland edge of the transition area.

e. Any existing site contamination problems would be controlled or remediated and would not hinder restoration.

f. Site preservation is guaranteed in perpetuity (through appropriate public agency or nonprofit ownership, or other means approved by the Executive Director), to protect against future degradation or incompatible land use.

g. Feasible methods are available to protect the longterm wetland values on the site, in perpetuity.

h. Does not result in loss of existing wetlands.

i. Does not result in impact on endangered species.

1.4 Objectives

The following objectives represent the factors that will contribute to the overall value of the wetland. The selected site shall be that with the best potential to achieve these objectives. These objectives shall also guide preparation of the restoration plan.

a. Provides maximum overall ecosystem benefits e.g. maximum upland buffer, enhancement of downstream fish values, provides regionally scarce habitat, potential for local ecosystem diversity.

b. Provides substantial fish habitat compatible with other wetland values at the site.

c. Provides a buffer zone of an average of at least 300 feet wide, and not less than 100 feet wide, as measured from the upland edge of the transition area.

d. Provides maximum upland transition areas (in addition to buffer zones);

e. Restoration involves minimum adverse impacts on existing functioning wetlands and other sensitive habitats.

f. Site selection and restoration plan reflect a consideration of site specific and regional wetland restoration goals.

g. Restoration design is that most likely to produce and support wetland-dependent resources.

h. Provides rare or endangered species habitat.

i. Provides for restoration of reproductively isolated populations of native California species.

j. Results in an increase in the aggregate acreage of wetland in the Southern California Bight.

k. Requires minimum maintenance.

l. Restoration project can be accomplished in a timely fashion.

m. Site is in proximity to ~~SONGS~~ the Carlsbad desalination facility.

1.6 Restrictions

(a) The permittee may propose a wetland restoration project larger than the minimum necessary size specified in subsection 1.3(c) above, if biologically appropriate for the site, but the additional acreage must (1) be clearly identified, and (2) must not be the portion of the project best satisfying the standards and objectives listed above.

(b) If the permittee jointly enters into a restoration project with another party: (1) the permittee's portion of the project must be clearly specified, (2) any other party involved cannot gain mitigation credit for the permittee's portion of the project, and (3) the permittee may not receive mitigation credit for the other party's portion of the project.

(c) The permittee may propose to divide the mitigation requirement between a maximum of two wetland restoration sites, unless there is a compelling argument, approved by the Executive Director, that the standards and objectives of subsections 1.3 and 1.4 will be better met at more than two sites.

[***Note: We'll probably recommend the text below, or similar, as conditions for the Commission to adopt in August to determine what will be required as follow-up to the Preliminary Plan to ensure it results in an adequate Final Plan – that is, while you may include them in your Plan for August, we'll probably handle them as conditions for approval.***]

2.0 FINAL PLAN AND PLAN IMPLEMENTATION

2.1 Final Restoration Plan

Within ~~12~~ 24 months [***Note: based on anticipated 18-month CEQA process***] following the Commission's approval of a site selection and preliminary restoration plan, the permittee shall submit a complete Coastal Development Permit application for a final restoration plan along with CEQA documentation ~~generated in connection with~~ and local or other state agency approvals~~, to the Executive Director of the Coastal Commission for review and approval~~. [***Note: the changes above reflect a difference between SONGS and Poseidon's processes. With SONGS, Edison applied for a CDP for its Preliminary Plan after Marine Resource Committee review and Commission approval of the selected site and applied for a CDP for its Final Plan. With Poseidon, your CDP application for the mitigation site work will come after CEQA is done and after other approvals are obtained.***] The final restoration plan shall substantially conform to the approved preliminary restoration plan as originally submitted or as amended by the Commission pursuant to a request by the permittee. The final restoration plan shall include, but not be limited to the following elements:

a. Detailed review of existing physical, biological, and hydrological conditions; ownership, land use and regulation.

b. Evaluation of site-specific and regional restoration goals and compatibility with the goal of mitigating for ~~SONGS impacts to fish~~ Poseidon's marine life impacts.

c. Identification of site opportunities and constraints.

[***Note: the above three elements should include a complete description of the relationship between Poseidon's mitigation and Edison's, and any legal/contractual relationships between***

Poseidon, Edison, the JPA, and other involved entities. This should also describe how Poseidon's ongoing sampling, monitoring, maintenance, contingency planning, etc. may be associated with Edison's.]

d. Schematic restoration design, including:

1. Proposed cut and fill, water control structures, control measures for stormwater, buffers and transition areas, management and maintenance requirements.

2. Planting Program, including removal of exotic species, sources of plants and or seeds (local, if possible), protection of existing salt marsh plants, methods for preserving top soil and augmenting soils with nitrogen and other necessary soil amendments before planting, timing of planting, plans for irrigation until established, and location of planting and elevations on the topographic drawings.

3. Proposed habitat types (including approximate size and location).

4. Assessment of significant impacts of design (especially on existing habitat values) and net habitat benefits. [***Note: this should include a description of any effects on existing habitat values within Poseidon's mitigation site (e.g., are there existing wetlands within your site that would be altered by your project?) and Edison's site, along with proposed measures to mitigate those impacts – e.g., methods, locations, etc.***]

5. Location, alignment and specifications for public access facilities, if feasible.

6. Evaluation of steps for implementation e.g. permits and approvals, development agreements, acquisition of property rights.

7. Cost estimates.

8. Topographic drawings for final restoration plan at 1" = 100 foot scale, one foot contour interval.

9. Drawings shall be directly translatable into final working drawings.

<u>g. Detailed information about how monitoring and maintenance will be implemented.</u>

<u>h. Detailed information about construction methods to be used.</u>

<u>i. Defined final success criteria for each habitat type and methods to be used to determine success.</u>

<u>j. Detailed information about how Poseidon will coordinate with the SONGS Scientific Advisory Panel, including its role in independent monitoring, contingency planning review, cost recovery, etc.</u>

k. Detailed information about contingency measures that will be implemented if mitigation does not meet the approved goals, objectives, performance standards, or other criteria.

l. Submittal of "as-built" plans showing final grading, planting, hydrological features, etc. within 60 days of completing initial mitigation site construction.

[***Note: the additions above reflect conditions generally included in more recent mitigation plans or needed to coordinate with Edison's efforts.***]

2.2 Wetland Construction Phase

Within 6 months of approval of the final restoration plan, subject to the permittee's obtaining the necessary permits, the permittee shall commence the construction phase of the wetland restoration project. The permittee shall be responsible for ensuring that construction is carried out in accordance with the specifications and within the timeframes specified in the approved final restoration plan and shall be responsible for any remedial work or other intervention necessary to comply with final plan requirements.

2.3 Timeframe for Resubmittal of Project Elements

If the Commission does not approve any element of the project (i.e. site selection, restoration plan), the Commission will specify the time limits for compliance relative to selection of another site or revisions to the restoration plan.

3.0 WETLAND MONITORING, MANAGEMENT AND REMEDIATION

Monitoring, management (including maintenance), and remediation shall be conducted over the "full operating life" of ~~SONGS Units 2 and 3~~ Poseidon's desalination facility. ~~"Full operating life" as defined in this permit includes past and future years of operation of SONGS units 2 and 3 including the decommissioning period to the extent there are continuing discharges. The number of past operating years at the time the wetland is ultimately constructed, shall be added to the number of future operating years and decommission period, to determine the length of the monitoring, management and remediation requirement.~~

The following section describes the basic tasks required for monitoring, management and remediation. Condition II-D specifies the administrative structure for carrying out these tasks, including the roles of the permittee and Commission staff.

3.1 Monitoring and Management Plan

A monitoring and management plan will be developed in consultation with the permittee and appropriate wildlife agencies, concurrently with the preparation of the restoration plan, to provide an overall framework to guide the monitoring work. It will include an overall description of the studies to be conducted over the course of the monitoring program and a description of management tasks that are anticipated, such as trash removal. Details of the monitoring studies and management tasks will be set forth in a work program (see Section II-D).

3.2 Pre-restoration site monitoring

Pre-restoration site monitoring shall be conducted to collect baseline data on the wetland attributes to be monitored. This information will be incorporated into and may result in modification to the overall monitoring plan.

3.3 Construction Monitoring

Monitoring shall be conducted during and immediately after each stage of construction of the wetland restoration project to ensure that the work is conducted according to plans.

3.4 Post-Restoration Monitoring and Remediation

Upon completion of construction of the wetland, monitoring shall be conducted to measure the success of the wetland in achieving stated restoration goals (as specified in restoration plan) and in achieving performance standards, specified below. The permittee shall be fully responsible for any failure to meet these goals and standards during the facility's full operational years ~~of SONGS Units 2 and 3~~. Upon determining that the goals or standards are not achieved, the Executive Director shall prescribe remedial measures, after consultation with the permittee, which shall be immediately implemented by the permittee with Commission staff direction. If the permittee does not agree that remediation is necessary, the matter may be set for hearing and disposition by the Commission.

Successful achievement of the performance standards shall (in some cases) be measured relative to approximately four reference sites, which shall be relatively undisturbed, natural tidal wetlands within the Southern California Bight. The Executive Director shall select the reference sites. The standard of comparison i.e. the measure of similarity to be used (e.g. within the range, or within the 95% confidence interval) shall be specified in the work program.

In measuring the performance of the wetland project, the following physical and biological performance standards will be utilized:

a. Longterm Physical Standards. The following longterm standards shall be maintained over the full operative life of ~~SONGS Units 2 and 3~~ the desalination facility.

    1) Topography. The wetland shall not undergo major topographic degradation (such as excessive erosion or sedimentation).

2) Water Quality. Water quality variables (to be specified) shall be similar to reference wetlands.

3) ~~Tidal prism. The designed tidal prism shall be maintained, and tidal flushing shall not be interrupted~~. [***Note: this is Edison's requirement, but could be part of Poseidon's obligiation based on the agreement you develop with Edison.***]

4) Habitat Areas. The area of different habitats shall not vary by more than 10% from the areas indicated in the final restoration plan.

b. Biological Performance Standards. The following biological performance standards shall be used to determine whether the restoration project is successful. Table 1, below, indicates suggested sampling locations for each of the following biological attributes; actual locations will be specified in the work program.

1) Biological Communities. Within 4 years of construction, the total densities and number of species of fish, macroinvertebrates and birds (see table 1) shall be similar to the densities and number of species in similar habitats in the reference wetlands.

2) Vegetation. The proportion of total vegetation cover and open space in the marsh shall be similar to those proportions found in the reference sites. The percent cover of algae shall be similar to the percent cover found in the reference sites.

3) Spartina Canopy Architecture. The restored wetland shall have a canopy architecture that is similar in distribution to the reference sites, with an equivalent proportion of stems over 3 feet tall.

4) Reproductive Success. Certain plant species, as specified by in the work program, shall have demonstrated reproduction (i.e. seed set) at least once in three years.

5) Food Chain Support. The food chain support provided to birds shall be similar to that provided by the reference sites, as determined by feeding activity of the birds.

6) Exotics. The important functions of the wetland shall not be impaired by exotic species.

Table 1: Suggested Sampling Locations

	Salt Marsh			Open Water			Tidal
	Spartina	Salicornia	Upper	Lagoon	Eelgrass	Mudflat	Creeks
1) Density/spp:							
Fish				X	X	X	X
Macroinverts				X	X	X	X
Birds	X	X	X	X		X	X
2) % Cover							
Vegetation	X	X	X		X		
algae	X	X				X	
3) Spar. arch.	X						
4) Repro. suc.	X	X	X				
5) Bird feeding				X		X	X
6) Exotics	X	X	X	X	X	X	X

...

CONDITION D: ADMINISTRATIVE STRUCTURE

[***Note: The conditions below will likely vary based on the relationship you develop with Edison and the JPA regarding monitoring, review, administration, etc.***]

1.0 ADMINISTRATION

Personnel with appropriate scientific or technical training and skills will, under the direction of the Executive Director, oversee the mitigation and monitoring functions identified and required by conditions II-A through C. The Executive Director will retain approximately two scientists and one administrative support staff to perform this function.

This technical staff will oversee the preconstruction and post-construction site assessments, mitigation project design and implementation (conducted by permittee), and monitoring activities (including plan preparation); the field work will be done by contractors under the

Executive Director's direction. The contractors will be responsible for collecting the data, analyzing and interpreting it, and reporting to the Executive Director.

The Executive Director shall convene a scientific advisory panel to provide the Executive Director with scientific advice on the design, implementation and monitoring of the wetland restoration and artificial reef. The panel shall consist of recognized scientists, including a marine biologist, an ecologist, a statistician and a physical scientist.

2.0 BUDGET AND WORK PROGRAM

The funding necessary for the Commission and the Executive Director to perform their responsibilities pursuant to these conditions will be provided by the permittee in a form and manner determined by the Executive Director to be consistent with requirements of State law, and which will ensure efficiency and minimize total costs to the permittee. The amount of funding will be determined by the Commission on a biennial basis and will be based on a proposed budget and work program, which will be prepared by the Executive Director in consultation with the permittee, and reviewed and approved by the Commission. If the permittee and the Executive Director cannot agree on the budget or work program, the disagreement will be submitted to the Commission for resolution.

The budget to be funded by the permittee will be for the purpose of reasonable and necessary costs to retain personnel with appropriate scientific or technical training and skills needed to assist the Commission and the Executive Director in carrying out the mitigation and lost resource compensation conditions (II-A through C) approved as part of this permit action. In addition, reasonable funding will be included in this budget for necessary support personnel, equipment, overhead, consultants, the retention of contractors needed to conduct identified studies, and to defray the costs of members of any scientific advisory panel(s) convened by the Executive Director for the purpose of implementing these conditions.

Costs for participation on any advisory panel shall be limited to travel, per diem, meeting time and reasonable preparation time and shall only be paid to the extent the participant is not otherwise entitled to reimbursement for such participation and preparation. Total costs for such advisory panel shall not exceed $100,000 per year adjusted annually by any increase in the consumer price index applicable to California.

The work program will include:

a. A description of the studies to be conducted over the subsequent two year period, including the number and distribution of sampling stations and samples per station, methodology and statistical analysis (including the standard of comparison to be used in comparing the mitigation projects to the reference sites.)

b. A description of the status of the mitigation projects, and a summary of the results of the monitoring studies to that point.

c. A description of the performance standards that have been met, and those that have yet to be achieved.

d. A description of remedial measures or other necessary site interventions.

e. A description of staffing and contracting requirements.

f. A description of the Scientific Advisory Panel's role and time requirements in the two year period.

The Executive Director may amend the work program at any time, subject to appeal to the Commission.

3.0 ANNUAL REVIEW

A duly noticed public workshop will be convened and conducted by the Executive Director or the Commission each year to review the status of the mitigation projects. The meeting will be attended by the contractors who are conducting the monitoring, appropriate members of the Scientific Advisory Panel, the permittee, Commission staff, representatives of the resource agencies (CDFG, NMFS, USFWS), and the public. Commission staff and the contractors will give presentations on the previous year's activities, overall status of the mitigation projects, identify problems and make recommendations for solving them, and review the next year's program. *The permittee shall report on the status of the behavioral barrier devices.*

The public review will include discussions on whether the artificial reef and wetland mitigation projects have met the performance standards, identified problems, and recommendations relative to corrective measures necessary to meet the performance standards. The Executive Director will utilize information presented at the annual public review, as well as any other relevant information, to determine whether any or all of the performance standards have been met, whether revisions to the standards are necessary, and whether remediation is required. Major revisions shall be subject to the Commission's review and approval.

The mitigation projects will be successful when all performance standards have been met each year for a three-year period. The Executive Director shall report to the Commission upon determining that all of the performance standards have been met for three years and that the project is deemed successful. If the Commission determines that the performance standards have been met and the project is successful, the monitoring program will be scaled down, as recommended by the Executive Director and approved by the Commission. A public review shall thereafter occur every five years, or sooner if called for by the Executive Director. The work program shall reflect the lower level of monitoring required. If subsequent monitoring shows that a standard is no longer being met, monitoring may be increased to previous levels, as determined necessary by the Executive Director.

The Executive Director may make a determination on the success or failure to meet the performance standards or necessary remediation and related monitoring at any time, not just at the time of the annual public review.

CONDITION E: MRC DATA MAINTENANCE

The scientific data collected by the MRC will be stored in the Commission library in San Francisco, and at the Los Angeles County Museum of Natural Science, or at an alternative location in Southern California, as determined by the Executive Director; and will be made available for public use. The permittee shall purchase the necessary computer equipment for the Commission and the Southern California location to store and retrieve the data, and shall fund appropriate staff training on data storage and retrieval at both locations.

Item W16a
Exhibit 3

Poseidon's August 2, 2008 Proposed MLMP and attachments

POSEIDON RESOURCES

August 2, 2008

Agenda Item
W 5b

VIA OVERNIGHT DELIVERY

Chairman Kruer and Honorable Commissioners
California Coastal Commission
North Central Coast District
45 Fremont, Suite 2000
San Francisco, CA 94105-2219

RECEIVED
AUG 0 4 2008
CALIFORNIA
COASTAL COMMISSION

Re: Carlsbad Desalination Project CDP Application No. E-06-013
Special Condition 8: Marine Life Mitigation Plan

Dear Chairman Kruer and Honorable Commissioners:

Poseidon Resources (Channelside) LLC ("Poseidon") requests that the Commission approve Poseidon's proposed Marine Life Mitigation Plan ("MLMP") attached hereto as Exhibit A, which Poseidon has prepared pursuant to Special Condition 8 of the above-referenced Coastal Development Permit (the "Permit") for the Carlsbad Seawater Desalination Facility (the "Project"). The Commission approved the Permit at its November 15, 2007 hearing, including Special Condition 8, which requires the Applicant to submit a Marine Life Mitigation Plan for Commission review and approval before the Permit will issue.

Following months of extensive collaboration with experts, Commission Staff, and state and local agencies,[1] Poseidon submitted its MLMP to the Commission on July 3, 2008. The MLMP contains the following elements that ensure Poseidon will implement and fund a wetland restoration project or projects that not only fully mitigate any Project impacts to marine life, but also provide additional mitigation that creates, enhances, and restores aquatic and wetland habitat consistent with Coastal Act Sections 30230 and 30231 and Special Condition 8:

- Contains **performance standards and objectives** that are consistent with those applied in Edison's San Onofre Nuclear Generating Station ("SONGS") project;

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[1] Poseidon has consulted with the Department of Fish and Game, the Department of Transportation, the State Lands Commission, the San Diego Regional Water Quality Control Board, the City of Carlsbad, Coastal Commission Staff, and the U.S. Fish and Wildlife Service, among others.

These materials have been provided to Coastal Commission Staff

Poseidon Resources Corporation
501 West Broadway, Suite 840, San Diego, CA 92101, USA
619-595-7802 Fax: 619-595-7892
Project Office: 4600 Carlsbad Boulevard, Carlsbad, CA 92008

- Provides for up to **42.5 acres of wetland restoration**, which is consistent with California Energy Commission ("CEC") methodology and Commission precedent;

- Implements a **phased mitigation program** to ensure that Poseidon is incentivized to incorporate emerging technologies that are not currently available into Project operations **to further reduce marine impacts**;

- Requires Poseidon to submit a new Coastal Development Permit application for Phase I of the restoration project **within 24 months** of MLMP approval;

- Ensures long-term **performance, monitoring, and protection** of the mitigation measures; and

- Allows for the Commission **to determine in the future** whether Lagoon dredging should entitle Poseidon to restoration credit applicable to all or part of its Phase II mitigation obligations.

On July 24, 2008, Commission Staff released its Staff Report recommending approval of the MLMP if it is modified and amended to include Staff's recommendations. In response to the Staff Report, Poseidon revised the MLMP to address substantially all of Staff's concerns (excluding the three issues discussed in the remainder of this letter), and to ensure that the MLMP substantially complies with Staff's recommendations.[2] For the Commission's convenience, we have attached as Exhibit B a document that sets forth the issues raised in the Staff Report and how Poseidon responded to those issues, including citations to the changes made to the MLMP. Poseidon's proposed MLMP is attached hereto as Exhibit A in redline format showing all of the changes made in response to the Staff Report that are discussed in Exhibit B. These documents demonstrate that Poseidon has made significant compromises to its positions regarding the MLMP to address and resolve Staff's concerns.

A. Key Differences With Staff Report

Poseidon believes there remain only three key differences between Poseidon's MLMP and Staff's position in the Staff Report that require the Commission's further consideration, including:

- (1) the amount of mitigation acreage;

- (2) whether mitigation may be phased; and

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[2] Poseidon forwarded these revisions to Staff on July 31, 2008 and hoped to have Staff confirm, prior to finalizing this letter, that these revisions addressed their concerns, but Staff cancelled the planned conference call to discuss these changes.

- (3) whether the Commission should have the discretion to decide at a later date if Poseidon may receive restoration credit for dredging the Agua Hedionda Lagoon (the "Lagoon").

Poseidon contends that the MLMP's proposed 42.5 acres of mitigation is soundly based on CEC methodology; that the phased approach to mitigation ensures the Project's marine life impacts will be fully mitigated during all Project operating scenarios; and that the Commission should be allowed to determine whether Poseidon may receive restoration credit for evidence demonstrating the environmental benefits attributable to Lagoon dredging at the time Poseidon actually requests such credit (if ever) for its Phase II obligations. Accordingly, for those reasons and the reasons summarized below and set forth in detail in Exhibit C ("Marine Life Mitigation Rationale"), Poseidon requests that the Commission not adopt Staff's recommended modifications and instead adopt Poseidon's MLMP as revised and attached hereto as Exhibit A.

B. <u>Poseidon's Restoration Acreage is Consistent with Commission Practice</u>

Independent review has confirmed that Poseidon's proposed 42.5 acres is sufficient restoration to fully mitigate the Project's marine life impacts, consistent with Coastal Act Sections 30230 and 30231. Poseidon's entrainment study, which provides the basis for Poseidon's proposed 42.5 acres of wetland restoration, was reviewed by the Coastal Commission's independent expert, Dr. Pete Raimondi of UC Santa Cruz. Dr. Raimondi confirmed, among other things, that: (1) Poseidon's study design is consistent with recent entrainment studies conducted in California;[3] and (2) using CEC methodology, the habitat restoration required to mitigate the Project's "stand-alone" operations would be 42.5 acres. This methodology is also consistent with the peer-reviewed and approved methodology the CEC applied to the Morro Bay Power Plant and the Moss Landing Power Plant.

Notably, Commission Staff originally recommended that Poseidon use CEC methodology to determine Project mitigation acreage, but Staff is now recommending a substantial *increase* in the mitigation acreage by *applying a new standard that has never been peer-reviewed and which adjusts variables in the modeling estimates*. Specifically, Dr. Raimondi suggested that in order to provide a *greater* level of assurance that impacts to lagoon and ocean species will be mitigated, Poseidon could restore a total of 55.4 to 68.2 acres, which would provide an unprecedented level of mitigation for the Project's "stand-alone" impacts that the Commission has never applied before. This "enhanced mitigation" proposal is not consistent with CEC methodology and established, peer-reviewed methodology and precedent. Notably, Dr. Raimondi has not advocated that the Commission should apply the "enhanced mitigation" methodology, and has appropriately left to the Commission the decision of which methodology should be used.

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[3] As Set forth in the Staff Report, "Dr. Raimondi was able to determine that the study's sampling and data collection methods were consistent with those used in other recent entrainment studies conducted in California pursuant to the protocols and guidelines used by the U.S. EPA, Regional Water Quality Control Boards, California Energy Commission, and Coastal Commission." (*Staff Report re: Condition Compliance for CDP No. E-06-013; Special Condition 8: Submittal of Marine Life Mitigation Plan*, July 24, 2008, at p. 8.)

C. Phased Mitigation is Appropriate for this Project

Poseidon's phased approach to mitigation would fully compensate for the Project's impacts to marine life under either of the power plant's operating scenarios. The initial phase would provide 37 acres of wetland restoration, which would fully compensate for Project-related impacts during the period when both the Encina Power Station ("EPS") and the Project are operating ("Phase I"). The second phase would provide up to 5.5 acres of additional restoration to address any additional unmitigated impacts occurring if the Project ever operates "stand-alone"; that is, when the EPS is decommissioned or when the EPS is providing less than 15% of the water needed for the Project based on the EPS's average water use over any three-year period ("Phase II").

- ***Phase I Substantially Over-mitigates Project Impacts.*** The 37 acres provided under Phase I would fully mitigate the Project's impacts as long as at least 13% of the Project's seawater requirements are provided by the EPS. In the last 18 months, the EPS would have provided over 65% of the water needed for the Project. Based on that number, the 37 acres provided by Poseidon under Phase I would have been about 2.5 times the mitigation actually required. Through the phased approach to mitigation, Poseidon will substantially over-mitigate its impacts while the EPS continues to operate.

- **Phase II Mitigation Provides New Opportunities to Reduce Impacts.** Under Phase II, the MLMP ensures that Poseidon will fully mitigate its "stand-alone" impacts by requiring Poseidon to: (1) analyze the environmental effects of ongoing Project operations; (2) use that analysis to investigate and evaluate reasonably feasible technologies that are unavailable today, which may reduce any marine life impacts; (3) provide its analysis of environmental effects and its evaluation of any reasonably feasible technologies to reduce impacts to the Commission; and (4) undertake Lagoon dredging obligations, if feasible. The Commission will then be able to determine if actual Project operations have less of an impact to marine life than originally estimated, if Poseidon can further reduce the Project's impacts through reasonably feasible technologies, or if Poseidon should receive restoration credit for demonstrated environmental benefits attributable to dredging (as discussed further in Section D below). Based on these determinations, the Commission may proportionally reduce Poseidon's habitat restoration obligation for Phase II mitigation. Accordingly, phased mitigation will incentivize Poseidon to investigate new technologies that are not available today to reduce impacts so that it can potentially reduce its restoration obligation, and it will enable the Commission to make mitigation decisions based on the Project's actual operational impacts rather than estimates. If the mitigation obligation is not reduced, the MLMP requires Poseidon to restore an additional 5.5 acres of wetland habitat subject to the same performance standards and objectives required under Phase I.

D. Lagoon Dredging Credit Should Be Evaluated in the Future

Pursuant to Poseidon's MLMP, the Commission may decide at a later date whether Poseidon should receive any restoration credit for assuming Lagoon dredging obligations. Poseidon has not requested that dredging credit be applied to its mitigation obligations now; on the contrary, Poseidon is asking the Commission only to leave open the possibility of allowing such credit in the future if Poseidon assumes dredging obligations. The Staff Report, however, recommends that the Commission should decide *now* that Poseidon's potential dredging is not subject to restoration credit because dredging is inconsistent with Special Condition 8's requirement that mitigation be in the form of creation, enhancement or restoration of wetland habitat.

The Staff Report, however, fails to acknowledge that Lagoon dredging is necessary to preserve the Lagoon's beneficial uses, and that sand dredged from the Lagoon would be used to maintain, restore and enhance habitat for grunion spawning and enhance opportunities for public access and recreation along the shoreline. Moreover, the Commission has applied dredging credit in the past for the SONGS project. Further, approval of the MLMP would not constitute approval of a particular dredging proposal or grant of dredging credit. Rather, any dredging proposal would require a separate Coastal Development Permit pursuant to Special Condition 12, so it would be premature for the Commission to analyze dredging that Poseidon cannot perform. Accordingly, it is perfectly appropriate for the Commission to determine whether Poseidon should receive restoration credit for dredging at the time it applies for such credit in the future (if ever).

We appreciate the Commission's consideration of these important issues and respectfully request that the Commission approve Poseidon's proposed Marine Life Mitigation Plan attached hereto as Exhibit A at its August 6, 2008 meeting.

Sincerely,

Peter MacLaggan

Peter MacLaggan
Poseidon Resources

Attachments

cc: Tom Luster;
Rick Zbur, Esq.

POSEIDON RESOURCES

Agenda Item
W 5b

EXHIBITS TO POSEIDON'S

AUGUST 2, 2008

RESPONSE TO STAFF REPORT

REGARDING THE

MARINE LIFE MITIGATION PLAN

Exhibit A	Marine Life Mitigation Plan
Exhibit B	Responses to Issues Identified in July 24, 2008 Staff Report
Exhibit C	Marine Life Mitigation Plan Rationale

These materials have been provided to California Coastal Commission Staff

EXHIBIT A

MARINE LIFE MITIGATION PLAN

CONDITION A: WETLAND RESTORATION MITIGATION

The permittee shall develop, implement and fund a wetland restoration project that compensates for marine life impacts from Poseidon's Carlsbad desalination facility.

1.0 PHASED IMPLEMENTATION

Poseidon's Carlsbad desalination facility will function under two operating scenarios: (1) using the Encina Power Station's seawater intake while the Power Station continues to operate ("Phase I "); and (2) as a stand-alone facility ("Phase II"). The permittee's restoration project shall be phased to address marine life impacts from each of the applicable operating scenarios.

To mitigate marine life impacts for Phase I operations, the permittee shall develop, implement and fund a 37-acre wetland restoration project consistent with the terms and conditions set forth in this Plan. The permittee's additional obligations to mitigate marine life impacts for Phase II operations, which may include up to 5.5 acres of additional wetland restoration, are set forth in section 6.0. Combined, mitigation for Phase I and Phase II would require up to 42.5 acres of wetland restoration.

1.1 Technology Review During Phase I Operations

On or before April 30 of each year following the commencement of the Carlsbad desalination facility's commercial operations, the permittee shall provide the Executive Director with data demonstrating the Encina Power Station's cooling water intake for the prior calendar year. On or before April 30 following the first three years of the Carlsbad desalination facility's commercial operations, the permittee shall also provide the Executive Director with the calculation demonstrating the Power Station's average water use during the prior three-year period. The permittee shall thereafter provide the Executive Director with that calculation annually, on or before April 30, until either of the occurrence of either of the "Phase II Pre-Conditions," as defined in subsection 1.2 below.

Consistent with the permittee's approvals from the State Lands Commission, the permittee shall perform the following ten years after the commencement of commercial operations, unless either of the "Phase II Pre-Conditions" occur before that time (as defined in subsection 1.2 below):

a. Conduct a new analysis of the environmental effects of ongoing desalination facility operations ten years after the commencement of commercial operations. The analysis shall provide information about the project's actual impacts from operations, taking into account all project features and mitigation measures;

b. Using that analysis, the permittee shall investigate and evaluate new and developing technologies that are reasonably feasible and unavailable today, which may further reduce any marine life impacts; and

c. Within 24 months of the date that the permittee commenced its analysis of the environmental effects of ongoing desalination facility operations, the permittee shall provide that analysis and its evaluation of potential and reasonably feasible technologies to the Commission for review. The determination of feasibility shall consider costs, potential impacts, and acceptability to the Encina Power Station, among other things.

Upon receiving the analysis of environmental effects of ongoing desalination facility operations and the evaluation of new and available technologies from the permittee, the Commission may request a hearing to determine whether those technologies are reasonably feasible and whether the permittee can implement any of the technologies to reduce marine life impacts. If the Commission determines that any such technologies are reasonably feasible and may further reduce marine impacts, this Marine Life Mitigation Plan may, after a public hearing before the Commission, be amended to require implementation of reasonably feasible technologies.

1.2 Implementation of Phase II Mitigation

The permittee's Phase I mitigation obligations will not be affected by whether or not the permittee is ultimately required to undertake mitigation for Phase II. If either the Encina Power Station stops using its existing seawater intake for cooling water, or the Encina Power Station's use of its seawater intake provides less than 15% of Poseidon's needed water based on the Power Station's average water use over any three-year period ("Phase II Pre-Conditions"), then the permittee shall also undertake the Phase II mitigation obligations set forth in section 6.0.

2.0 PHASE I SITE SELECTION

In consultation with Commission staff, the permittee shall select a wetland restoration site for Phase I mitigation in accordance with the following process and terms.

Within 10 months of the effective date of this permit, the permittee shall submit the proposed site and preliminary Phase I restoration plan to the Commission for its review and approval or disapproval.

The location of the wetland restoration project shall be within the Southern California Bight. The permittee shall select from sites including, but not limited to, the following eleven sites:

Tijuana Estuary in San Diego County; San Dieguito River Valley in San Diego County; Agua Hedionda Lagoon in San Diego County; San Elijo Lagoon in San Diego County; Buena Vista Lagoon in San Diego County; Huntington Beach Wetland in Orange County, Anaheim Bay in Orange County, Santa Ana River in Orange County, Los Cerritos Wetland in Los Angeles County, Ballona Wetland in Los Angeles County, and Ormond Beach in Ventura County. The permittee may also consider any sites that may be recommended by the California Department of Fish & Game as high priority wetlands restoration projects.

The basis for the selected site shall be an evaluation of the site against the minimum standards and objectives set forth in subsections 3.1 and 3.2 below. The permittee shall take into account and give consideration to the advice and recommendations of the scientific advisory panel established and convened by the Executive Director pursuant to Condition B.1.0. The permittee shall select the site that meets the minimum standards and best meets the objectives.

2.1 Preliminary Phase I Restoration Plan

In consultation with Commission staff, the permittee shall develop a preliminary wetland restoration plan for Phase I mitigation of the wetland site identified through the site selection process. The preliminary Phase I restoration plan shall meet the minimum standards and incorporate as many as possible of the objectives in subsections 3.1 and 3.2, respectively.

The preliminary Phase I restoration plan shall include the following elements:

- **a. Review of existing physical, biological, and hydrological conditions; ownership, land use and regulation.**
- **b. Site-specific and regional restoration goals and compatibility with the goal of mitigating Poseidon's marine life impacts.**
- **c. Identification of site opportunities and constraints.**
- **d. Conceptual restoration design, including:**
  - **1. Proposed grading and excavation; water control structures; planting; integration of public access, if feasible; buffers and transition areas; management and maintenance requirements.**
  - **2. Proposed habitat types (including approximate size and location).**
  - **3. Preliminary assessment of significant impacts of design (especially on existing habitat values) and net habitat benefits.**

4. **Evaluation of steps for implementation e.g. permits and approvals, development agreements, acquisition of property interests.**

5. **A graphic depiction of proposed plan.**

3.0 PHASE I PLAN REQUIREMENTS

In consultation with Commission staff, the permittee shall develop a **final** wetland restoration plan for the wetland site ~~identified through the site selection process for Phase I. The wetland restoration~~**based on the preliminary Phase I plan, which the permittee shall submit to the Commission as part of the Coastal Development Permit Application described in Section 4.0. The final** plan shall **also** meet the minimum standards and incorporate as many as feasible of the objectives in subsections 3.1 and 3.2, respectively.

3.1 Minimum Standards

The Phase I wetland restoration project site and preliminary plan must meet the following minimum standards:

a. Location within Southern California Bight;

b. Potential for restoration as tidal wetland, with extensive intertidal and subtidal areas;

c. Creates or substantially restores a minimum of 37 acres of habitat similar to the affected habitats in Agua Hedionda Lagoon, excluding buffer zone and upland transition area;

d. Provides a buffer zone of a size adequate to ensure protection of wetland values, and ~~substantially~~ at least 100 feet wide, as measured from the upland edge of the transition area. The Executive Director or the Commission may make exceptions to the 100-foot buffer requirement in certain locations if they determine that the exceptions are de minimis, or that a lesser buffer is sited and/or designed to prevent impacts that would significantly degrade wetland areas and that they are compatible with the continuance of those areas;

e. Any existing site contamination problems would be controlled or remediated and would not hinder restoration;

f. Site preservation is guaranteed in perpetuity (through appropriate public agency or nonprofit ownership, or other means approved by the Executive Director), to protect against future degradation or incompatible land use;

g. Feasible methods are available to protect the long-term wetland values on the site, in perpetuity;

h. Does not result in a net loss of existing wetlands; and

i. Does not result in an adverse~~,~~ **impact on endangered animal species, or an adverse** un-mitigated impact on endangered **plant** species.

3.2 Objectives

The following objectives represent the factors that will contribute to the overall value of the wetland. The selected site shall be determined to achieve these objectives. These objectives shall also guide preparation of the restoration plan.

a. Provides ~~substantial~~**maximum** overall ecosystem benefits, e.g. ~~substantial~~**maximum** upland buffer, enhancement of downstream fish values, provides regionally scarce habitat, potential for local ecosystem diversity;

b. Provides substantial fish habitat compatible with other wetland values at the site;

c. Provides a buffer zone of ~~at least~~**an average of at least 300 feet wide, depending on the feasibility at the selected site(s), and not less than** 100 feet wide, as measured from the upland edge of the transition area, subject to the exemptions set forth in subsection 3.1(d);

d. Provides ~~substantial~~**maximum** upland transition areas (in addition to buffer zones);

e. Restoration involves minimum adverse impacts on existing functioning wetlands and other sensitive habitats;

f. Site selection and restoration plan reflect a consideration of site specific and regional wetland restoration goals;

g. Restoration design is that most likely to produce and support wetland-dependent resources;

h. Provides potential habitat for rare or endangered species;

i. Provides for restoration of reproductively isolated populations of native California species;

j. Results in an increase in the aggregate acreage of wetland in the Southern California Bight;

k. Requires minimum maintenance;

l. Restoration project can be accomplished in a reasonably timely fashion; and

m. Site is in proximity to the Carlsbad desalination facility.

3.3 Restrictions

(a) The permittee may propose a wetland restoration project larger than the minimum necessary size specified in subsection 3.1(c) above, if biologically appropriate for the site, but the additional acreage must (1) be clearly identified, and (2) must not be the portion of the project best satisfying the standards and objectives listed above.

(b) If the permittee jointly enters into a restoration project with another party: (1) the permittee's portion of the project must be clearly specified, (2) any other party involved cannot gain mitigation credit for the permittee's portion of the project, and (3) the permittee may not receive mitigation credit for the other party's portion of the project.

(c) The permittee may propose to divide the mitigation requirement between a maximum of ~~four~~two wetland restoration sites, unless the Executive Director determines that the standards and objectives of subsections 3.1 and 3.2 will be better met at more than ~~four~~two sites.

4.0 PHASE I PLAN IMPLEMENTATION

4.1 Coastal Development Permit Application

The permittee shall submit a complete Coastal Development Permit application for the Phase I restoration plan along with CEQA documentation and local or other state agency approvals by either 24 months following the issuance of the Coastal Development Permit for the Carlsbad desalination facility~~, or the commencement of commercial operations at the facility, whichever is later~~. The Executive Director may grant an extension to this time period at the request of and upon a demonstration of good cause by the permittee. The restoration plan shall substantially conform to Section 3.0 above and shall include, but not be limited to the following elements:

a. Detailed review of existing physical, biological, and hydrological conditions; ownership, land use and regulation;

b. Evaluation of site-specific and regional restoration goals and compatibility with the goal of mitigating for Poseidon's marine life impacts;

c. Identification of site opportunities and constraints;

d. Schematic restoration design, including:

    1. Proposed cut and fill, water control structures, control measures for stormwater, buffers and transition areas, management and maintenance requirements;

    2. Planting Program, including removal of exotic species, sources of plants and or seeds (local, if possible), protection of existing salt marsh plants, methods for preserving

top soil and augmenting soils with nitrogen and other necessary soil amendments before planting, timing of planting, plans for irrigation until established, and location of planting and elevations on the topographic drawings;

3. Proposed habitat types (including approximate size and location);

4. Assessment of significant impacts of design (especially on existing habitat values) and net habitat benefits;

5. Location, alignment and specifications for public access facilities, if feasible;

6. Evaluation of steps for implementation e.g. permits and approvals, development agreements, acquisition of property rights;

7. Cost estimates;

8. Topographic drawings for final restoration plan at 1" = 100 foot scale, one foot contour interval; and

9. Drawings shall be directly translatable into final working drawings.

g. Detailed information about how monitoring and maintenance will be implemented;

h. Detailed information about construction methods to be used;

i. Defined final success criteria for each habitat type and methods to be used to determine success;

j. Detailed information about how Poseidon will coordinate with any other agency or panel that will have a role in implementing and monitoring the restoration plan, including the respective roles of the parties in independent monitoring, contingency planning review, cost recovery, etc.;

k. Detailed information about contingency measures that will be implemented if mitigation does not meet the approved goals, objectives, performance standards, or other criteria; and

l. Submittal of "as-built" plans showing final grading, planting, hydrological features, etc. within 60 days of completing mitigation site construction.

4.2 Wetland Construction Phase

Within 12 months of approval of the Phase I restoration plan, subject to the permittee's obtaining the necessary permits, the permittee shall commence the construction phase of the wetland restoration project. The permittee shall be responsible for ensuring that construction is carried out in accordance with the specifications and within the timeframes specified in the approved restoration plan and shall be responsible for any remedial work or other intervention necessary to comply with plan requirements.

4.3 Timeframe for Resubmittal of Project Elements

If the Commission does not approve any element of the project (i.e. site selection, restoration plan), the Commission will specify the time limits for compliance relative to selection of another site or revisions to the restoration plan.

5.0 PHASE I WETLAND MONITORING, MANAGEMENT AND REMEDIATION

Monitoring, management (including maintenance), and remediation shall be conducted over the "full operating life" of Poseidon's desalination facility, which shall be 30 years from the date "as-built" plans are submitted pursuant to subsection 4.1(*l*).

The following section describes the basic tasks required for monitoring, management and remediation for Phase I. Condition B specifies the administrative structure for carrying out these tasks, including the roles of the permittee and Commission staff.

5.1 Monitoring and Management Plan

A monitoring and management plan will be developed in consultation with the permittee and appropriate wildlife agencies, concurrently with the preparation of the restoration plan for Phase I, to provide an overall framework to guide the monitoring work. It will include an overall description of the studies to be conducted over the course of the monitoring program and a description of management tasks that are anticipated, such as trash removal. Details of the monitoring studies and management tasks will be set forth in a work program (see Condition B).

5.2 Pre-restoration site monitoring

Pre-restoration site monitoring shall be conducted to collect baseline data on the wetland attributes to be monitored. This information will be incorporated into and may result in modification to the overall monitoring plan.

5.3 Construction Monitoring

Monitoring shall be conducted during and immediately after each stage of construction of the wetland restoration project to ensure that the work is conducted according to plans.

5.4 Post-Restoration Monitoring and Remediation

Upon completion of construction of the wetland, monitoring shall be conducted to measure the success of the wetland in achieving stated restoration goals (as specified in restoration plan) and in achieving performance standards, specified below. The permittee shall be fully responsible for any failure to meet these goals and standards during the facility's full operational years. Upon determining that the goals or standards are not achieved, the Executive Director shall prescribe remedial measures, after consultation with the permittee, which shall be implemented by the permittee as soon as practicable with Commission staff direction. If the permittee does not agree with the remedial measures prescribed by the Executive Director, or that remediation is necessary, the matter may be set for hearing and disposition by the Commission.

Successful achievement of the performance standards shall (in some cases) be measured relative to approximately four reference sites, which shall be relatively undisturbed, natural tidal wetlands within the Southern California Bight. The reference sites and the standard of comparison, i.e. the measure of similarity to be used, shall be specified in the work program.

In measuring the performance of the wetland project, the following physical and biological performance standards will be utilized:

a. Longterm Physical Standards. The following long-term standards shall be maintained over the full operative life of the desalination facility:

   1) Topography. The wetland shall not undergo major topographic degradation (such as excessive erosion or sedimentation);

   2) Water Quality. Water quality variables [to be specified] shall be similar to reference wetlands; and

   3) **Tidal Prism. If the plan requires dredging, the permittee shall provide such dredging for the duration of the "full operating life" of the project (as defined in Section 5.0), in exchange for a dredging credit consistent with the credit provided to Edison for the SONGS restoration project, and any designed tidal prism shall be maintained, and tidal flushing shall not be interrupted.**

   4) ~~3)~~ Habitat Areas. The area of different habitats shall not vary by more than 10% from the areas indicated in the restoration plan.

b. Biological Performance Standards. The following biological performance standards shall be used to determine whether the restoration project is successful. Table 1, below, indicates suggested sampling locations for each of the following biological attributes; actual locations will be specified in the work program:

1) Biological Communities. Within 4 years of construction, the total densities and number of species of fish, macroinvertebrates and birds (see Table 1) shall be similar to the densities and number of species in similar habitats in the reference wetlands;

2) Vegetation. The proportion of total vegetation cover and open space in the marsh shall be similar to those proportions found in the reference sites. The percent cover of algae shall be similar to the percent cover found in the reference sites;

3) Spartina Canopy Architecture. The restored wetland shall have a canopy architecture that is similar in distribution to the reference sites, with an equivalent proportion of stems over 3 feet tall;

4) Reproductive Success. Certain plant species, as specified by in the work program, shall have demonstrated reproduction (i.e. seed set) at least once in three years;

5) Food Chain Support. The food chain support provided to birds shall be similar to that provided by the reference sites, as determined by feeding activity of the birds; and

6) Exotics. The important functions of the wetland shall not be impaired by exotic species.

Table 1: Suggested Sampling Locations

	Salt Marsh			Open Water			Tidal
	Spartina	Salicornia	Upper	Lagoon	Eelgrass	Mudflat	Creeks
1) Density/spp:							
Fish				X	X	X	X
Macroinverts				X	X	X	X
Birds	X	X	X	X		X	X
2) % Cover							
Vegetation	X	X	X		X		
Algae	X	X				X	
3) Spar. arch.	X						
4) Repro. suc.	X	X	X				
5) Bird feeding				X		X	X
6) Exotics	X	X	X	X	X	X	X

6.0 MITIGATION REQUIRED AFTER PHASE II PRECONDITION

6.1 Reasonably Feasible Technologies

Following the occurrence of either of the Phase II Pre-Conditions, as defined in subsection 1.1, the permittee shall:

a. Conduct a new analysis of the environmental effects of ongoing desalination facility operations. The analysis shall provide information about the project's actual impacts from operations, taking into account all project features and mitigation measures;

b. Using that analysis, the permittee shall investigate and evaluate new and developing technologies that are reasonably feasible and unavailable today, which may further reduce any marine life impacts;

c. Within 24 months of the occurrence of the applicable Phase II pre-condition, the permittee shall provide that analysis and its evaluation of potential and reasonably feasible technologies to the Commission for review. The determination of feasibility shall consider costs, potential impacts, and acceptability to the Encina Power Station, among other things; and

d. The analysis and evaluation provided to the Commission shall also include an evaluation of whether the 37 acres of wetland restoration implemented by the permittee has fully or only partially mitigated marine life impacts for stand-alone operations, taking into account actual operating conditions from facility operations for Phase I and potential reductions to impacts that would occur as a result of any new and reasonably feasible technologies that the permittee may implement pursuant to this subsection 6.1.

Upon receiving the evaluation of new and available technologies from the permittee, the Commission may request a hearing to determine whether those technologies are reasonably feasible and whether the permittee can implement any of the technologies to reduce marine life impacts. If the Commission determines that any such technologies are reasonably feasible and may further reduce marine impacts, this Marine Life Mitigation Plan may be amended after a public hearing before the Commission to require implementation of reasonably feasible technologies. The Commission also may determine the additional mitigation, if any, required after implementation of available technologies to reduce marine life impacts from Phase II operations.

6.2 Additional Mitigation

The permittee also shall comply with the following mitigation measures after the occurrence of either Phase II Pre-Condition:

a. If within 24 months of the occurrence of the applicable Phase II Pre-Condition, the permittee assumes dredging obligations of the Agua Hedionda Lagoon from the Encina Power Station or other applicable entity, the permittee shall provide evidence to the Executive Director in the form of a contract or other agreement that demonstrates the permittee's assumption of dredging obligations, along with an evaluation of the permittee's dredging activities and supporting documentation for the proposed mitigation credit the permittee is seeking for this activity. Pursuant to Special Condition 12 of this Permit, the permittee shall not dredge the Agua Hedionda Lagoon without obtaining a new Coastal Development Permit approval from the Commission for dredging activities. If such dredging obligations are assumed, the Commission shall evaluate and determine the mitigation credit the permittee is entitled to receive for Lagoon dredging using substantially the same methodology the Commission used for the San Onofre Nuclear Generating Station's dredging approvals. If the Commission's evaluation set forth in subsection 6.1 determines that there is any remaining mitigation obligation following the implementation of reasonably feasible technologies to reduce marine impacts, the credit for Lagoon dredging shall be applied to satisfy any remaining mitigation obligation of the permittee; or

b. If the permittee does not assume the dredging obligations for the Agua Hedionda Lagoon (for any reason other than delays by the Commission in issuing the Coastal Development Permit for dredging) and the analysis and evaluation set forth in subsection 6.1 identifies that additional wetland restoration is necessary to mitigate Phase II impacts not fully mitigated by the 37-acre restoration project, then within 24 months of the occurrence of the applicable Phase II Pre-Condition, the permittee shall apply for a new Coastal Development Permit to perform additional wetland mitigation to mitigate marine life impacts for Phase II operations that meets the following criteria:

   (i) the Phase II wetland mitigation shall credit the 37-acres of restoration required under this Plan for Phase I, and may require additional mitigation of up to an additional 5.5 acres. The Commission shall proportionally reduce the potential 5.5 acre restoration requirement based on: (1) any reduction to marine life impacts caused by the permittee's implementation of reasonably feasible technologies, as set forth in subsection 6.1; and (2) any demonstration that actual plant operations have caused less marine life impacts than originally anticipated during the project's initial evaluation;

   (ii) the permittee shall apply for a new Coastal Development Permit to perform the wetland restoration, and the restoration shall be of habitat similar to the affected habitats in Agua Hedionda Lagoon, excluding buffer zone and upland transition area, and consistent with the objectives and restrictions in subsections 3.1 (excluding subsection 3.1(c)), 3.2 and 3.3 above;

(iii) the permittee shall select a wetland restoration site for Phase II mitigation in a manner generally in accordance with section 2.0 above;

(iv) the restoration plan for Phase II mitigation shall be generally in accordance with the requirements in section 4.0 above, and shall be monitored in a manner generally in accordance with that set forth in section 5.0 above; and

(v) Phase II wetland restoration shall be included in and administered as part of the same administrative structure created for Phase I mitigation and set forth in Condition B of this Plan.

CONDITION B: ADMINISTRATIVE STRUCTURE

1.0 ADMINISTRATION

Personnel with appropriate scientific or technical training and skills will, under the direction of the Executive Director, oversee the mitigation and monitoring functions identified and required by Condition A. The Executive Director will retain scientific and administrative support staff to perform this function, as specified in the work program.

This technical staff will oversee the preconstruction and post-construction site assessments, mitigation project design and implementation (conducted by permittee), and monitoring activities (including plan preparation); the field work will be done by contractors under the Executive Director's direction. The contractors will be responsible for collecting the data, analyzing and interpreting it, and reporting to the Executive Director.

The Executive Director shall convene a scientific advisory panel to provide the Executive Director with scientific advice on the design, implementation and monitoring of the wetland restoration. The panel shall consist of recognized scientists, including a marine biologist, an ecologist, a statistician and a physical scientist.

2.0 BUDGET AND WORK PROGRAM

The funding necessary for the Commission and the Executive Director to perform their responsibilities pursuant to these conditions will be provided by the permittee in a form and manner reasonably determined by the Executive Director to be consistent with requirements of State law, and which will ensure efficiency and minimize total costs to the permittee. The amount of funding will be determined by the Commission on a biennial basis and will be based on a proposed budget and work program, which will be prepared by the Executive Director in consultation with the permittee, and reviewed and approved by the Commission in conjunction with its review of the restoration plan. ~~Permit application fees paid by the permittee for Coastal~~

~~Development Permits (or amendments thereto) for the restoration program shall be credited against the budget to be funded by the permittee.~~ If the permittee and the Executive Director cannot agree on the budget or work program, the disagreement will be submitted to the Commission for resolution.

The budget to be funded by the permittee will be for the purpose of reasonable and necessary costs to retain personnel with appropriate scientific or technical training and skills needed to assist the Commission and the Executive Director in carrying out the mitigation. In addition, reasonable funding will be included in this budget for necessary support personnel, equipment, overhead, consultants, the retention of contractors needed to conduct identified studies, and to defray the costs of members of any scientific advisory panel(s) convened by the Executive Director for the purpose of implementing these conditions.

Costs for participation on any advisory panel shall be limited to travel, per diem, meeting time and reasonable preparation time and shall only be paid to the extent the participant is not otherwise entitled to reimbursement for such participation and preparation. The amount of funding will be determined by the Commission on a biennial basis and will be based on a proposed budget and work program, which will be prepared by the Executive Director in consultation with the permittee, and reviewed and approved by the Commission in conjunction with its review of the restoration plan. **Total costs for such advisory panel shall not exceed $100,000 per year adjusted annually by any increase in the consumer price index applicable to California.** If the permittee and the Executive Director cannot agree on the budget or work program, the disagreement will be submitted to the Commission for resolution.

The work program will include:

a. A description of the studies to be conducted over the subsequent two year period, including the number and distribution of sampling stations and samples per station, methodology and statistical analysis (including the standard of comparison to be used in comparing the mitigation project to the reference sites);

b. A description of the status of the mitigation projects, and a summary of the results of the monitoring studies to that point;

c. A description of up to four reference sites;

d. A description of the performance standards that have been met, and those that have yet to be achieved;

e. A description of remedial measures or other necessary site interventions;

f. A description of staffing and contracting requirements; and

g. A description of the scientific advisory panel's role and time requirements in the two year period.

~~Any amendment to the work program requested by the permittee shall require an amendment to the Coastal Development Permit for the restoration plan, unless the Executive Director determines that no Coastal Development Permit amendment is necessary or required. Any amendment to the work program proposed by the Executive Director shall be made in consultation with the permittee. If the permittee and the Executive Director cannot agree on an amendment to the work program, the disagreement will be submitted to the Commission for resolution.~~

The Executive Director may amend the work program at any time, subject to appeal to the Commission.

3.0 ANNUAL REVIEW AND PUBLIC WORKSHOP REVIEW

The permittee shall submit a written review of the status of the mitigation project to the Executive Director each year on April 30 for the prior calendar year. The written review will discuss the previous year's activities and overall status of the mitigation project, identify problems and make recommendations for solving them, and review the next year's program.

Every fifth year, the Executive Director or the Commission shall also convene and conduct a duly noticed public workshop to review the status of the mitigation project. The meeting will be attended by the contractors who are conducting the monitoring, appropriate members of the Scientific Advisory Panel, the permittee, Commission staff, representatives of the resource agencies (CDFG, NMFS, USFWS), and the public. Commission staff and the contractors will give presentations on the previous five years' activities and the overall status of the mitigation project, identify problems and make recommendations for solving them, and review the next period's program.

The workshop review will include discussions on whether the wetland mitigation project has met the performance standards, identified problems, and recommendations relative to corrective measures necessary to meet the performance standards. The Executive Director will utilize information presented at the public review, as well as any other relevant information, to determine whether any or all of the performance standards have been met, whether revisions to the standards are necessary, and whether remediation is required. Major revisions shall be subject to the Commission's review and approval.

The mitigation project will be successful when all performance standards have been met each year for a three-year period. The Executive Director shall report to the Commission upon determining that all of the performance standards have been met for three years and that the project is deemed successful. If the Commission determines that the performance standards have been met and the project is successful, the monitoring program will be scaled down, as recommended by the Executive Director and approved by the Commission. The work program shall reflect the lower level of monitoring required. If subsequent monitoring shows that a standard is no longer being met, monitoring may be increased to previous levels, as determined necessary by the Executive Director.

The ~~Commission~~**Executive Director** may make a determination on the success or failure to meet the performance standards or necessary remediation and related monitoring at any time, not just at the time of the workshop review.

4.0 ADDITIONAL PROCEDURES

4.1 Dispute Resolution

In the event that the permittee and the Executive Director cannot reach agreement regarding the terms contained in or the implementation of any part of this Plan, the matter may be set for hearing and disposition by the Commission.

4.2 Extensions

Any of the time limits established under this Plan may be extended by the Executive Driector at the request of the permittee and upon a showing of good cause.

EXHIBIT B

RESPONSES TO ISSUES IDENTIFIED IN JULY 24, 2008 STAFF REPORT

In response to Commission Staff's specific concerns regarding Poseidon's proposed Marine Life Mitigation Plan ("MLMP"), as identified on page 15 of the July 24, 2008 Staff Report, Poseidon has modified its MLMP to address Staff's concerns. Below we have listed each of Staff's identified concerns, followed by Poseidon's response. In addition to the responses herein, Exhibit A is a redline of Poseidon's MLMP that shows the changes Poseidon has made in response to Staff's concerns. Note that this document does not address the three issues discussed in Poseidon's letter responding to the Staff Report: mitigation acreage, phased mitigation and restoration credit for lagoon dredging.

I. **Responses to Bullet Points on Page 15:** In this section, Poseidon has responded to each of the bullet points listed on page 15 of the Staff Report.

Issue 1: *Staff recommended that Poseidon submit a complete coastal development permit application for its Final Restoration Plan within 24 months of Commission approval of its Preliminary Plan (i.e., the Plan being reviewed herein). Poseidon modified that recommendation in Section 4 of its Plan to allow submittal of that application either 24 months after issuance of the project coastal development permit or commencement of commercial operations of the desalination facility, whichever is later. This could substantially delay the implementation of mitigation and could result in several years of impacts occurring without mitigation.*

- **Poseidon Response to Issue 1:** In Section 4.1 of Poseidon's MLMP, Poseidon has revised its Plan so that the Coastal Development Permit for the Final Restoration Plan will be submitted within 24 months of Commission approval of its Preliminary Plan.

Issue 2: *A proposed change to Poseidon's Plan at Section 3.1(d) and at Section 3.2(c) would reduce the required buffer zone at its mitigation sites from no less than 100 feet wide to an average that could be much less than 100 feet.*

- **Poseidon Response to Issue 2:** Poseidon has removed the word "substantially" from Section 3.1(d) so that it is evident that buffer zones will be at least 100 feet wide. (See Poseidon's MLMP, Page 4 of 16.)

Issue 3: *A proposed change to Section 3.1(i) would allow the Plan to affect endangered species in a way not allowed under the Edison requirements.*

- **Poseidon Response to Issue 3:** Poseidon has revised Section 3.1(i) to indicate that Poseidon's Plan will not result in an adverse impact on endangered animal species, and that it will require mitigation for Plan impacts on endangered plant species. (See Poseidon's MLMP, Page 5 of 16.) The formulation of this provision in the Edison plan does not take into account that substantially all wetlands restoration projects will have impacts on sensitive plant species, which would likely be mitigated through relocation to upland areas. The Edison plan's formulation would not allow mitigation in any area where there is a sensitive plant. Accordingly, Poseidon modified this language to ensure there are no adverse impacts to endangered animals, but to allow for mitigation and relocation of sensitive plants.

Issue 4: *Poseidon proposes to change Section 3.3(c) to allow mitigation to occur in up to four sites, rather than up to two sites, as required of Edison, which could fragment the mitigation and reduce its overall value.*

- **Poseidon Response to Issue 4:** Poseidon has revised Section 3.3(c) to allow mitigation to occur only at up to two sites without Executive Director approval. (See Poseidon's MLMP, Page 6 of 16.)

Issue 5: *Poseidon also proposed deleting a requirement at Section 5.4 that would require a designed tidal prism to be maintained to ensure the wetland mitigation site has adequate tidal action.*

- **Poseidon Response to Issue 5:** Poseidon has revised its Plan to include a requirement at Section 5.4(a)(3) that would require a designed tidal prism be maintained if the Plan requires dredging. (See Poseidon's MLMP, Page 9 of 16.)

Issue 6: *Poseidon Proposes that any fees it pays for coastal development permits or amendments be credited against the budget needed to implement the mitigation plan.*

- **Poseidon Response to Issue 6:** Poseidon has revised Condition B, Section 2.0 to remove its proposal regarding the crediting of fees paid for coastal development permits or amendments. (See Poseidon's MLMP, Pages 13-14 of 16.)

II. **<u>Responses to Staff's Recommendation to Include Conditions in Exhibit 2</u>:** In this section we have responded to Staff's comment on page 15 of the Staff Report that Poseidon's Plan should be modified to include the conditions in Exhibit 2 by identifying each of the differences between Poseidon's Plan and Staff's Exhibit 2, followed by Poseidon's response.

- Poseidon's Plan removes the requirement in Section 2.0 that would require Poseidon to submit the proposed site and preliminary plan to the Commission within 9 months of the effective date of the approval, and removes Exhibit 2's "Preliminary Plan" requirements set forth in Staff's Exhibit 2 at §1.2.
    - **Poseidon Response:** Poseidon has revised its Plan to include the "Preliminary Plan" requirements (Poseidon's MLMP § 2.1, Pages 3-4 of 16.) and has modified its Plan so that a proposed site and preliminary plan will be submitted to the Commission within 10 months of the effective date of the approval. (See Poseidon's MLMP § 2.0, Page 2 of 16.)
- Poseidon's Plan adds three potential restoration sites (Agua Hedionda, San Elijo, and Buena Vista) for a total of 11 sites in Section 2.0.

- Poseidon Response: This remains part of Poseidon's proposal because these sites are in close proximity to the Project site, and have been recommended as potential mitigation sites by local and state agencies.

- Poseidon's Plan allows Poseidon to consider other sites that may be recommended by the Department of Fish and Game ("DFG") as high-priority wetlands restoration projects, while Staff's MLMP only allows additional sites to be considered with approval from the Executive Director. (Section 2.0.)
    - **Poseidon Response:** This remains part of Poseidon's proposal to allow consideration of sites that could be proposed by DFG.

- Poseidon's MLMP has objectives of providing "substantial' upland buffer and upland transition areas, as compared to Staff's objective of providing "maximum" upland buffer and upland transition areas. (See Poseidon's MLMP §§ 3.2(a),(d).)
    - **Poseidon Response:** Poseidon has revised Sections 3.2(a) and (d) of its Plan to incorporate Staff's proposed "maximum" language. (See Poseidon's MLMP, Page 5 of 16.)

- Poseidon's Plan deletes Staff's Objective in Section 3.2(c) of providing a buffer zone of an average of at least 300 feet wide, and includes a 100 feet-wide Objective.
    - **Poseidon Response:** Poseidon has revised Section 3.2(c) so that the Objective provides for a buffer zone that is an average of 300 feet wide, depending on the feasibility at the selected site(s), and not less than 100 feet wide. (See Poseidon's MLMP, Page 5 of 16.) This modification addresses Staff's concerns and will allow Poseidon to have necessary flexibility in selecting the mitigation site(s).

- Poseidon proposes commencing restoration construction within 12 months of approval of the restoration plan (Poseidon's MLMP § 4.2), while Staff proposes construction within 6 months of approval of the restoration plan (Staff's Exhibit 2 at § 2.2).
    - **Poseidon Response:** This remains part of Poseidon's proposal because it is a more reasonable estimate of time that will be required to undertake the restoration efforts.

- Poseidon's Plan adds a provision to assure that the mitigation is in place for 30 years, and therefore adds a definition of the facility's "full operating life" of 30 years from the date as-built plans are submitted. (See Poseidon's MLMP § 5.0)
    - **Poseidon Response:** This remains part of Poseidon's proposal because it provides clarity for Poseidon's responsibilities and obligations under the Plan.

- Poseidon modifies the requirement that the Executive Director will retain approximately two scientists and one administrative support staff to oversee the plan's mitigation and monitoring functions, and provides that the Executive Director shall retain staff as set forth in the "work program." (See Poseidon's MLMP Condition B § 1.0, Page 13 of 16.)

- **Poseidon Response:** This remains part of Poseidon's proposal because Poseidon does not believe this amount of staffing is necessary given the significantly smaller scope of Poseidon's restoration obligations compared to SONGS. Poseidon's proposal provides that the work program will identify the necessary staffing.

- Poseidon's Plan removes the cap on total costs for the advisory panel of $100,000 per year contained in Staff's Exhibit 2, and requires the Executive Director to submit a proposed budget for the advisory panel to the Commission for approval on a biennial basis, and provides that any disagreement over the budget to be submitted to the Commission for resolution. (Poseidon's MLMP Condition B § 2.0.)
  - **Poseidon Response:** Poseidon has revised Condition B Section 2.0 to include Staff's language regarding the $100,000 cap, but has retained its procedures for the budget due to the fact that the scope of Poseidon's restoration obligations will be significantly smaller than Edison's, and the budget for the advisory panel should bear a reasonable relationship to the scope of restoration. (See Poseidon's MLMP, Page 14 of 16.)

- Poseidon's Plan modifies the Executive Director's ability to amend the work program. (Poseidon's MLMP Condition B § 2.0.)
  - **Poseidon Response:** Poseidon has modified Condition B, § 2.0 so that it is now consistent with the language in Staff's Exhibit 2. (See Poseidon's MLMP, Page 15 of 16.)

- Poseidon's Plan requires submission of a written review of the restoration project's previous year by April 30 instead of an annual public workshop. Poseidon provides for a public workshop every fifth year, regardless of whether the project's performance standards have been met. (Poseidon's MLMP Condition B § 3.0, Pages 15-16 of 16.) Staff's Exhibit 2 provides for an annual public workshop, and would lower the frequency of this obligation to a five year review once performance standards are achieved.
  - **Poseidon Response:** This remains part of Poseidon's proposal because of the substantially limited size of the Poseidon's restoration project as compared to Edison's SONGS restoration project, and the significant cost already imposed on Poseidon's mitigation program.

- Poseidon's Plan gives the Commission, rather than the Executive Director, the authority to determine the success or failure to meet the performance standards, or necessary remediation and related monitoring.
  - **Poseidon Response:** Poseidon has modified Condition B, § 3.0 so that it is consistent with the language in Staff's Exhibit 2. (See Poseidon's MLMP, Page 10 of 16.)

- Poseidon's Plan adds a general dispute resolution provision that would allow any disputes to be heard by the Commission. (Poseidon's MLMP Condition B § 4.1, Page 16 of 16.)

- Poseidon Response: This remains part of Poseidon's proposal because it retains and states the permittee's implicit rights.

• Poseidon's MLMP allows for time extensions by the Executive Director at Poseidon's request upon a showing of good cause. Poseidon's MLMP Condition B § 4.2, Page 16 of 16.)

- **Poseidon's Response:** This remains part of Poseidon's proposal.

EXHIBIT C

MARINE LIFE MITIGATION PLAN RATIONALE

In addition to the reasons set forth in Poseidon's letter to the Commission, below Poseidon has provided more detailed support for its position that the Commission should accept Poseidon's arguments concerning mitigation acreage, mitigation phasing and dredging over those offered by Staff. Accordingly, and for the following reasons, Poseidon respectfully asks the Commission to adopt Poseidon's Marine Life Mitigation Plan ("MLMP") as amended and set forth in Exhibit A, and without Staff's requested modifications from the Staff Report.

I. POSEIDON'S RESTORATION ACREAGE IS CONSISTENT WITH COMMISSION PRACTICE

Independent review has confirmed that Poseidon's proposed 42.5 acres is sufficient restoration to fully mitigate the Project's marine life impacts. Poseidon's entrainment study, which provides the basis for Poseidon's proposed 42.5 acres of wetland restoration, was reviewed by the Coastal Commission's independent expert, Dr. Pete Raimondi of UC Santa Cruz. Dr. Raimondi confirmed, among other things, that: (1) Poseidon's study design is consistent with recent entrainment studies conducted in California; (2) using CEC methodology and Coastal Commission precedent, the habitat restoration required to mitigate the Project's "stand-alone" operations would be 42.5 acres (37 acres to compensate for Agua Hedionda Lagoon ("Lagoon") species impacts, and 5.5 acres to compensate for open ocean species impacts); and (3) habitat mix for mitigation should include mudflat/tidal channel and open water habitat. This methodology is also consistent with the peer-reviewed and approved methodology the CEC applied to the Morro Bay Power Plant and the Moss Landing Power Plant.

Notably, Commission Staff originally recommended that Poseidon use CEC methodology to determine the Project's mitigation requirement. Staff, however, is now recommending a substantial *increase* in the mitigation acreage by applying a new standard that has not been peer-reviewed and which adjusts variables in the modeling estimates. Specifically, Dr. Raimondi suggested that in order to provide an even *greater* level of assurance that impacts to lagoon and ocean species will be mitigated, Poseidon could restore 12.9 to 25.7 acres above the 42.5 acres required under CEC methodology – for a total of 55.4 to 68.2 acres – to provide an unprecedented level of mitigation for the Project's "stand-alone" impacts that the Commission has never applied before. This "enhanced mitigation" proposal is inconsistent with CEC methodology and established, peer-reviewed methodology and precedent. Notably, Dr. Raimondi has not advocated that the Commission should apply the "enhanced mitigation" methodology, and has appropriately left to the Commission the decision of which methodology should be used.

In contrast to the "enhanced mitigation" proposal, Poseidon's restoration acreage methodology conforms entirely to Commission-accepted precedent, and Staff has not identified any mitigation projects using this methodology that have resulted in under-compensation for marine impacts. Poseidon's Area Production Foregone ("APF") calculation is extremely conservative because it assumes that the proportional mortality resulting from entrainment occur across the entire area of the Lagoon. In fact, the habitat areas in the Lagoon for the three species used to calculate the APF estimate are all much smaller than the entire Lagoon. Accordingly, an averaging approach was used because it accounts for the uncertainty associated with the estimates of the exact areas of habitat associated for each species. This methodology is considered conservative and conforms entirely to standards and procedures used for APF determination at the Moss Landing project.

Staff has also suggested that if Poseidon does not use Staff's "enhanced mitigation" proposal, that Poseidon should be required to apply a mitigation ratio (such as 2:1 or 3:1) to its mitigation acreage so that Poseidon considers mitigation that may be "out of kind" or provided at some distance from the affected area. Staff, however, has not and cannot provide examples of any California entrainment mitigations that have applied a mitigation ratio on top of a conservative "in-kind" approach to mitigation that is consistent with CEC methodology, such as the mitigation acreage contained in the MLMP. Moreover, the MLMP ensures that Poseidon will provide "in-kind" restoration in the Southern California Bight similar to the affected area in the Lagoon.

For these reasons, Poseidon asks the Commission to approve its 42.5 acreage calculation over that proposed by Staff to ensure that the Project's mitigation is consistent with prior Commission approvals rather than subject to an obligation that is based on un-proven methodology.

II. PHASED MITIGATION IS APPROPRIATE FOR THIS PROJECT

Poseidon's phased approach to mitigation would fully compensate for the Project's impacts to marine life under either of the power plant's operating scenarios. The initial phase of the mitigation plan would provide 37 acres of wetland restoration, which would fully compensate for Project-related impacts during the period when both the Encina Power Station ("EPS") and the Project are operating ("Phase I"). The second phase would provide up to 5.5 acres of additional restoration to address any additional unmitigated impacts occurring from Project operations when the EPS is decommissioned or when the EPS is providing less than 15% of the water needed for the Project based on the EPS's average water use over any three-year period[1] ("Phase II"). Below, Poseidon has identified the benefits of phased mitigation for this Project and explained why Staff's arguments against phasing are unsupported and inconsistent with the benefits that phasing would provide.

A. Phase I Mitigation Over-mitigates Project Impacts

Under Phase I, Poseidon would restore 37 acres of wetland habitat similar to the affected habitats in Agua Hedionda Lagoon. Using CEC and prior Coastal Commission methodology, the Phase I mitigation would mitigate 87% of the total requirements for the Project's "stand alone" operations (when the EPS has ceased operating). Accordingly, the Phase I mitigation

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[1] This threshold is very conservative. The Phase I restoration project would fully mitigate the Project's impacts as long as at least 13% of the Project's seawater requirements are provided by the EPS. Poseidon's MLMP is conservative in that it requires Poseidon to implement Phase II mitigation if the EPS is providing an average of less than 15% of the Project's seawater requirements over a three-year period.

would fully mitigate the Project's impacts as long as at least 13% of the Project's seawater requirements are provided by the EPS. By providing this level of mitigation while the Project and the power plant are both operating, Poseidon will perform more mitigation than what is necessary to mitigate this stage of the Project's operations. For example, in the last 18 months the EPS would have provided over 65% of the water needed for the Project. Based on that number, Poseidon would have been required to provide only 14.9 acres of mitigation using CEC methodology and Commission precedent. Poseidon's Phase I restoration of 37 acres would be approximately 2.5 times the mitigation actually required. Therefore, through the phased approach to mitigation, Poseidon is actually providing the substantial majority of the mitigation required for the Project's stand-alone operations up front.

B. <u>Phase II Mitigation Provides New Opportunities to Reduce Impacts</u>

The MLMP requires Poseidon to implement mitigation measures for Phase II (including up to 5.5 acres of additional restoration) if the EPS stops using its existing seawater intakes for cooling purposes, or if the intakes provide less than 15% of Poseidon's needed water based on the EPS' average water use over any three-year period ("Phase II Pre-Conditions"). To ensure that the Commission is aware of the amount of water the EPS is providing to the Project, and when Phase II mitigation should commence, the MLMP requires Poseidon to submit that information to the Executive Director annually.

Wetland habitat restoration under Phase II would credit the 37 acres of restoration already provided for under Phase I, and provide assurances that stand-alone operations are fully mitigated in Phase II. Once either of the Phase II Pre-Conductions occur, the MLMP requires Poseidon to: (1) analyze the environmental effects of ongoing Project operations; (2) use that analysis to investigate and evaluate reasonably feasible technologies that are unavailable today, which may reduce any marine life impacts; and (3) provide its analysis of environmental effects and its evaluation of any reasonably feasible technologies to reduce marine life impacts to the Commission within 24 months. Accordingly, the Commission will be able to determine if Poseidon can further reduce the Project's impacts to marine life through reasonably feasible technologies, and may proportionally reduce Poseidon's habitat restoration obligation for Phase II mitigation based on that mitigation.[2]

In addition, Poseidon may assume dredging obligations of the Agua Hedionda Lagoon from the EPS within 24 months of the occurrence of either Phase II Pre-Condition, if feasible.[3] If Poseidon assumes dredging obligations, it will provide evidence of its obligations to the Commission, along with an analysis of how Lagoon dredging is beneficial to the Lagoon and

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[2] Note that in the event the Phase II Pre-Conditions do not occur, Poseidon's approval from the State Lands Commission requires Poseidon to undertake a substantially similar evaluation of environmental effects of ongoing Project operations and to investigate and evaluate new and developing technologies that are unavailable today to reduce any marine life impacts ten years after Project operations commence. Accordingly, if the State Lands Commission requires Poseidon to implement any such technologies that constitute "development", such development would be subject to Coastal Commission review and approval.

[3] Since Special Condition 12 of the Project's Coastal Development Permit requires Poseidon to obtain a new Permit approval from the Coastal Commission for any dredging activities, the Commission shall have oversight over any Lagoon dredging.

how such dredging activities may entitle Poseidon to some amount of restoration credit. (See Section C below).

In the event that Poseidon does not assume Lagoon dredging obligations (for example, if the EPS never fully ceases use of its intakes but operates the intakes at very low levels and continues to dredge the Lagoon), Poseidon's MLMP requires it to develop a plan within 24 months in which: (1) the Commission shall evaluate whether Poseidon's 37 acres of wetland restoration under Phase I has fully mitigated the Project's stand-alone operations; and (2) the Commission may reduce Poseidon's Phase II restoration based on the reduction to marine impacts caused by Poseidon's implementation of new, reasonably feasible technologies (as discussed above).

Accordingly, phased MLMP implementation would provide a tremendous incentive for Poseidon to investigate and invest in new technologies and opportunities to further reduce Project impacts and avoid additional mitigation costs. If Poseidon is required to provide all of the mitigation for the "stand-alone" operations upfront, there is substantially less incentive to invest in additional avoidance measures. In addition, the opportunity for the Commission to consider these issues once Project operations have commenced is another valuable benefit of phased implementation of the MLMP: with phased mitigation, Poseidon, the Commission and other regulatory agencies would have an opportunity to measure the actual impacts of the Project, and to evaluate new opportunities to further reduce the impacts and refine the scope of the Phase II mitigation as necessary to ensure the "stand-alone" Project impacts are fully mitigated.

If the Commission determines that none of the above-opportunities are feasible or if these opportunities in combination with the Phase I mitigation plan do not fully mitigate the "stand-alone" Project impacts, then the MLMP requires Poseidon to restore up to an additional 5.5 acres consistent with the performance standards and objectives used for the 37 acres provided under Phase I restoration.

C. <u>Phased Mitigation is Not Speculative</u>

Commission Staff argue in the Staff Report that the Commission should require Poseidon to provide all mitigation up-front, rather than in two phases, because it considers "phasing to be speculative in that it is tied to unknown future operations of the power plant." Staff's argument is without merit. As set forth in MLMP Section 1.1, Poseidon will be obligated to provide the Executive Director annually with data demonstrating the power plant's seawater intake for the prior year, which will ensure that the Commission is always informed of the power plant's operations. Since the MLMP requires Poseidon to undertake Phase II mitigation when the power plant is decommissioned or when it provides less than 15% of the Project's water over a three-year period, the Commission will have the necessary data about power plant operations so that it will not need to "speculate" about when Poseidon will need to implement Phase II mitigation.

Staff also contends in the Staff Report that tying phased mitigation to the power plant's operations would be "inappropriate" because the power plant is not a co-applicant on the Project's Permit. Poseidon's Permit application and the Commission's approval, however, provide that the desalination facility's intake would be connected to the power plant's discharge channel. Accordingly, the discharge from the power plant, to the extent it is available, will serve the Project's needs. In the past 18 months, the power plant would have provided over 65% of the water needed for the Project. It is both appropriate and there is no prohibition on allowing the phased approach proposed by Poseidon.

In addition to the reasons discussed above, a phased approach to mitigation for this Project is based on sound policy for the following three reasons:

- (1) EPS will operate indefinitely: As discussed above, while the EPS continues to operate, it will provide a significant portion of the seawater required for the Project, and the need for Project mitigation would be proportionally reduced. The power plant's generating capacity is subject to "Reliability Must Run" status, as contracted by the California Independent System Operator (Cal-ISO), which is meant to provide electrical grid reliability. At the October 2007 State Lands Commission meeting, an EPS representative testified that the units will remain in service indefinitely and that Cal-ISO would determine when they are no longer needed for grid stability. Further, in a July 12, 2007 letter to the Commission, EPS stated that at least two of its generating units "can be reliably operated for the foreseeable future." Because the power plant will continue to operate in some capacity and provide water to the Project, requiring more than 37 acres of mitigation up-front would substantially over-mitigate the Project's impacts for many years.

- (2) Phasing allows the Commission to retain authority and evaluate impacts: Due to the phased approach, the Commission would have ongoing involvement in the implementation of the MLMP alongside other regulatory agencies. This will allow the Commission to evaluate the impacts of the Project's *actual* operations, rather than relying on estimates, and will enable the Commission to more accurately determine what additional mitigation should be required to fully mitigate the Project's marine impacts (if any).

- (3) Other regulatory agencies retain authority to evaluate and address impacts: The Regional Water Quality Control Board ("Regional Board") and the State Lands Commission have indicated that upon decommissioning of the power plant, they will undertake an environmental review of the Project to determine what, if any, additional design, technology or mitigation measures should be required. Further, and to the extent that there are modifications to the Project as a result of power plant decommissioning or to comply with State Lands Commission or Regional Board requirements, such modifications would also be subject to review by the Coastal Commission for Coastal Act compliance.

For these reasons, Poseidon asks the Commission to reject Staff's argument about phasing, and to approve Poseidon's MLMP as set forth in Exhibit A, without Staff's recommended changes from the Staff Report.

III. LAGOON DREDGING CREDIT SHOULD BE EVALUATED IN THE FUTURE

Pursuant to Poseidon's proposed MLMP, the Commission may decide at a later date whether Poseidon should receive any restoration credit for assuming dredging obligations of the Agua Hedionda Lagoon. Poseidon has not requested that dredging credit be applied to its mitigation obligations now; on the contrary, Poseidon is asking the Commission only to leave open the possibility of allowing such credit in the future if Poseidon assumes dredging obligations. Staff argues, however, that the Commission should decide now that Poseidon's potential dredging is not subject to restoration credit – even though approval of the MLMP does not involve any dredging approval.

Staff argues that Lagoon dredging would be inconsistent with Special Condition 8's requirement that mitigation be in the form of creation, enhancement or restoration of wetland habitat, but that argument is not supported by the evidence. The Lagoon supports a wide range of beneficial uses, including over 300 acres of marine wetlands and a variety of recreational activities, and needs to be dredged for those uses to continue. The sand dredged from the Lagoon would be placed on adjacent beaches so as to maintain, restore and enhance habitat for grunion spawning and enhance opportunities for public access and recreation along the shoreline. In recognition of the value these uses, the Commission previously granted wetlands restoration credit for inlet maintenance for Edison's SONGS project, and this precedent allowed one acre of restoration credit for every 3.3 acres of tidally exchanged wetlands supported by dredging. As applied to Poseidon, such credit would represent seventeen times the required 5.5 acres of mitigation required under Phase II. The MLMP does not specify the amount of restoration credit Poseidon should receive for dredging, and ultimately the Commission would need to determine the amount of credit to which Poseidon is entitled (if any) if Poseidon applies for such credit.

Finally, Staff argues that credit for dredging cannot be granted because EPS is obligated to dredge the Lagoon, and there is neither an agreement with EPS for Poseidon to undertake dredging nor is EPS a co-applicant for the Project. As discussed above, Poseidon is not asking for dredging credit now, only the possibility of such credit in the future, and Poseidon would provide the Commission with any dredging agreement with EPS, or a new Coastal Development Permit Application that may include EPS as a co-applicant, at the time it requests such credit. Accordingly, Staff's argument is without merit, and Poseidon asks the Commission to approve the MLMP as proposed by Poseidon in Exhibit A.

Item W16a
Exhibit 4

Transcript of August 6, 2008 hearing (Commission deliberations only)

whoever makes the motion.

CHAIR KRUER: Exactly.

EXECUTIVE DIRECTOR DOUGLAS: Right.

CHAIR KRUER: Exactly, and your process sounds rational, but then it might even take longer. I am not sure.

EXECUTIVE DIRECTOR DOUGLAS: Yes, those are the points of differences, right.

CHAIR KRUER: Okay.

You don't get to speak, Mr. Geever.

MR. GEEVER: Mr. Chairman, I am going to ask you for an exception.

CHAIR KRUER: No, I am not going to give any exceptions tonight, at this hour, no, sir, cannot do it.

MR. GEEVER: I wanted to take issue with --

CHAIR KRUER: Well, you are not entitled to rebuttal. We have closed the public hearing, first of all.

MR. GEEVER: Okay.

CHAIR KRUER: Thank you, sir.

Okay, Commissioner Hueso.

[**MOTION**]

COMMISSIONER HUESO: Thank you.

I am going to move that we approve the Marine Life Mitigation Plan attached to the staff recommendation, as Exhibit 1, if modified as shown in Section 1.1 below, and Exhibit 2 of this memorandum as compliant with Special

Condition 8 of CDP E-06-013.

And, I will have some modifications.

CHAIR KRUER: Okay, it has been moved by Commissioner Hueso, seconded by --

Is there a "seconded" to your motion?

Anyone want to "seconded" it.

COMMISSIONER LOWENTHAL: Second.

CHAIR KRUER: Seconded by Commissioner Lowenthal.

Would you like to speak to your motion?

COMMISSIONER HUESO: I would actually like to go through some of the modifications with staff, and maybe go over some of their recommendations that they have made, just to understand how they apply it.

We have gone over this in the discussion, but I would like to go over, for example, Modification No. 1, says Poseidon shall create or restore between 55 and 68 acres of coastal estuarine wetland habitat within the Southern California bite.

My question to staff about that, I mean, there were a lot of complaints about there not being a specific area, and staff also followed up that there aren't really expressed locations, in terms of where this mitigation will take place. In your recommendation, is that still the condition, in terms of we don't know where this is going to take place?

ENVIRONMENTAL SPECIALIST LUSTER: Staff consulted with the SONGS Scientific Advisory Panel, and our recommendation is based on input we got from the panel.

The conditions that the Commission imposed on Edison for the San Dieguito site, those were issued before Edison had selected its site, and so we feel that if Poseidon meets the same conditions that Edison was held to, and selects a site within the Southern California bite, that would provide adequate assurance that subsequent plans that come to you would be sufficient.

COMMISSIONER HUESO: So, we can still work out locations, in terms of optimizing the location, and there is the benefit of the improvements.

ENVIRONMENTAL SPECIALIST LUSTER: Right, as long as they are held to the same conditions SONGS was.

COMMISSIONER HUESO: And, getting to this specific acreage, you put a range of 55 to 68, that was your recommendation. Now, that is not a very, very specific number. Is that based on, again, putting the burden on the applicant to come back with a plan that mitigates the impacts of the project?

ENVIRONMENTAL SPECIALIST LUSTER: Staff felt that that was a decision for the Commission.

The two figures are based on the levels of confidence that derive from the study. If the Commission wants 80 percent confidence that they would insure full mitigation for the impacts, the 55 acres, staff believes, would be sufficient. If you want 95 percent confidence in your decision, then you go with the higher number.

So, the Commission could either decide on a specific figure, this evening, or if Poseidon came back later, with a mitigation proposal, somewhere within that range, that would be the other option.

COMMISSIONER HUESO: So, is it so accurate, is it possible to get 95 percent with 37 acres? You are saying, is it impossible? is it improbable? is it that accurate? in terms of the possibility of getting the kind of mitigation that we want within a certain amount of acreage? Can that be achieved through a very intense mitigation monitoring of a specific acreage amount?

ENVIRONMENTAL SPECIALIST LUSTER: If you don't mind I will ask Dr. Raimondi to answer that.

COMMISSIONER HUESO: Sure.

ENVIRONMENTAL SPECIALIST LUSTER: He has far more expertise.

MR. RAIMONDI: There are really two issues here, you have addressed one of the. One of them is the amount of acreage that is required, and the other is insuring that it works, because, clearly, you could put in 50, 70, 100 acres and if it doesn't work, you get no compensation.

The key thing here is using the information that Poseidon provided, and just using what I laid out there -- and again, we are not using any data that didn't come from Poseidon -- the 80 percent really is 55 acres, and the 95 really is 68. In addition, you would still need to monitor it, to make sure that it works, because 68 acres of garbage is no compensation.

So, there are two issue, really.

COMMISSIONER HUESO: So, in terms of maybe hearing from Poseidon's representatives, in terms of what they can guarantee, in terms of providing the adequate mitigation for the project, you are saying you can do it with 42.5 acres is the claim that you are making?

MR. ZBUR: Yes, I mean I think we think that based upon the standards that were used for the Morro Bay Plant, and for the Moss Landing Plant, that the acreage amount consistent with that would be 42.5 acres.

COMMISSIONER HUESO: And, what level of mitigation would 42 acres provide?

MR. ZBUR: It would provide --

COMMISSIONER HUESO: In terms of a percentage?

MR. ZBUR: It would present 100 percent mitigation for the stand-alone operations.

COMMISSIONER HUESO: If monitoring showed that it didn't, would that mean that you are not let off the hook.

You would have to come back and do some work?

MR. ZBUR: Well, I think that one of the concerns that we have about the adoption of the staff recommendation is that it, basically, is just a very vague recommendation, if we conform it to the SONGS approach, which had a lot of details, which were related to a much, much larger restoration program, including very significant costs.

So, one of the things that we were hoping you would do is to use the -- start with the Poseidon plan, and if you wanted to make changes with respect to the acreage, and I think we want -- phasing is an important thing. Not having any phasing, really restricts the number of sites that we can do, that we can get entitled and ready to go on line, within the 24 months that the plan has required.

I mean, one of the things that is very important for us is that we are able to not delay the operation of the plant, and in order to not delay the operation of the plant, we need as broad a number of sites, as possible, and obviously, we are requiring all of that up front, so it potentially restricts the number of sites, and that makes it less likely --

COMMISSIONER HUESO: And, that would be required to come back to the Coastal Commission for approval, for each project?

MR. ZBUR: What the Poseidon proposal does is it would require 37 acres up front. We would have to come back to the Coastal Commission within 24 months for a CDP for that project, at least 37 acres.

COMMISSIONER HUESO: That is 24 for the 37 acres? and, then?

MR. ZBUR: And, then, the Poseidon proposal was that we would have to do the additional acreage at the time that there was stand alone operations occurring, which would be that the power plant would completely shut down, or provides less than 15 percent of the water.

And, I actually wanted to dispute, there is a lot of information on the record which we can site, that provides explanation as to what the basis was of those figures.

COMMISSIONER HUESO: So, how did you come up with the 42.5? that is the 37 plus the 5.5 acres?

MR. ZBUR: Yes, the 37 plus the 5.5 acres. The 42 acres is using the CEC methodology that was used for the Morro Bay and Moss Landing. The 37 acres was, in part, picked because the San Dieguito site, which is not the site that we will, necessarily, go to -- there are still issues with respect to permitting on that site -- but, we know that we can get 37 acres out of the San Dieguito site, if we can resolve issues with the JPA and some of the other entities involved in the site.

COMMISSIONER HUESO: So, under of the staff's recommended modifications, now where it says, under 1.1 on 1 we have to come up with a determination on the acres, and on No. 2 in conformity with Exhibit 2 -- and we will get to that a little bit later -- and in No. 3 it says when the 60 days of the Commission's approval of the modified plan, Poseidon shall submit for Executive Director's review an approval and review -- excuse me -- of a revised plan that includes these modifications.

So, that is not necessarily -- you are asking for 24 months, as opposed to 60 days? does that condition apply to that?

MR. ZBUR: I didn't think we had any disagreement with the staff on the timing of when the CDP had to come back.

ENVIRONMENTAL SPECIALIST LUSTER: Right, and the 60 days refers to once we decide on a plan this evening, that Poseidon returns within 60 days, and that incorporates all of the changes that are made. If we end up with some conditions, some Poseidon has proposed, and some staff has proposed, that there is one plan that encapsulates all of that.

COMMISSIONER HUESO: So, that would be taken care of by No. 3? there is no disagreement on timing for that?

ENVIRONMENTAL SPECIALIST LUSTER: I don't think there is any disagreement.

COMMISSIONER HUESO: Special Condition No. 2, that refers to Exhibit 2, are there any disagreements on Item No. 2?

ENVIRONMENTAL SPECIALIST LUSTER: Yes, staff's recommendation in Exhibit 2, those are the conditions that the Commission required of SONGS. Staff modified some of those conditions to reflect some updates, and mitigation approaches, and you know, removed references to SONGS and Edison and replaced them with Poseidon.

COMMISSIONER HUESO: Why are we referencing SONGS, specifically, because of their approach to the mitigation? what you are doing is recommending that exact same approach?

ENVIRONMENTAL SPECIALIST LUSTER: Yes, going back a ways, over the last several months we have been working with Poseidon and up until about a month ago, Poseidon's proposal was to mitigate at San Dieguito adjacent to the SONGS restoration site, and they had come up with a very detailed preliminary plan, showing the number of acres of the different types of habitat, hydraulic analyses, showing the change in tidal flows, that sort of thing. And, so we were basing our approach, up until then on consistency with the adjacent SONGS restoration site. It all changed in the last month.

We now no longer have that site as the selected mitigation area, but in consulting with the SONGS scientists, we believe that the conditions that SONGS was held to would be applicable to Poseidon if they did estuarine restoration somewhere else in the Southern California bite.

So, that is how we ended up with proposing the SONGS conditions.

COMMISSIONER HUESO: Okay, and what part of those conditions can't you achieve?

MR. ZBUR: The SONGS conditions?

COMMISSIONER HUESO: Yes.

MR. ZBUR: I think what you have attached to the motion that we suggested that you make, included many things to respond to the staff's concerns relating to the inconsistencies within the SONGS plan. I don't think that there are very many, but I am trying to figure out what they are, frankly.

I think the only change, really, is with respect to how significant the funding and -- you know, the SONGS plan required the funding of a number of scientists, and really very frequent reports back to the Commission about the restoration plan. And, I think our plan, because it is a much smaller restoration effort, did not anticipate imposing that kind of costs, I mean, the number of scientists that would be employed full time with annual reports -- workshops, it wasn't even reports -- workshops back to the Commission.

So, I think that is the major change that remains isn't it? plus the phasing and the number of acres.

COMMISSIONER HUESO: Couldn't you propose that as part of your mitigation plan? I mean, tell me here where it is that specific, where it calls out a specific number of scientists, and project management staff, and the other things you alluded to?

MR. ZBUR: Well, basically, it is not in our plan. It is in, basically, the old SONGS plan. There is a general recommendation, and a staff recommendation that we make this consistent with the SONGS plan.

It is in Section 1.0 Administration, and 2.0 Budget and Work Program. There are differences between the SONGS approach, which required --

EXECUTIVE DIRECTOR DOUGLAS: Mr. Chairman, if I may, I think this is going to be virtually impossible for us to work through tonight.

COMMISSIONER HUESO: I agree, I mean --

EXECUTIVE DIRECTOR DOUGLAS: I think, if you would just work on major issues --

COMMISSIONER HUESO: Exactly.

EXECUTIVE DIRECTOR DOUGLAS: -- and then ask us to work with Poseidon, in terms of how we implement it, I think that is what everybody is looking to at the end of the day.

You know what our recommendations are on the points of contention. If you go with our recommendation on acreage, fine, we will work through what the nature of the plan will have to be. If you go through each one of these, at least you will be able to act on the plan tonight, and we then come back and work through some of the details of what exactly has to be in the plan, relative to whether or not it is exactly tracking with the SONGS approach, or not.

But, that is something that we can work out. You have to decide the fundamental questions here, and if we have a dispute over any of those other items, we can bring those back to you, too. But, at least, in terms of what you have got before you, and what you have asked us to bring to you, was something that you could act on today that would lead to the issuance of the permit, and we were trying to do that.

I think the best way for you to go through it is to address the issues in contention.

MR. ZBUR: I think we would be comfortable in working out the issues with the staff, in terms of consistent with the SONGS, as they really are not that different.

I think the one thing we would ask that the Commission consider as part of the motion is that the detail with respect to the budget is something that we could work out with the staff, and potentially that would be -- the budget, in terms of how much we have to spend could be determined at the time the CDP comes forward.

COMMISSIONER HUESO: And, would you like a specific acreage amount to be decided today? or could that be done through your discussions with the applicant?

EXECUTIVE DIRECTOR DOUGLAS: I think that is pretty fundamental. I get the sense, from talking with them, that that is what they want you to decide, and we would like that guidance, too.

COMMISSIONER HUESO: Well, I am going to propose then, a --

CHAIR KRUER: Well, you have prefaced your --

COMMISSIONER HUESO: Okay.

COMMISSIONER LOWENTHAL: [Inaudible]

COMMISSIONER POTTER: Mr. Chair, if I might, I am prepared to move through these items in an amending form, and then we can give direction accordingly.

CHAIR KRUER: Well, just a --

Yes, go ahead, sir.

COMMISSIONER LOWENTHAL: [Inaudible]

COMMISSIONER POTTER: Unless there is the desire to belabor this kind of conversation, anyway.

CHAIR KRUER: Commissioner Lowenthal, you don't have a problem with Commissioner Potter going?

COMMISSIONER LOWENTHAL: No.

CHAIR KRUER: Okay, thank you.

[MOTION]

COMMISSIONER POTTER: Okay, I offer an amending motion that the restoration acreage be 55.4 acres.

I need a "second" and then I will speak to it, briefly.

COMMISSIONER HUESO: I'll second it.

CHAIR KRUER: It has been moved by Commissioner Potter, seconded by Commissioner Hueso.

COMMISSIONER POTTER: My concern is that wetland restoration, I am compelled by the testimony by staff that the higher percentage of success is with the 55 or 68 number. That said, I also am concerned that this deal of like-kind restoration, that they not get credit for a restoration project that is not similar to this wetland.

The attachment that is here, Exhibit A, it does go through a fairly involved criteria, with minimum standards and objectives. I believe that that incorporated with the increased acreage would get us to a successful wetland mitigation project. That is my logic.

CHAIR KRUER: Okay, and the "seconder" Commissioner Hueso, no question, please. Do you want to speak to it?

COMMISSIONER HUESO: No.

CHAIR KRUER: Okay, any other Commissioners?

Yes, Commissioner Shallenberger.

COMMISSIONER SHALLENBERGER: Question to the maker of the motion. If it turns out that this doesn't adequately

-- I mean, are there any performance standards that you are proposing to put in so that we know whether or not at the end of monitoring that 55.4 has, in fact, mitigated it?

COMMISSIONER POTTER: I think the CDP that comes in is going to be conditioned for the project, is due in 24 months, and is going to have all of those necessary standards as part of that CDP application, that is my belief.

COMMISSIONER SHALLENBERGER: My question is which one rules? In other words, if we adopt the 5.4 now, and --

COMMISSIONER POTTER: It is 55.4.

COMMISSIONER SHALLENBERGER: -- 55.4, sorry, and right you are, and when we, in 24 months when we get the CDP, and the performance standard show that maybe that doesn't --

COMMISSIONER POTTER: It is proposed --

EXECUTIVE DIRECTOR DOUGLAS: No, if I may.

CHAIR KRUER: Yes, Director Douglas.

EXECUTIVE DIRECTOR DOUGLAS: The way that I understand this would work is that 55.4 acres is what they have to restore. There are performance standards that have to be met, and to the extent that those performance standards aren't met, they have to take remedial action, but that doesn't necessarily mean an increase. It means that they have to go back and make the changes that are necessary to make it function to the level that it meets the performance standards. And, that is built into the --

COMMISSIONER POTTER: And, specific to that, the 5.0 in here, with the wetlands monitoring management remediation, reads monitoring management remediation shall be conducted over the full operating life of Poseidon's desalination facility, which shall be 30 years.

So, there is never going to be a lapse of non-monitoring or mitigation.

CHAIR KRUER: Okay.

Commissioner Wan.

COMMISSIONER WAN: Yeah, along the lines of what Commissioner Shallenberger was talking about, you know, I don't have -- I think the problem here is that, as it has been pointed out, we don't really have the plan in front of us. We have the elements here of what will be a plan, and that makes things very difficult and very uncomfortable, because you can say, well, they will come in in 24 months, and they will be required to do 55.4 acres of restoration, and there will be some performance standards, of which I don't know what they are now.

There will be monitoring, of which I, essentially, don't know what that monitoring is, and then they will be required to meet these performance standards on these 55.4 acres, but what happens if it turns out that they can't? what happens if it turns out that after all is said and done, because at this point, we do not even know where these acres are going to be located, so it is very difficult to really know if it is adequate. What happens then? and there is where I am really uncomfortable with what we am doing now.

I was going to talk about the total issue of uncertainty, and whether you use 50 percent uncertainty, or 80 percent in the 50 percent, plus mitigation.

But, even if you go with the 55.4 it is the uncertainty because we don't have a plan in front of us now. We are putting off the actual plan for 24 months that I don't know how you can do it.

CHAIR KRUER: Okay.

Commissioner Reilly.

COMMISSIONER REILLY: Well, the uncertainty isn't with performance standards or whether they are going to be able to do it. The uncertainty has to do with the impact of their project. And, it is not going to change.

Whatever performance standards we put on their mitigation, for success, is not going to change the analysis or the level of confidence that this Commission needs to be able to set mitigation acreage, so those are two separate issues, I believe.

And, you know, when this comes back, and you know a couple of us were here for Edison -- little grayer than we were then -- but, we were here, and when this comes back what is going to be before the Commission is adoption of an entire restoration plan, you know, agreement on baselines, agreement on what performance standards we are going to use on this, and I am sure we are going to go back to some of the ones we have done before, and take a look at that. We are going to make decision on status reports. We are going to make decision on workshops and what period of time we do them over, and so all of those things will be before us, along with we will have an identification, hopefully, by then, of the sites that are involved, and but none of that has to do with setting the acreage. The acreage is based on the analysis, and the percentage level of confidence we have based on uncertainties.

I don't have a problem with going forward with this.

CHAIR KRUER: Okay, thank you, Commissioner Reilly.

EXECUTIVE DIRECTOR DOUGLAS: And, this is the approach that we took in San Onofre.

CHAIR KRUER: And, I am going to call for the question.

COMMISSIONER HUESO: I do want to include the concept of phasing into --

COMMISSIONER POTTER: I am going to move each one individually.

CHAIR KRUER: Phasing is in there.

Okay, with that, again the maker and seconder are asking for a "Yes" vote on the amending motion.

Would the Clerk call the roll.

SECRETARY MILLER: Commissioner Blank?

COMMISSIONER BLANK: Yes.

SECRETARY MILLER: Commissioner Burke?

COMMISSIONER BURKE: Yes.

SECRETARY MILLER: Commissioner Lowenthal?

COMMISSIONER LOWENTHAL: Yes.

SECRETARY MILLER: Commissioner Hueso?

COMMISSIONER HUESO: Yes.

SECRETARY MILLER: Commissioner Kram?

COMMISSIONER KRAM: [Absent]

SECRETARY MILLER: Commissioner Neely?

VICE CHAIR NEELY: Yes.

SECRETARY MILLER: Commissioner Potter?

COMMISSIONER POTTER: Aye.

SECRETARY MILLER: Commissioner Reilly?

COMMISSIONER REILLY: Yes.

SECRETARY MILLER: Commissioner Shallenberger?

COMMISSIONER SHALLENBERGER: No.

SECRETARY MILLER: Commissioner Wan?

COMMISSIONER WAN: No.

SECRETARY MILLER: Commissioner Achadjian?

COMMISSIONER ACHADJIAN: Aye.

SECRETARY MILLER: Chairman Kruer?

CHAIR KRUER: Yes.

SECRETARY MILLER: Nine, two.

CHAIR KRUER: Nine, two, the motion passes. Next, on this.

COMMISSIONER POTTER: Yes, Mr. Chair --

CHAIR KRUER: Yes, Commissioner Potter.

[**MOTION**]

COMMISSIONER POTTER: -- before the tech crew took away the chart of options, and decided it was better to look at us -- okay, there we go.

I believe the next issue was the phased implementation, and I am prepared to move the phased implementation approach, that is proposed in the Poseidon recommendation, and if I get a "second" I'll speak to it.

COMMISSIONER HUESO: Second.

COMMISSIONER POTTER: The original approach was to take the 37.5 and then the balance up to the 42 and phase that. I am under the impression that they can do the 37 in the 2-year period, so then it leaves, basically, the balance between the 37 and 55, so whatever that is -- and my math says it is 18.4, so that would be the second phase.

And, the details of that is to be worked out by staff. What staff wanted was direction on these items, and so for that reason I would throw that out as the approach.

CHAIR KRUER: Okay, Commissioner Hueso?
Commissioner Reilly.

COMMISSIONER REILLY: I would be willing to support that if the Phase 2 had a time certain placed on it. And, you know, we are talking about bringing it back within 2 years. They are anxious to get this project up and going, I understand, and in their concern, they may not be able to get -- well, they were concerned that they weren't going to be able to get 42.5 acres, I am assuming they are concerned they are not going to be able get 55.4 within a 2-year period.

I am willing to let them come back with 37 on a Phase 1, but from the time of that approval of Phase 1, I don't think we should let more than 5 years pass before we require the Phase 2 to come back.

COMMISSIONER POTTER: And, I would include that --

CHAIR KRUER: Is that okay with you, Commissioner Potter, as the maker of the motion?

COMMISSIONER POTTER: -- in my recommendation.

CHAIR KRUER: Commissioner Hueso, is that okay with you?

COMMISSIONER HUESO: Yes.

CHAIR KRUER: Okay, is there anyone else who wants to speak to that amending motion?
Commissioner Lowenthal.

COMMISSIONER LOWENTHAL: So, with the acreage change to 55.4 what would Phase 2 acreage be?

COMMISSIONER POTTER: It would be 18.4.

COMMISSIONER LOWENTHAL: So, it will be clearly the difference as what is in the report?

COMMISSIONER POTTER: Yes.

CHAIR KRUER: Yes, and thank you, Commissioner Lowenthal.

EXECUTIVE DIRECTOR DOUGLAS: What I understand the motion to be is that the initial acreage is 37, that has to be done, and then according to their suggestion for phasing, which is when the power plant goes down --

COMMISSIONER POTTER: No, that got changed to 5 years.

EXECUTIVE DIRECTOR DOUGLAS: Okay, so the second phase comes in when?

COMMISSIONER POTTER: Within 5, that is per the Reilly idea.

COMMISSIONER REILLY: Five years after your approval on Phase 1.

EXECUTIVE DIRECTOR DOUGLAS: All right, that is more workable, thank you.

CHAIR KRUER: Commissioner Wan.

COMMISSIONER WAN: I still have a problem with the phasing, although with the time certain, it is a little bit better, because we are going to have a long period of time where are going to have impacts, and we are not going to have any mitigations for those impacts.

And, in part, that is because I don't know when this is going to come on line, relative to these dates, and you have to remember, that if you start with 37 acres 2 years from now, it takes time to build it, and it takes even more time, quite a few years, before it is actually functioning.

So, we are now looking at 2 years before they start, to, probably, you know, 5 or 6 years down the road before we even start to get anything out of the first phase, and if you add some time on it, by the time you get, quote, full mitigation, if you ever do, you are talking about 10 years, and you have had all of those impacts you haven't accounted for.

And, so pushing this out, remember it takes time for all of this. Pushing it out this way really leaves us with a whole lot of impacts to that ocean without any mitigation.

CHAIR KRUER: Commissioner Reilly.

COMMISSIONER REILLY: I don't disagree with what Commissioner Wan said, but I would point out that SONGS operated for 20 years before we got that mitigation, so and we finally got it, and it is happening, and I think there is a balance here betweem being able to move forward on this project, for the local water needs, and our being able to nail down the mitigation that fully mitigates what is going on, in terms of impacts.

EXECUTIVE DIRECTOR DOUGLAS: And, I might add that the 5-year component is 5 years from what?

COMMISSIONER REILLY: Adoption of Phase 1.

EXECUTIVE DIRECTOR DOUGLAS: The permit for Phase 1. It may be that they decide, in looking at that, that it is better to do it all at once, and they may, indeed, find an area that is big enough to accommodate the whole thing, so that would be an option open to them.

But, at least, this way, it is workable and we don't get into the ambiguity of when does it trigger, and when does it not.

CHAIR KRUER: Commissioner Scarborough, then Commissioner Shallenberger.

COMMISSIONER SCARBOROUGH: That was -- thank you, Chair, that was part of my question, was it 2 plus 5, or how did you get to the 5 plus 5, but I also wondered what would be the association, or the relationship between the 5 years, versus when the power plant does, potentially, close? I didn't understand why Poseidon had chosen the plant closing, and was wondering if I could enquire with them why that was chosen, and how it relates to 5?

CHAIR KRUER: Okay.

MR. ZBUR: The reason why we had suggested doing the phasing at the plant closing is because, essentially, at that time we think there will be other kinds of technologies we can put in place that would reduce the potential impingement entrainment impacts that we don't have now, because we have to, basically, rely on the power plant flow, so that is why we thought that at that point we would have a technology incentive to avoid additional mitigation by doing it through avoidance and technology.

So, that is why we prefer doing it at the power plant closure.

COMMISSIONER SCARBOROUGH: What is the estimated time of that? time frame?

MR. ZBUR: It is uncertain. I mean, it could be a few years, or it could be a long time. According to the methodology, we are fully mitigated in the interim on the 37 acres, under the 50 percent compensated criteria, we would be fully mitigated, 2.5 times mitigated at the get go, until -- that is where that 15 percent number came from. We are fully mitigated until you get to the power plant only operating 15 percent of the time.

COMMISSIONER REILLY: That is where we got the 7 years.

CHAIR KRUER: Commissioner Shallenberger.

COMMISSIONER SHALLENBERGER: Yes, I would like to hear from staff, Dr. Raimondi, about what you think about the phasing? and how workable that is?

MR. RAIMONDI: I am not going to comment about the motivation for the phasing, but the practicality of it, as we have had some experience with SONGS.

In the SONGS permit there was language that allowed there to be restoration, and up to 2 wetland areas. There was the initial phase where there was the selection of the wetlands, where restoration could be done, and in the end, Southern California Edison, and their partners, decided it was logistically more easily to do it at a single wetland for all sorts of reasons. It minimized the monitoring, it minimized the costs associated with the permitting, it minimized the construction costs, it was just cheaper to do it.

Another thing about it, and again, it is going to matter how you decide to do the monitoring, but with SONGS they are on the hook for working for what they call the full operating life of the plant.

So with phasing you are going to have two sequences. You will have the first 37 acres, which will go for a 30-year period, if you adopt that, and then the second 17 or 16 acres that will be out of phase with that, and will go longer, so that becomes problematic from a monitoring standpoint, financially, as well, because you have to carry the monitoring longer.

COMMISSIONER SHALLENBERGER: But, it is problematic to the project proponent, not to us, in terms, I mean, they could decide to do them all at once.

MR. RAIMONDI: Yes, but there is a stronger issue, and that is it is way better. It is possible, and I am sympathetic to them, at this point, about being able to find the acreage, but it is way better for the system if it is 55 rather than two pieces. You are going to have much more likelihood of it working, and it is probably going to link into other restorations, so from an ecological point of view, bigger is better.

CHAIR KRUER: Right, okay.

COMMISSIONER POTTER: Well, just as the maker, to that issue. It is a real estate issue. I mean if the opportunity is out there, and during this period of working with staff, they realize we would do better to do it in one fell swoop, fine then come back and tell us that.

I understand the logic behind what you are saying, but it is going to be more of a property acquisition problem is my suspicion.

CHAIR KRUER: Okay.

Commissioner Lowenthal, and then we are going to call for the question, if that is okay with everybody, unless there is somebody who hasn't spoken yet.

COMMISSIONER LOWENTHAL: I wanted to just be clear

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on when the second -- I know we have the 5-year time frame, but just from the proponent's presentation there were different triggering mechanisms, so under our new scheme what would actually trigger Phase 2?

EXECUTIVE DIRECTOR DOUGLAS: It would be 5 years from the first phase, that is, the 37 acres, which has to come in for a permit within 24 months, as I understand it, right, and then once that permit is issued, that is what I understand, then the 5-year period is triggered.

But, I would suggest that the maker of the motion also incorporate in it that if they want to do the entire amount together, that that would be okay, they don't have to wait.

COMMISSIONER POTTER: I literally stated that 3 minutes ago, but that is my intention, and I think everybody else concurs, that if they come back and can do it great, okay.

EXECUTIVE DIRECTOR DOUGLAS: Okay.

CHAIR KRUER: Okay, and we are going --

Ms. Schmeltzer, we are going to call for the question. I thought I mentioned.

CHIEF COUNSEL SCHMELTZER: I am sorry, I just did want to make sure, on this timing question, I thought I heard the Executive Director say two different things.

There is the provision of coming in for a permit within 24 months, and it being issued within the 24 months --

COMMISSIONER POTTER: Specific to the 37, and if they want to go ahead and try to do more at that time, for economy sake, then fine, they can go to the full 55.4, but they have an option to go ahead and do it in a phase.

CHIEF COUNSEL SCHMELTZER: Right, and I understand that, but if they just do the 37 within the first 24 months, that the trigger is not -- the trigger is within 24 months. It is not if the permit takes longer than that to issue.

COMMISSIONER POTTER: No.

EXECUTIVE DIRECTOR DOUGLAS: No, my understanding was, that they have to come in for a permit within 24 months, and then it depends on what the Commission does. They may have conditions about the issuance of that permit. My understanding was that the 5 years starts from the issuance of the permit.

COMMISSIONER REILLY: That is correct.

COMMISSIONER POTTER: Correct.

CHAIR KRUER: That is correct, Mr. Douglas, thank you.

Yes, Commissioner.

COMMISSIONER SCARBOROUGH: I am not sure where you are headed with your phasing in your motions, where does the dredging fit into this?

COMMISSIONER POTTER: I was going to that in the next --

CHAIR KRUER: We will get to -- I think we are going to call the question, here, and then we will get to the other amending, if there are other amending things.

Again, the amending motion, the maker and seconder are asking for a "Yes" vote.

Would the Clerk call the roll, please.

MR. ZBUR: Mr. Chair, can I just so there is not a dispute on this, can I just make sure there is clarity on what the timing is on the motion. We are assuming it is 24 months --

COMMISSIONER POTTER: I am hoping it gets moved sometime tonight.

MR. ZBUR: -- 24 months -- well, only because I -- 24 months to get our application in, which is what we thought it was, and then from the date that the permit is issued, so if it takes 9 months or a year to get the permit approved, from the date the permit is issued, then the 5 years runs, and then I assume that we have to get another permit application in within that 5 years?

COMMISSIONER POTTER: That is correct.

CHAIR KRUER: Correct.

MR. ZBUR: Thank you for that clarification.

CHAIR KRUER: Okay, thank you.

Would the Clerk call the roll, please.

SECRETARY MILLER: Commissioner Burke?
COMMISSIONER BURKE: Yes.
SECRETARY MILLER: Commissioner Lowenthal.
COMMISSIONER LOWENTHAL: Yes.
SECRETARY MILLER: Commissioner Hueso?
COMMISSIONER HUESO: Yes.
SECRETARY MILLER: Commissioner Kram?
COMMISSIONER KRAM: Yes.
SECRETARY MILLER: Commissioner Neely?
VICE CHAIR NEELY: Yes.
SECRETARY MILLER: Commissioner Potter?
COMMISSIONER POTTER: Aye.
SECRETARY MILLER: Commissioner Reilly?
COMMISSIONER REILLY: Yes.
SECRETARY MILLER: Commissioner Shallenberger?
COMMISSIONER SHALLENBERGER: Yes.
SECRETARY MILLER: Commissioner Wan?
COMMISSIONER WAN: Yes.
SECRETARY MILLER: Commissioner Achadjian?
COMMISSIONER ACHADJIAN: Aye.
SECRETARY MILLER: Commissioner Blank?
COMMISSIONER BLANK: Yes.
SECRETARY MILLER: Chairman Kruer?
CHAIR KRUER: Yes.
SECRETARY MILLER: Unanimous.

CHAIR KRUER: Okay, the amending motion passes.

Commissioner Potter, do you have anymore amending motions?

COMMISSIONER POTTER: I am going to actually ask for staff clarification on these last two items. I think they blend together.

Staff is saying that new technologies not appropo, or in this consideration, and the applicant is saying they would like the ability to utilize new technology.

And, the other one is this dredging credits, can you explain what the conflicts are here?

EXECUTIVE DIRECTOR DOUGLAS: What I understand, relative to the new technology, that is that if they can come up the way that they had originally proposed it, if they come up with technology that shows that they can filter the water and avoid entrainment impacts, because of new technology, that there ought to be some adjustment in the mitigation requirement.

It seems to me that one way you could address that, and you know, we have some sympathy for that position. Obviously, if we could avoid the impacts altogether, that would be the best. But, if in that 5-year period, for the second phase, they can come up with technology that shows that they are not having impacts, you could then factor that into whether or not it necessary to add that. But, take that into account in the permit that would be applied for in the Phase 2.

COMMISSIONER POTTER: Okay, with that said, I move that we amend to allow to encourage the use of new technologies --

CHAIR KRUER: Commissioner Potter.

COMMISSIONER POTTER: He spoke, I didn't preface.

CHAIR KRUER: Let me, just to be clear on it. I am not sure about that.

Let me just go to Vice Chair Neely for one second, and then I am coming right back to you for your motion. There is a question of you prefacing.

COMMISSIONER POTTER: I would like to know where in the law you can't speak anyway. I think that is something that Rusty Arias made up from his stay in the state assembly.

VICE CHAIR NEELY: Mr. Chairman, I don't have any questions at this time.

CHAIR KRUER: Okay, Commissioner Potter.

[MOTION]

COMMISSIONER POTTER: All right, I'll move to amend, and incorporate in the motion that we encourage the use of new technologies under the framework that was expressed by the Executive Director.

COMMISSIONER HUESO: I'll second it.

COMMISSIONER POTTER: With the intent of lessening the impact.

CHAIR KRUER: Just a second.

Commissioner Potter has made the motion, and recommending a "Yes" vote, and Commissioner Hueso seconded that motion.

Commissioner Potter, would you like to speak to that motion?

COMMISSIONER POTTER: No, I think Mr. Douglas and I worked pretty well on that item. That was exactly what I wanted him to say, so thank you.

COMMISSIONER REILLY: Mr. Chairman.

CHAIR KRUER: That is why it was prefaced.

COMMISSIONER REILLY: Let me ask.

Staff is going to be incorporating the concept of the 2-year application, and the 5 years afterwards, is staff willing, in discussing that 5 years, willing to incorporate language that suggests that they look into new technology to lessen impacts, and that as part of that 5-year hearing, if they are able to do that, could be a review of mitigation requirement?

EXECUTIVE DIRECTOR DOUGLAS: Well, that is what I discussed, and I think that is what the motion would do, and we don't have a problem with that.

COMMISSIONER REILLY: Are you willing to just incorporate that into the staff?

EXECUTIVE DIRECTOR DOUGLAS: I would rather have the Commission do it.

COMMISSIONER REILLY: That's fine, okay.

CHAIR KRUER: Commissioner Wan.

COMMISSIONER WAN: I just have a question on this one, and that is, I am assuming it is always okay, if you can avoid the entrainment, that is the best, because the fact is -- I don't care what you say -- no matter what mitigation you perform, no matter how you try to compensate for it, you never get full compensation. So, the best thing is always avoidance, so I am certainly not opposed to that.

The question I want to make sure is that when they come back for the review, that we are talking about a review that requires some kind of proof, and not just a statement, "We want to use it." That there is going to be some real scientific analysis done to make sure that that is the case, because up until now there doesn't seem to be anything that has been developed that can avoid the entrainment, and we went through that in great and painful detail when we did SONGS.

So, I am not aware of it, and I just want to make sure that we know how this is going to be handled.

EXECUTIVE DIRECTOR DOUGLAS: Obviously, the proof would have to be that there are reductions in impacts, or elimination of impacts, in order for us to consider -- if this motion passes -- a reduction of the Phase 2 mitigation requirement.

But, this leaves that open, and it is up to them to try to find that technology, and again, if they decide right up front, we are not going to worry about that, we are just going to do the 55.4 acres, then it becomes a moot point.

CHAIR KRUER: Okay.

EXECUTIVE DIRECTOR DOUGLAS: But, it leaves open that opportunity.

CHAIR KRUER: Okay, I am going to call on the amending motion.

Priscilla's got her pen up, and we'll need a brief break.

Call the roll, please, on the amending motion, on the technology.

SECRETARY MILLER: Commissioner Lowenthal?

COMMISSIONER LOWENTHAL: [inaudible]

VICE CHAIR NEELY: Speak up, she can't hear you.

COMMISSIONER LOWENTHAL: Yes.

SECRETARY MILLER: Commissioner Hueso?

COMMISSIONER HUESO: Yes.

SECRETARY MILLER: Commissioner Kram?

COMMISSIONER KRAM: Yes.

SECRETARY MILLER: Commissioner Neely?

VICE CHAIR NEELY: Yes.

SECRETARY MILLER: Commissioner Potter?

COMMISSIONER POTTER: Aye.

SECRETARY MILLER: Commissioner Reilly?

COMMISSIONER REILLY: Yes.

SECRETARY MILLER: Commissioner Shallenberger.

COMMISSIONER SHALLENBERGER: Yes.

SECRETARY MILLER: Commissioner Wan?

COMMISSIONER WAN: Yes.

SECRETARY MILLER: Commissioner Achadjian?

COMMISSIONER ACHADJIAN: Aye.

SECRETARY MILLER: Commissioner Blank?

COMMISSIONER BLANK: Yes.

SECRETARY MILLER: Commissioner Burke?

COMMISSIONER BURKE: Yes.

SECRETARY MILLER: Chairman Kruer?

CHAIR KRUER: Yes.

SECRETARY MILLER: Unanimous.

CHAIR KRUER: The amending motion passes. Commissioner Potter, any more?

[**MOTION**]

COMMISSIONER POTTER: I am going to move that the dredging restoration credit be at the Commission's discretion, and if I get a "second" I'll speak to it.

COMMISSIONER HUESO: Second.

CHAIR KRUER: Moved by Commissioner Potter, seconded by Commissioner Hueso.

Commissioner Potter, would you like to speak to your motion?

COMMISSIONER POTTER: I think my concern is, and this is sort of an open ended question, that whether they can even get ownership of the dredging operations, and can incorporate that in, remains pretty much unanswered, and may remain there for awhile.

So, if there does seem to be a dredging plan that comes forward, and we can get something tangible there about how is going to be operated? who is going to do it? when it is going to occur? all of those ingredients, then it is up to the Commission to decide if that is something that we want to entertain at that time. That is my thought behind it.

CHAIR KRUER: Okay, Commissioner Potter or Commissioner Hueso, anything else?

Anyone else? Commissioner Wan.

COMMISSIONER WAN: Just very quickly, if you are going to leave this open for the discretion -- and I think I heard Commissioner Potter say this, but I just want to make sure -- there is one thing, there is a big difference between dredging connected with maintaining the project, and dredging for mitigation, because as in SONGS it is required for the mitigation, and as long as the dredging credit is understood, it is for whatever future project they are going to be dredging for, not for the desal plant, then I would find that acceptable.

COMMISSIONER POTTER: That is --

COMMISSIONER WAN: You understand the distinction?

CHAIR KRUER: Commissioner Reilly.

COMMISSIONER REILLY: If I understood the staff correctly, earlier, your statement was if dredging becomes part of the project, and becomes a reality, as opposed to a possibility, then staff would do a full analysis of that activity, at that time, both in terms of impacts and in terms of benefits, and be prepared to make recommendations relative to whether additional conditions had to be added, or benefits would be accorded to that.

I guess, I would prefer to wait to see what happens with that issue, before we pre-judge it, that's all.

EXECUTIVE DIRECTOR DOUGLAS: That is the way we understand it, and this motion would just say that they could come in for credit for dredging, but they would have to prove that it warrants it, so that is fine with us.

CHAIR KRUER: Okay.

Call for the question.

Clerk, would you call the roll, please. They are asking for a "Yes" vote, on the amending motion.

SECRETARY MILLER: Commissioner Hueso?

COMMISSIONER HUESO: Yes.
SECRETARY MILLER: Commissioner Kram?
COMMISSIONER KRAM: Yes.
SECRETARY MILLER: Commissioner Neely?
VICE CHAIR NEELY: Yes.
SECRETARY MILLER: Commissioner Potter?
COMMISSIONER POTTER: Aye.
SECRETARY MILLER: Commissioner Reilly?
COMMISSIONER REILLY: No.
SECRETARY MILLER: Commissioner Shallenberger?
COMMISSIONER SHALLENBERGER: Yes.
SECRETARY MILLER: Commissioner Wan?
COMMISSIONER WAN: No.
SECRETARY MILLER: Commissioner Achadjian?
COMMISSIONER ACHADJIAN: Aye.
SECRETARY MILLER: Commissioner Blank?
COMMISSIONER BLANK: Aye.
SECRETARY MILLER: Commissioner Burke?
COMMISSIONER BURKE: No.
SECRETARY MILLER: No?
COMMISSIONER BURKE: [Inaudible]
SECRETARY MILLER: Commissioner Lowenthal?
COMMISSIONER LOWENTHAL: Yes.
SECRETARY MILLER: Chairman Kruer?
CHAIR KRUER: Yes.

SECRETARY MILLER: Nine, three.

CHAIR KRUER: Nine, three, the amending motion passes.

And, now we will need back to the main motion, okay. Back to the motion, and again the maker and the seconder are asking for a "Yes" vote.

Commissioner Wan has her hand up.

COMMISSIONER WAN: Just on the main motion, this is not an amending motion, and I just want a quick explanation as to why I am going to vote "No" and the reason I am going to vote "No" is that I don't believe, if you look at this whole thing, that we really are getting the kind of assurances we need that this is real mitigation, and the reason is -- and that this is adequate mitigation -- this is going to be doing, this facility, once it becomes a stand alone facility, essentially, what once-through cooling does, and once-through cooling has been found by the courts to be a violation of the *Porter Cologne Act*, and I don't see how -- I don't even know why you bother to phase out the power plant, if you are just going to substitute something that is going to do exactly the same thing. It is not acceptable, because it is not protective of the ocean.

Our oceans are under horrific assault, and this kind of thing is simply not appropriate, particularly, when we get a plan that is -- we deferred our decision, we passed the power plant, deferred the decision on the mitigation, and now we are again with all of the things that we had in the amending motions, deferring the real plan for another 2 years.

We will not see a full plan, and I don't think you can approve a mitigation without the appropriate plan, and if I had a full plan in front of me, it might be different, but I don't, and without that I don't have the confidence to know just the real extent of the mitigation that is going to take place here.

And, let me, again, say mitigations here, as elsewhere, does not give you complete compensation.

CHAIR KRUER: Okay, would the Clerk call the roll on the main motion, please, as amended by the Commission.

SECRETARY MILLER: Commissioner Kram?

COMMISSIONER KRAM: Yes.

SECRETARY MILLER: Commissioner Neely?

VICE CHAIR NEELY: Yes.

SECRETARY MILLER: Commissioner Potter?

COMMISSIONER POTTER: Aye.

SECRETARY MILLER: Commissioner Reilly?

COMMISSIONER REILLY: Yes.

SECRETARY MILLER: Commissioner Shallenberger?

COMMISSIONER SHALLENBERGER: Yes.

SECRETARY MILLER: Commissioner Wan?

COMMISSIONER WAN: No.
SECRETARY MILLER: Commissioner Achadjian?
COMMISSIONER ACHADJIAN: Aye.
SECRETARY MILLER: Commissioner Blank?
COMMISSIONER BLANK: Yes.
SECRETARY MILLER: Commissioner Burke?
COMMISSIONER BURKE: Yes.
SECRETARY MILLER: Commissioner Lowenthal?
COMMISSIONER LOWENTHAL: Yes.
SECRETARY MILLER: Commissioner Hueso?
COMMISSIONER HUESO: Yes.
SECRETARY MILLER: Chairman Kruer?
CHAIR KRUER: Yes.
SECRETARY MILLER: Eleven, one.
CHAIR KRUER: Okay, the Commission hereby approves the main motion, as amended by the Commission.
We will take a break.

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[Whereupon the hearing concluded at 7:35 p.m.]

W 15a
W 16b

ADDENDUM TO COMMISSION PACKET

FOR

ENERGY, OCEAN RESOURCES and

FEDERAL CONSISTENCY

For Wednesday, December 10, 2008

Item No. W 15a — **E-08-012**
Chevron

- Staff Modifications

Item Nos. 16b — **E-06-013**
Revised Condition Compliance Findings
Poseidon Resources Corporation

- Staff Modifications
- Ex Parte Communications
- Correspondence

STATE OF CALIFORNIA – THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, GOVERNOR

CALIFORNIA COASTAL COMMISSION

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W15a

December 10, 2008

TO: Coastal Commissioners and Interested Parties

FROM: Alison Dettmer, Deputy Director

RE: **Addendum to Staff Report for Coastal Development Permit (CDP) Application E-08-012**

The Commission staff recommends the following modifications to the staff report for CDP Application E-08-012. Proposed changes are illustrated by ~~strikethroughs for deletions~~ and <u>underlines for additions.</u>

The first paragraph on Page 2 shall read:

> In this application, Chevron proposes to construct a 5,060-foot long segment of a perimeter fence and remove 90 feet of existing fencing at the former Guadalupe Oil Field in San Luis Obispo County. The new fence is required by Condition 106 of ~~Chevron's~~ County-issued Coastal Development Permit/Development Plan ("CDP/DP") D890558D…

The third paragraph on Page 2 shall read:

> The entire site is designated ESHA in the County's LCP. The site includes the mouth of the Santa Maria River and wetland ponds A, B and C. Although Chevron designed the fence and its location to minimize impacts to wetlands, ESHA and wildlife, construction of the fence will unavoidably cause temporary and minor impacts to about .23 acres of jurisdictional wetlands and ESHA <u>within the Coastal Commission's original jurisdiction</u>. All work will be done manually with hand tools. The fencing project will provide long-term habitat preservation benefits by preventing cattle from accessing the site and damaging those habitat areas.

Special Condition 2 on Page 4 shall read:

2. **Public Access Signs.** Prior to construction of Segment 1 of the fence, Chevron shall submit to the Coastal Commission's Executive Director for review and approval final

design of ~~the~~ a beachfront ~~fence~~ signs (including size, color, and wording) and sign locations~~s~~.

The fourth paragraph on Page 6 shall read:

In this application, Chevron proposes to construct a 5,060-foot long segment of a perimeter fence at the former Guadalupe Oil Field. The former oil field (now called the Guadalupe Restoration Project) is owned by Union Oil Company of California. In 2005, Union Oil became an indirect subsidiary of Chevron Corporation. Chevron Environmental Management Company now conducts the site activities on behalf of Union Oil....

The first paragraph on Page 9 shall read:

Of the total length of fence proposed within the Coastal Commission's permit jurisdiction (5,060 feet), 3,105.7 feet would be located in an area designated as State of California jurisdictional wetlands. The work *includes placement of fence posts within wetlands.* Fence posts are "fill" as that term is defined in the Coastal Act.[1] Building the fence would impact 0.14 acres of state-designated wetlands within the Coastal Commission's original jurisdiction (this assumes a two-foot wide fence installation corridor) due to (a) minor trimming of willows along the fence corridor near the Santa Maria River floodplain and dune swales; (b) possible limited occurrences of ORVs driving over herbaceous wetland vegetation; and (c) digging holes for support posts…

Paragraphs 3 and 4 on Page 9 shall read:

1. Allowable Use: The proposed fence is a component of the overall Guadalupe Oil Field Restoration Project and is required by a condition of ~~Chevron's~~ County-issued CDP/DP for the remediation and restoration of the 2,800 site. ..

2. No Feasible Less Environmentally Damaging Alternative*:* The second test of Coastal Act Section 30233(a) allows for the placement of fill in wetlands if there is no feasible less environmentally damaging alternative to the development. Unocal, the ~~former~~ landowner, *pursued a number of alternatives to installing a perimeter fence to keep out cattle.* These included: …

The first sentence of the first full paragraph on Page 10 shall read:

Chevron, who now conducts site activities on behalf of Union Oil~~the new former oil field property owner~~, also considered a number of fencing alternatives…

[1] Coastal Act Section 30108.2 states, ""Fill" means earth or any other substance or material, including pilings placed for the purposes of erecting structures thereon, placed in a submerged area."

Paragraphs 1 and 2 under Section 5.3 on Page 13 shall read:

The segment of the fence within the Coastal Commission's jurisdiction would be located in an area bounded on the south by the Rancho Guadalupe County Park. The closest recreational access to the beach west of the former Guadalupe Oil Field is provided by two entrances to the Dunes Complex. One entrance is located at the Rancho Guadalupe County Park in Northern Santa Barbara County, immediately south of the Santa Maria River, and the other entrance is four miles north of the Guadalupe Field at the Oso Flaco Lake Natural Area in San Luis Obispo County. The public uses the beach west of the site along the beach, but presently there is no coastal public access allowed through the field. There is a ~~horizontal~~ limited public access easement[2]~~, however,~~ landward of the mean high tide line. (See Exhibit 2.) The beginning of the fence (Segment 1) starts approximately 250 feet east (landward) of the ~~mean high tide line~~ easternmost boundary of the easement. ~~Lateral public access occurs along the shoreline and is permitted along the western boundary of the overall site.~~ The fence would not impede lateral public access in any manner.

Condition 30 of Chevron's Minor Use Permit DRC2007-00103 for the fence requires Chevron immediately upon completion of Segment 1 of the fence to "post signage at the westernmost terminus of the southern boundary segment of the fence to explain that trespassing onto the project site is not allowed, but the fence is not intended to impede public access. ~~along the easement below the mean high tide line.~~" Chevron proposes ~~to place two~~ an off-white colored 18" by 24" signs ~~on the fence, each 18" by 24"~~. **Special Condition 2** of this permit requires Chevron, prior to construction of Segment 1 of the fence, to submit to the Coastal Commission's Executive Director for review and approval final sign design (including size, color, and wording) and sign location.

[2] Within the easement area public access is to be controlled and restricted to walking and hiking in small organized groups.

STATE OF CALIFORNIA—THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, Governor

CALIFORNIA COASTAL COMMISSION
45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
FAX (415) 904-5400

W16b

December 9, 2008

TO: Coastal Commissioners and Interested Parties

FROM: Alison J. Dettmer, Deputy Director
Tom Luster, Staff Environmental Scientist

SUBJECT: Addendum to E-06-013 Revised Condition Compliance Findings for proposed Energy Minimization and Greenhouse Gas Reduction Plan – Poseidon Resources (Channelside) LLC – Carlsbad Desalination Facility

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STAFF NOTE

[Please note that this Staff Note replaces in its entirety the Staff Note in the November 26, 2008 Revised Condition Compliance Findings.]

This Addendum includes recommended modifications to staff's November 26, 2008 Revised Condition Compliance Findings. It also provides several *ex parte* forms Commission staff received before December 9, 2008, and briefing materials Poseidon provided to Commissioners. The recommended modifications herein cover three main areas [note – all page numbers refer to staff's November 26th report]:

- Clarification (on pages 12-13 and 20) that Poseidon may request the Executive Director approve the use of offsets from entities other than the California Air Resources Board, the California Climate Action Registry, or any state air district, if offsets from those entities are not available at a price reasonably equivalent to offsets in the broader domestic market. This modification also corrects a minor typographical error on page 13.

- Clarification (on page 22) that the approved Plan will mitigate the project's net GHG emissions to the maximum extent feasible.

- Added language similar to that from the August 2008 Findings related to the Plan's annual reporting requirements.

- Clarification (on pages 3, 6-7, 10, 12-15, 17, and 19) that Poseidon may obtain RECs from entities other than CARB, CCAR, or the Air District.

Based on staff's review of the record, staff believes the recommended Revised Condition Compliance Findings, as modified herein, accurately reflect the Commission August 6, 2008 approval of Poseidon's Energy Minimization and Greenhouse Gas Reduction Plan. Staff therefore recommends the Commission **approve** the Findings, as modified.

STAFF RECOMMENDED MODIFICATIONS TO THE REVISED FINDINGS:

Staff recommends the Commission adopt the modifications as described below, or as shown in ~~strikethrough~~ and **bold underline**. Please note that recommended Findings from the November 26th report are shown in plain text.

Pages 1 & 2, Staff Note:

Delete the entire Staff Note.

Page 3, bulleted paragraph, continuing to page 4:

1) Except as set forth in the Plan's contingency provisions (as described below in Section 4.0 of these Findings), Poseidon is ~~to~~ implement the Plan's provisions regarding offsetting the project's net GHG emissions using the protocols, criteria, and mechanisms provided by Assembly Bill 32 (AB 32):
   a. Use CARB-, CCAR-, or California Air District-approved protocols and mechanisms for all emission reduction measures proposed**, except for Renewable Energy Credits (RECs)**[3] to offset the net GHG emissions from Poseidon's purchased electricity. On-site and project-related measures identified in the Plan are used to calculate the project's net GHG emissions and therefore are not subject to the CARB, CCAR, or Air District requirements for offsetting the net GHG emissions.[4]
   b. Join the CCAR "Climate Action Reserve" or other entities that require the use of CARB-, CCAR-, and/or California Air District-approved protocols to implement the Plan's emission reduction measures**, except for RECS,** and provide necessary accounting of those measures."

"[3] **Each REC confirms that one megawatt of electricity was generated from renewable energy (e.g., wind, solar, geothermal, etc.). The Plan provides that the acquisition of RECS is not limited to purchase from CARB, CCAR, or the Air Districts.**"

Pages 6 & 7, Section 1.1, bullets a) and b):

a) "Use California Air Resources Board (CARB), California Climate Action Registry (CCAR), and/or California Air District approved protocols and mechanisms for all emission reduction measures proposed to offset the net GHG emissions from Poseidon's purchased electricity use**, except for RECs**.[6] On-site and project-related measures identified in the Plan are used to calculate the project's net GHG emissions and are therefore not subject to the CARB, CCAR, or Air District requirements regarding offsetting the net GHG emissions.[7]
b) Join the CCAR "Climate Action Reserve" and other entities that require the use of CARB-, CCAR-, or California Air District-approved protocols to implement the Plan's emission reduction measures and provide necessary accounting of those measures**, except for RECs**."

"[6] **As noted previously, each REC confirms that one megawatt of electricity was generated from renewable energy (e.g., wind, solar, geothermal, etc.). The Plan provides that the acquisition of RECS is not limited to purchase from CARB, CCAR, or the Air Districts.**"

Page 10, second full paragraph:

"Based on the above, it is appropriate for the Commission to use AB 32 and its implementing regulations, protocols, criteria, and mechanisms as the basis for its review and approval of the provisions of Poseidon's Plan regarding offsetting the project's net GHG emissions. The Commission includes the Plan's identified on-site and project-related measures as part of Poseidon's calculation of the project's net GHG emissions and these measures**, along with RECs,** therefore will not be subject to the Commission's requirement that Poseidon use CARB-, CCAR-, or Air District- approved AB 32 **regulations,** protocols**, or mechanisms** regarding offsets for net GHG emissions. **The California Center for Sustainable Energy (CCSE) or other consultant will prepare annual reports that will, among other things, analyze whether Poseidon acquired offsets and/or RECs in accordance with the Plan's requirements, including consistency with the six AB 32 criteria identified below. The annual report is subject to the Executive Director's review and approval.** This approach is supported by other agencies that have been involved in Commission staff's review, including CARB, the San Diego Air Pollution Control District (SDAPCD), the State Lands Commission (SLC), and the California Energy Commission (CEC), all of which requested that Poseidon use AB 32 provisions to develop and implement its Plan. Implementing Coastal Act requirements using the terms, criteria, and mechanisms provided through AB 32 would result in the Plan's conformity to **Special Condition 10**. Additionally, this would ensure the Plan is consistent with the state goals and targets expressed in AB 32, and would result in maximum credible and verifiable emissions reductions."

Page 12, first partial paragraph, last sentence:

"Only the remaining provisions of the Plan intended to offset the project's net GHG emissions**, except for RECs,** are subject to CARB-, CCAR-, or Air District-approved AB 32 protocols."

Page 12, last paragraph, continuing to page 13:

"As recommended by CARB and other agencies, Commission staff provided in its review of Poseidon's proposed Plan an initial application of these six criteria to assess whether Poseidon's suggested emissions reduction measures might conform to AB 32. The Commission finds in Section 4.0 of these Findings that emission reduction measures to offset the project's net GHG emissions**, except for RECs,** must comply with CARB-, CCAR-, and/or Air District-approved measures and protocols and that Poseidon must purchase or implement these offsets through CCAR, CARB, or a California air district. If offsets cannot be acquired through these entities ~~due to price or inadequate supply~~ **at a price that is reasonably equivalent to the price for offsets in the broader domestic market**, Poseidon may request the Commission's Executive Director to approve purchases of offsets or implementation of projects from other entities. Poseidon may also, upon approval of the Executive Director or the Commission, deposit funds into an escrow account in lieu of purchasing offsets/RECs in the event that (i) offset/REC projects in an amount necessary to mitigate the Project's net indirect GHG emissions are not reasonably available; (ii) the "market price" for carbon offsets or RECs is not reasonably discernable; (iii) the market for offsets/RECs is suffering from significant market disruptions or instability; or, (iv) the market price has escalated to a level that renders the purchase of offsets/RECs economically infeasible to Poseidon. The funds placed in escrow will be paid in an amount equal to $10 per metric ton, adjusted for inflation from 2008, and will be used to fund offset projects as they become available, with the Executive Director or Commission determining the entities that may use these funds and the time period for which this contingency may be used. With these modifications, the Plan is consistent with ***Special Condition 10*** and applicable Coastal Act requirements."

Page 14, last partial bulleted paragraph describing Section 4.2.1:

"***Section 4.2.1*** – Use CARB-, CCAR-, and/or California Air District-approved protocols and mechanisms for all emission reduction measures proposed**, except for RECs,** to offset the net GHG emissions from Poseidon's purchased electricity are "net zero"."

Page 15, bulleted paragraph near top of page describing Section 4.2.2:

"***Section 4.2.2*** – Join the CCAR "Climate Action Reserve" and other entities that require the use of CARB-, CCAR-, or California Air District-approved protocols to implement the Plan's emission reduction measures**, except for RECs,** and provide necessary accounting of those measures."

Page 17, last paragraph, continuing to page 18:

"As noted in Section 2.0, AB 32 includes a number of provisions meant to apply to emission reductions measures such as those Poseidon is proposing to offset its net GHG emissions. The Commission's primary modification is to require that Poseidon's Plan use these provisions to ensure these proposed emission reduction measures (i.e., those needed to reach net zero emissions after on-site and project-related measures are factored in), **except for RECs,** fit within the framework California has established for this type of project. The existing or anticipated protocols and mechanisms being implemented by CARB, CCAR, and/or California Air Districts pursuant to AB 32 can be used to evaluate these proposed emission reduction measures**, except for RECs**."

Page 19, first partial paragraph:

"The best way to ensure Poseidon's Plan provides the intended result – that is, to mitigate for Poseidon's net indirect GHG emissions – is for the Plan's offset provisions to be based on the protocols and mechanisms that are already approved or that will be approved pursuant to AB 32. The Commission's approval therefore requires that, with respect to offsetting the project's net GHG emissions (i.e., for other than Poseidon's identified on-site and project-related measures), **except for RECs,** Poseidon ~~to~~ must select emission reduction measures and project proposals for which there are CARB-, CCAR-, or California Air District-approved project protocols and must purchase emission reduction offsets or credits**, except for RECs,** approved by CARB-, CCAR-, or California Air District-accredited verifiers."

Page 19, last paragraph:

"As noted above, AB 32's criteria are expected to apply to a wide range of emission reduction measures, including those implemented for both regulatory and voluntary efforts, which include Poseidon's. The Commission has determined, therefore, that the Plan will use one set of criteria – those established in AB 32 – to apply to the measures it proposes to mitigate for the net indirect GHG emissions resulting from its use of purchased electricity.[18] This allows Poseidon's Plan to use a single, clear, and applicable set of criteria by which some of its emission reduction measures can be verified and incorporated into California's emission reduction framework. Trying to implement the Plan using three sets of different and sometimes overlapping or conflicting criteria would likely cause confusion and uncertainty and would not allow some of Poseidon's proposed measures to be adequately reviewed and verified. By relying on these criteria and on ~~CARB's and CCAR's implementation of AB 32~~ **each year's review and approval by the Executive Director of Poseidon's annual report**, the Commission will have adequate assurance that Poseidon's modified Plan will conform to ***Special Condition 10***. The Commission will also be assured that its review will be consistent with the framework the state has selected for addressing the need to reduce GHG emissions, and Poseidon will be able to validate **some of** its GHG **emission reduction efforts** ~~offset measures, including RECs,~~ as part of California's program."

Page 20, first paragraph, last sentence:

"The Commission also authorizes the Executive Director to approve, upon Poseidon's request, the use of emission reduction measures that may be available from entities other than CARB, CCAR, or the Air Districts **if offsets are not available from CARB, CCAR, or the Air Districts at a price that is reasonably equivalent to the price of offsets in the broader domestic market**."

Page 21, second paragraph:

"The Commission modifies the Plan to require that Poseidon join CCAR's Climate Action Reserve, which is a program within CCAR, so that it could ~~it implement some of~~ **acquire and verify offsets purchased under** its Plan through the Reserve. The Reserve was designed specifically for the voluntary GHG emission reduction market. The Reserve provides account holders accurate and transparent measurement, verification, and tracking of GHG reduction projects and inventories of their GHG ~~reductions~~ **offsets**, thus assuring a high degree of integrity."

Page 22, first full paragraph:

"The Commission finds that the Project's energy minimization features described above will minimize the Project's energy consumption in accordance with Coastal Act Section 30253(4) and reduce impacts to coastal resources. Additionally, the Plan will mitigate impacts from the desalination facility's net GHG emissions from electrical usage by requiring all such net GHG impacts of the project be offset, and the Commission finds that the Plan will mitigate to the **maximum** extent feasible impacts on coastal resources of the project's net GHG emissions, in accordance with applicable Coastal Act policies, including Section 30260."

Page 22-23, Section 4.3:

4.3 Submit annual reports for Commission staff review and approval

"Poseidon's Plan includes an annual review process to ensure that the Commission has an opportunity to review the results of Poseidon's implemented emission reduction measures each year and to determine conformity to ***Special Condition 10***. Poseidon has agreed to provide an annual report for Executive Director review and approval (see Exhibit 1 insert: July 24, 2008, *Memorandum to File – Plan Modifications Agreed to By Poseidon and Commission Staff*). **As noted in the Plan, Poseidon will have its contractor initially analyze and validate the project's annual GHG emission calculations, the positive or negative balance of Poseidon's net emissions, the acquisition of offsets and/or RECs, and other related information.** The type and amount of emission reductions is expected to vary each year based on the annual update of SDG&E's certified emission factor and the amount of electricity Poseidon purchases each year from SDG&E.

~~However, the current Plan proposes a complex reporting method involving different timelines, committee review, RFP submittals and approvals, accounting methods, and other elements. Staff's recommendation is that Poseidon's annual report submittal be based on the review and timing needed to conform to the particular AB 32-related review processes Poseidon chooses to implement its Plan.~~ The report ~~should~~ **is to** describe and account for all approved emission reduction measures and **is to** include both an annual and cumulative balance of Poseidon's net emissions~~; however, the particular mechanisms to develop each year's report may vary. For example, as a member of the Reserve described above, Poseidon will have its own account that reflects the amount of emission reductions credits it owns. This accounting service negates the need for Poseidon's committee, SDAPCD, or Commission staff to perform this function. It also eliminates the need for the committee to serve as a third-party reviewer, as this would be provided by the Reserve.~~

~~If Poseidon were to join the Reserve and use its accounting services for the annual report, the review process would be simplified and would provide Commission staff with a full account of its emission reduction credits that are CARB and/or CCAR-approved.~~ This ~~recommendation would also~~ provide**s** the Commission with the necessary level of assurance that Poseidon's Plan is conforming to **Special Condition 10** and meeting the Commission's expectations as expressed in its Findings."

W 16b

E-06-013

Revised Condition Compliance Findings
(Poseidon Resources Corporation)

EX PARTE COMMUNICATIONS

FORM FOR DISCLOSURE OF EX PARTE COMMUNICATIONS

Name or description of project, LCP, etc: Poseidon Resources Corporation Carlsbad Desalination Facility CDP E-06-013, Agenda Items W16a, and W16b

Date and time of receipt of communication: December 2, 2008; 10:00 a.m.

Location of communication: Telephonic

Type of communication (letter, facsimile, etc.): Telephonic meeting with Chair Patrick Kruer

Person(s) initiating communication:
Susan McCabe, McCabe & Company
Rick Zbur, Latham & Watkins LLP
David Goldberg, Latham & Watkins LLP
Peter MacLaggan, Poseidon Resources
Charlie Stringer, Renewable Resources

Detailed substantive description of content of communication:
(Attach a copy of the complete text of any written material received.)

Poseidon representatives discussed Poseidon's concerns regarding Staff's Revised Condition Compliance Findings for the project's Energy Minimization and Greenhouse Gas Reduction Plan ("GHG Plan") and Marine Life Mitigation Plan ("MLMP"), and the contents of Poseidon's December 10, 2008 Briefing Materials that Poseidon provided to Commission Staff.

Poseidon representatives indicated that two issues involving the GHG Plan findings remain. The first issue involved Staff's interpretation of the GHG Plan's requirements for Renewable Energy Credits (RECs), which would require Poseidon to purchase RECs from CARB, CCAR or an Air District. Poseidon explained that Staff's interpretation would eliminate its ability to use RECs under the GHG Plan and would be contrary to the Commission's intent at the August 6, 2008 hearing. Poseidon believes that the plain language in the GHG Plan approved by the Commission allows it to purchase RECs from entities besides CARB, CCAR or the Air Districts, and that there was no discussion on the record modifying that language. Poseidon explained that Staff's interpretation would eliminate its ability to fund specific, local renewable energy projects that are expressly identified in the GHG Plan, which would result in poor public policy and would conflict with established state policy in AB 32 that encourages renewable energy projects.

Regarding the second issue, Poseidon representatives indicated that the Staff failed to correctly incorporate a contingency in the GHG Plan findings allowing Poseidon to acquire offsets from entities other than CARB, CCAR, or the Air Districts in the event that these entities cannot provide sufficient offsets at a price reasonably equivalent to the general domestic market price. Poseidon explained that, instead, the Staff proposed findings imposing a "feasibility" requirement that does not make clear that Poseidon can seek to purchase offsets from other entities if the price of CARB/CCAR/Air District offsets is not reasonably consistent with domestic market prices. Poseidon explained that testimony in the record by Commissioner Hueso and Chair Kruer clearly indicates that the Commission intended for Poseidon to have access to this contingency if CARB, CCAR or the Air Districts could not provide offsets at a price reasonably equivalent to the domestic market price.

Poseidon representatives also indicated that they are in the process of working out one additional issue regarding the GHG Plan findings with Staff, and that all outstanding issues with the MLMP findings were resolved with Staff.

12/5/08
Date

Chair Patrick Kruer

FORM FOR DISCLOSURE OF EX PARTE COMMUNICATIONS

Name or description of project , LCP, etc: <u>Poseidon Resources Corporation Carlsbad Desalination Facility CDP E-06-013, Agenda Items W16a. and W16b</u>

Date and time of receipt of communication: <u>December 3, 2008; 10:00 a.m.</u>

Location of communication: <u>Telephonic</u>

Type of communication (letter, facsimile, etc.): <u>Telephonic meeting with Commissioner Bonnie Neely</u>

Person(s) initiating communication: <u>Susan McCabe, McCabe & Company</u>
<u>Rick Zbur, Latham & Watkins LLP</u>
<u>Peter MacLaggan, Poseidon Resources</u>
<u>Charlie Stringer, Renewable Resources</u>

Detailed substantive description of content of communication:
(Attach a copy of the complete text of any written material received.)

Poseidon representatives indicated that they have worked out all outstanding issues with Staff regarding Staff's Revised Condition Compliance Findings for the Marine Life Mitigation Plan. Poseidon's representative then discussed Poseidon's concerns regarding Staff's Revised Condition Compliance Findings for the project's Energy Minimization and Greenhouse Gas Reduction Plan ("GHG Plan"), and the contents of Poseidon's December 10, 2008 Briefing Materials that Poseidon provided to Commission Staff.

Poseidon representatives indicated that Staff's revised findings for the GHG Plan contained two provisions that Poseidon believes are inconsistent with the Commission's approval. The first issue involved Staff's interpretation of the GHG Plan's requirements for Renewable Energy Credits (RECs), which would require Poseidon to purchase RECs from CARB, CCAR or an Air District. Poseidon explained that Staff's interpretation would eliminate its ability to use RECs under the GHG Plan and would be contrary to the Commission's intent at the August 6, 2008 hearing. Poseidon believes that the plain language in the GHG Plan approved by the Commission allows it to purchase RECs from entities besides CARB, CCAR or the Air Districts, and that there was no discussion on the record modifying that language. Poseidon explained that Staff's interpretation would eliminate its ability to fund specific, local renewable energy projects that are expressly identified in the GHG Plan, which would result in poor public policy and would conflict with established state policy in AB 32 that encourages renewable energy projects.

Regarding the second issue, Poseidon representatives indicated that the Staff failed to correctly incorporate a contingency in the GHG Plan findings allowing Poseidon to acquire offsets from entities other than CARB, CCAR, or the Air Districts in the event that these entities cannot provide sufficient offsets at a price reasonably equivalent to the general domestic market price. Poseidon explained that, instead, the Staff proposed findings imposing a "feasibility" requirement that does not make clear that Poseidon can seek to purchase offsets from other entities if the price of CARB/CCAR/Air District offsets is not reasonably consistent with domestic market prices. Poseidon explained that testimony in the record by Commissioner Hueso and Chair Kruer clearly indicates that the Commission intended for Poseidon to have access to this contingency if CARB, CCAR or the Air Districts could not provide offsets at a price reasonably equivalent to the domestic market price.

Poseidon representatives also indicated that they are in the process of working out one additional issue regarding the GHG Plan findings with Staff.

12-3-08
Date

Bonnie Neely
Commissioner Bonnie Neely

EX PARTE COMMUNICATIONS

Name of project:	Poseidon Resources Corporation Carlsbad Desalination Facility CDP E-06-013, Agenda Items W16a, and W16b
Date and time:	December 3, 2008; 11:15 a.m.
Location:	Menlo Park, CA
Type of communication:	Phone
Persons initiating communication:	Susan McCabe, McCabe & Company Rick Zbur, Latham & Watkins LLP Peter MacLaggan, Poseidon Resources Charlie Stringer, Renewable Resources

Detailed content of communication:
Poseidon indicated that they have two issues with the Staff's Revised Findings for the Greenhouse Gas Reduction Plan ("GHG Plan") they believe is inconsistent with the Commission's approval.

1. Staff's interpretation of the GHG Plan's requirements for Renewable Energy Credits (RECs) would require Poseidon to purchase RECs from only CARB, CCAR or an Air District. The language in the GHG Plan approved by the Commission allows it to purchase RECs from entities besides CARB, CCAR or the Air Districts, and that there was no discussion on the record modifying that language.
   Poseidon claimed that Staff's interpretation would eliminate its ability to fund local renewable energy projects that are identified in the GHG Plan, would result in poor public policy and would conflict with established state policy in AB 32 that encourages renewable energy projects.

2. Staff failed to incorporate a contingency allowing Poseidon to acquire offsets from entities other than CARB, CCAR, or the Air Districts in the event that these entities cannot provide sufficient offsets at a price reasonably equivalent to the general domestic market price. The Staff's proposed findings imposes a "feasibility" requirement that does not allow Poseidon to purchase offsets from other entities if the price of CARB/CCAR/Air District offsets are not reasonably consistent with domestic market prices. Poseidon said that testimony in the record by Commissioner Hueso and Kruer indicates that the Commission intended for Poseidon to have access to this contingency.

Poseidon representatives also indicated that they are in the process of working out one additional issue regarding the GHG Plan findings with Staff.

Thursday, December 04, 2008
Date

Commissioner Steve Blank

FORM FOR DISCLOSURE OF EX PARTE COMMUNICATIONS

Name or description of project , LCP, etc: Poseidon Resources Corporation Carlsbad Desalination Facility CDP E-06-013, Agenda Items W16a, and W16b

Date and time of receipt of communication: December 8, 2008; 11:00 a.m.

Location of communication: Telephonic

Type of communication (letter, facsimile, etc.): Telephonic meeting with Assistant Secretary for Ocean and Coastal Policy Brian Baird

Person(s) initiating communication: Susan McCabe, McCabe & Company Rick Zbur, Latham & Watkins LLP

Detailed substantive description of content of communication:
(Attach a copy of the complete text of any written material received.)

Poseidon representatives indicated that they have worked out all outstanding issues with Coastal Commission Staff regarding Staff's Revised Condition Compliance Findings for the Marine Life Mitigation Plan. Poseidon's representative then discussed Poseidon's concerns regarding Staff's Revised Condition Compliance Findings for the project's Energy Minimization and Greenhouse Gas Reduction Plan ("GHG Plan"), and the contents of Poseidon's December 10, 2008 Briefing Materials that Poseidon provided to Commission Staff. Poseidon representatives explained they believe that they have resolved their two primary concerns with the GHG Plan findings with Staff, which Staff indicated to them would be addressed in an Addendum prior to the hearing on the findings.

Poseidon representatives indicated that Staff's revised findings for the GHG Plan had contained two provisions that Poseidon believes are inconsistent with the Commission's approval. The first issue involved Staff's interpretation of the GHG Plan's requirements for Renewable Energy Credits (RECs), which would require Poseidon to purchase RECs from CARB, CCAR or an Air District. Poseidon explained that Staff's interpretation would eliminate its ability to use RECs under the GHG Plan and would be contrary to the Commission's intent at the August 6, 2008 hearing. Poseidon believes that the plain language in the GHG Plan approved by the Commission allows it to purchase RECs from entities besides CARB, CCAR or the Air Districts, and that there was no discussion on the record modifying that language. Poseidon explained that

Staff's interpretation would eliminate its ability to fund specific, local renewable energy projects that are expressly identified in the GHG Plan, which would result in poor public policy and would conflict with established state policy in AB 32 that encourages renewable energy projects.

Regarding the second issue, Poseidon representatives indicated that the Staff failed to correctly incorporate a contingency in the GHG Plan findings allowing Poseidon to acquire offsets from entities other than CARB, CCAR, or the Air Districts in the event that these entities cannot provide sufficient offsets at a price reasonably equivalent to the general domestic market price. Poseidon explained that, instead, the Staff proposed findings imposing a "feasibility" requirement that does not make clear that Poseidon can seek to purchase offsets from other entities if the price of CARB/CCAR/Air District offsets is not reasonably consistent with domestic market prices. Poseidon explained that testimony in the record by Commissioner Hueso and Chair Kruer clearly indicates that the Commission intended for Poseidon to have access to this contingency if CARB, CCAR or the Air Districts could not provide offsets at a price reasonably equivalent to the domestic market price.

Poseidon representatives also indicated that they are in the process of working out one additional issue regarding the GHG Plan findings with Staff.

12/9/08
Date

Brian Baird, California Resources Agency,
Asst. Secretary for Ocean and Coastal Policy

W 16b

E-06-013

Revised Condition Compliance Findings
(Poseidon Resources Corporation)

CORRESPONDENCE

CALIFORNIA COASTAL COMMISSION
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W16b

REVISED CONDITION COMPLIANCE FINDINGS

November 26, 2008

RECEIVED
DEC 0 8 2008
CALIFORNIA
COASTAL COMMISSION

To: Commissioners and Interested Parties

From: Peter Douglas, Executive Director
Alison Dettmer, Deputy Director
Tom Luster, Staff Environmental Scientist

Regarding: **Condition Compliance for CDP No. E-06-013** – Poseidon Resources (Channelside), LLC; **Special Condition 10**: Submittal of a Energy Minimization and Greenhouse Gas Reduction Plan

Commissioners on Prevailing Side: Commissioners Achadjian, Blank, Burke, Hueso, Kram, Lowenthal, Neely, Potter, Reilly, and Chair Kruer

Exhibit 1: Carlsbad Seawater Desalination Project: August 2, 2008 cover letter and *Energy Minimization and Greenhouse Gas Reduction Plan*

Exhibit 2: Assembly Bill 32

Exhibit 3: Transcript of Commission deliberations, August 6, 2008

STAFF NOTE

Staff prepared these recommended Revised Findings based on the Commission's August 6, 2008 decision approving an Energy Minimization and Greenhouse Gas Reduction Plan for Poseidon Resources. Recommended changes from the August 6th document are shown in ~~strikethrough~~ and **underline** text.

~~Staff is aware of one area of disagreement with Poseidon regarding these recommended Revised Findings. Staff and Poseidon agree that the Commission approved those parts of Poseidon's Plan that provide emission reduction credit for the Plan's identified on-site and project-related emission reduction measures – including, but not limited to, projected reductions in State Water Project imports. However, based on review of the record before the Commission and of the hearing transcript, staff believe that the Commission required Poseidon to obtain any necessary remaining offsets, credits, or emission reduction measures through the California Air Resources Board (CARB), California Climate Action Registry (CCAR), or a California air district, unless otherwise authorized by the Executive Director. Poseidon, on the other hand, contends the~~

~~Commission allowed Poseidon to obtain a certain type of offset – a REC, or Renewable Energy Credit – from any third-party provider, and that Poseidon is to purchase through CARB, CCAR, or an air district only those offsets or credits that do not qualify as RECs.~~

~~Staff's position is based in part on the clear intent expressed by the Commission that any emission reduction measures Poseidon will need after accounting for its on-site and project-related measures are to be obtained and verified through CARB, CCAR, or an air district. Poseidon's position is based in part on text in its Plan that the Commission did not specifically change – particularly, a statement added to the August 2, 2008 version of the Plan providing that "[c]onsistent with Staff's recommendation, acquisition of RECs are not limited to purchase from CCAR, CARB, or any other Third Party Provider." Poseidon has also stated that it believes its Plan differentiates more generally between offsets and RECs.~~

~~Staff, however, believes Poseidon's contentions are not supported by the record or the hearing transcript. With regard to Poseidon's first contention, the quoted statement in the Plan is inaccurate and contradictory. The staff recommendation proposed that all emission reduction measures (apart from on-site measures that directly reduced the project's electricity use)be verified by CARB, CCAR, or an air district. It did not distinguish RECs from other forms of offsets. Moreover, the Plan Poseidon presented to the Commission (see Exhibit 1)describes offsets and credits interchangeably, and in fact defines a REC as a type of offset.~~[+] ~~The Plan also categorizes renewable energy projects not as RECs, but as a type of offset. In presenting its Plan to the Commission at the August 6th hearing, Poseidon also used the terms "offsets" and "credits" interchangeably, as did staff in its recommendation to the Commission based on Poseidon's proposal. Staff notes that in discussions with Poseidon prior to the Commission hearing, staff had recommended that both offsets and RECs be handled through one of the three entities referenced above. Finally, and importantly, the Commission in its discussion and its motions at the hearing clearly stated that Poseidon is to obtain its necessary offsets and credits through CARB, CCAR, or an air district in the same manner as other types of offsets, and made no distinction that would allow RECs to be handled differently (see, for example, pages 197, 200, and 211-213 of Exhibit 3). Staff therefore believes that the record viewed as a whole establishes that the Commission intended RECs to be handled through CARB, CCAR, or an air district in the same manner as other kinds of offsets.~~

[+] ~~Poseidon's Plan at pages 18 and 19 states:~~

> ~~An offset is created when a specific action is taken that reduces, avoids or sequesters greenhouse gas (GHG)emissions in exchange for a payment from an entity mitigating its GHG emissions. Examples of offset projects include, but are not limited to: increasing energy efficiency in buildings or industries, reducing transportation emissions,~~ ~~***generating electricity from renewable resources such as solar or wind***~~, ~~modifying industrial processes so that they emit fewer GHGs, installing cogeneration, and reforestation or preserving forests.~~
>
> ~~***One type of offset project is Renewable Energy Credits (RECs)***~~, ~~also known as Green Tags, Renewable Energy Certificates or Tradable Renewable Certificates. Each REC represents proof that 1 MW of electricity was generated from renewable energy (wind, solar or geothermal). For GHG offsetting purposes, purchasing a REC is the equivalent of purchasing 1 MW of electricity from a renewable energy source, effectively offsetting the GHGs otherwise associated with the production of that electricity... [emphasis added]~~

Staff ~~therefore~~ recommends the Commission ***approve*** these Recommended Revised Findings.

SUMMARY

On November 15, 2007, the Commission conditionally approved CDP E-06-013 for Poseidon Resources (Channelside), LLC (Poseidon)for construction and operation of a desalination facility to be located adjacent to the Encina Power Plant in Carlsbad, San Diego County. The Commission imposed as part of its approval ***Special Condition 10***, which required Poseidon to submit for further Commission review and approval, an Energy Minimization and Greenhouse Gas Reduction Plan (the Plan)(see the full text and requirements of ***Special Condition 10*** in Section 2.0 below).[2]

On July ~~7~~3, 2008, Poseidon submitted to Commission staff ~~its~~ a proposed Plan**, which staff received on July 7, 2008** ~~(see Exhibit 1)~~. **Commission staff reviewed the Plan and prepared a staff report for the August 2008 hearing recommending the Commission approve the Plan with modifications. After several conversations with Commission staff, Poseidon on August 2, 2008 submitted a revised Plan for Commission consideration (see Exhibit 1). At its August 6, 2008 hearing, the Commission approved the Plan submitted on August 2nd with modifications. Because the Commission's action differed from staff's recommendation, revised findings are necessary.** ~~This report provides staff's analysis of the Plan, staff's evaluation of whether the Plan conforms to **Special Condition 10** as described in the Findings, and staff's recommendation as to whether the Commission should approve the Plan.~~

~~In brief, staff's analysis shows that the Plan as submitted does not conform to **Special Condition 10**. However, if modified as described herein, staff believes the modified Plan would conform to **Special Condition 10**. Staff therefore recommends the Commission **approve** the Plan, as modified herein. The primary modifications staff has identified as being necessary for Plan approval are summarized below and are further detailed in Sections 1.1 and 4.0 of this memorandum.~~

~~Staff recommends the Plan be~~ **The Commission** modified **Poseidon's August 2, 2008 version of the Plan** as follows:

1) **Except as set forth in the Plan's contingency provisions (as described below in Section 4.0 of these Findings), Poseidon is to** ~~I~~implement the Plan**'s provisions regarding offsetting the project's net GHG emissions** using the protocols, criteria, and mechanisms provided by Assembly Bill 32 (AB 32):

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[2] The Commission's approval of this CDP also included **Special Condition 8**, which required Poseidon to submit for Commission review and approval a Marine Life Mitigation Plan. ~~That Special Condition and Poseidon's submitted plan are evaluated in a separate staff report under Item W5b of the August 6, 2008 Commission hearing.~~ **The Commission approved the Marine Life Mitigation Plan at that hearing. The recommended Revised Findings for that Plan are on the Commission's December 2008 hearing agenda as Item W16a.**

a. Use CARB-, ~~and/or~~ CCAR-, **or California Air District-**approved protocols and mechanisms for all emission reduction measures proposed**, except for Renewable Energy Credits ("RECs"),**[3] to ~~ensure~~ **offset the net GHG** emissions from Poseidon's purchased electricity ~~are "net zero"~~. **On-site and project-related measures identified in the Plan are used to calculate the project's net GHG emissions and therefore are not subject to the CARB, CCAR, or Air District requirements for offsetting the net GHG emissions.**[4] ~~This requirement does not apply to measures Poseidon identified in its Plan as "on-site" or "project-related" measures.~~

b. Join the CCAR "Climate Action Reserve" ~~and~~ **or** other entities that require the use of CARB-, ~~or~~ CCAR**-, and/or California Air District-approved** protocols to implement the Plan's emission reduction measures**, except for RECs,** and provide necessary accounting of those measures.

~~2) Submit annual reports for Executive Director review and approval that show the results of Poseidon's verified emission reduction measures as determined pursuant to CARB or CCAR approved verification procedures.~~

~~3) Modify the Plan's GHG template to conform to AB 32-based review processes.~~

~~4) Within 60 days of the Commission's approval of this modified Plan, submit for the Executive Director's review and approval a revised Plan that includes these modifications.~~

These recommended Revised Findings incorporate the modifications described above. Staff recommends the Commission *approve* these Findings.

~~Staff's main recommendation – that the Plan be implemented using AB 32 protocols for verifying greenhouse gas reductions – is based on recommendations from the California Air Resources Board, the San Diego Air Pollution Control District, the California State Lands Commission, and the California Energy Commission. The other recommendations are meant to help Poseidon and the Commission implement the Plan in a manner consistent with the Commission's approval and with AB 32.~~

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[3] **Each REC confirms that one megawatt of electricity was generated from renewable energy (wind, solar, geothermal, hydroelectric). The Plan provides that the acquisition of RECs is not limited to purchase from CARB, CCAR or any other designated provider.**

[4] **The "on site" and "project-related" measures identified in the Plan consist of the following:**

- **use of an energy recovery system for the desalination facility.**
- **implementation of "green building" design. • on-site solar power generation.**
- **addition of carbon dioxide (CO2)from a CO2 recovery facility into produced water.**
- **avoided emissions from reduced energy use at a Carlsbad water reclamation facility.**
- **avoided emissions from displaced imported water.**
- **avoided emissions from carbon sequestration in project-related wetland mitigation.**

~~With these modifications, staff believes Poseidon's Plan would conform to **Special Condition 10** and applicable provisions of the Commission's Findings. Further, staff believes that the modified Plan would also be fully consistent with the goals and provisions of AB 32. By using CARB and CCAR approved methods and protocols to quantify and verify its emission reductions, Poseidon would also be able to participate in the state's approved program, which will allow it to transition smoothly to any future AB 32 regulations that may apply to its facility.~~

TABLE OF CONTENTS

1.0 MOTION & RESOLUTION

Motion:

*"I move that the Commission **adopt the revised findings in support of the Commission's action on August 6, 2008 to** approve the Energy Minimization and Greenhouse Gas Reduction Plan ~~attached to the staff recommendation as Exhibit 1, if modified as shown in Section 1.1 below,~~ as compliant with* ***Special Condition 10*** *of CDP E-06-013."*

Resolution to Approve:

*The Commission hereby **adopts the findings set forth below for the Commission's approval of the Energy Minimization and Greenhouse Gas Reduction Plan as compliant with Special Condition 10 of CDP E-06-13 on the grounds that the findings support the Commission's decision made on August 6, 2008, and accurately reflect the reasons for it** ~~finds that the compliance plan titled "Carlsbad Seawater Desalination Project: Energy Minimization and Greenhouse Gas Reduction Plan" prepared and submitted by the permittee, Poseidon Resources (Channelside)LLC, dated July 3, 2008, if modified as shown in Section 1.1 of the July 24, 2008 Commission staff report, is adequate, if fully implemented to comply with **Special Condition 10** of CDP E-06-013~~.*

Staff Recommendation:

Staff recommends a **"YES"** vote **on the motion. Passage of this motion will result in the adoption of revised findings as set forth in this staff report. The motion requires a majority vote of the members from the prevailing side present at the revised findings hearing, with at least three of the prevailing members voting. Only those Commissioners on the prevailing side of the Commission's action are eligible to vote on the revised findings**~~, which will result in the **approval** of the modified plan as compliant with **Special Condition 10** and adoption of the motion, resolution, and findings herein. The motion passes only by an affirmative vote of a majority of the Commissioners present. Staff's recommended modifications are provided in Section 1.1 below, and are further detailed in Section 4.0 of this memorandum. If these recommended modifications are not incorporated into the Plan, staff recommends the Commission find the Plan, as submitted, does not conform to **Special Condition 10** and staff would therefore recommend the Plan be denied~~.

1.1 RECOMMENDED MODIFICATIONS TO POSEIDON'S PROPOSED PLAN

1) Implement the Plan**'s provisions regarding offsetting the project's net GHG emissions** using the protocols, criteria, and mechanisms provided by Assembly Bill 32 (AB 32)[5]:

   a) Use California Air Resources Board (CARB)**,** ~~and/or~~ California Climate Action Registry (CCAR)**, and/or California Air District** approved protocols and mechanisms for all emission reduction measures **proposed to offset the net GHG emissions from Poseidon's purchased electricity use, except for RECs[6]. On-site and project-related measures identified in the Plan are used to calculate the project's net GHG emissions and are therefore not subject to the CARB, CCAR, or Air District requirements regarding offsettingthe net GHG emissions.**[7] ~~proposed to ensure emissions from Poseidon's purchased electricity are "net zero".~~

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[5] See Exhibit 3: The Global Warming Solutions Act of 2006, also known as **Assembly Bill 32** (AB 32)– from http://www.arb.ca.gov/cc/docs/ab32text.pdf (last visited June 30, 2008).

[6] **As noted, each REC confirms that one megawatt of electricity was generated from renewable energy (wind, solar, geothermal, hydroelectric). The Plan provides that the acquisition of RECs is not limited to purchase from CARB, CCAR or any other designated provider.**

[7] ~~This would not include measures Poseidon implments at the desalination facility to avoid or reduce its need for purchased electricity. These measures include, for example~~**The on-site measures consist of**:

- Poseidon's installation of a high efficiency energy recovery system;
- Its use of green building design components; and,
- Installation of solar photovoltaics on the facility's roof to generate electricity for Poseidon's use.

Each of these measures, if implemented, would result in the facility needing less purchased electricity, which would therefore reduce the GHG emissions for which Poseidon's emission reduction measures would be needed.

b) Join the CCAR "Climate Action Reserve" and other entities that require the use of CARB-**,** ~~or~~ CCAR-**, or California Air District-**approved protocols to implement the Plan's emission reduction measures and provide necessary accounting of those measures**, except for RECs**.

~~2) Submit annual reports for Executive Director review and approval that show the results of Poseidon's verified emission reduction measures as determined pursuant to AB 32-approved review processes.~~

~~3) Modify the Plan's GHG template to conform to AB 32-based review processes.~~

~~4) Within 60 days of the Commission's approval of this modified Plan, submit for the Executive Director's review and approval a revised Plan that includes these modifications.~~

2.0 STANDARD OF REVIEW

The ~~Commission must determine whether the~~ subject plan **must** conform~~s~~ to ***Special Condition 10*** of CDP E-06-013, which states:

> *PRIOR TO ISSUANCE OF THE PERMIT, the Permittee shall submit to the Commission a Revised Energy Minimization and Greenhouse Gas Reduction Plan that addresses comments submitted by the staffs of the Coastal Commission, State Lands Commission, and the California Air Resources Board. The permit shall not be issued until the Commission has approved a Revised Energy Minimization and Greenhouse Gas Reduction Plan after a public hearing.*

As shown in the **Permit** Findings and in the Commission's November 15, 2007 hearing transcript, Poseidon offered as part of the project to make its facility operations "carbon neutral" or "net carbon neutral".[8] It offered a Climate Action Plan to implement this part of its project. The Commission required through ***Special Condition 10*** that Poseidon submit a revised Plan to ensure conformity to applicable Coastal Act provisions. In its **Permit** Findings, the Commission stated that this Plan was to "ensure that Poseidon minimizes ~~electricity~~ **energy** consumption of

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The "project-related" measures Poseidon identified in its Plan are recovery of CO2 for injection into produced desalinated water, emission reductions from reducing electricity used at the Carlsbad water treatment facility, avoided emissions expected from imported water offsets, and carbon sequestration in the project's wetland mitigation site(s).

[8] These terms generally refer to a broader range of emissions than are addressed in Poseidon's Plan. For example, "carbon neutral" is defined as providing mitigation for the amount of carbon emitted from both direct and indirect emissions. Poseidon's Plan identifies only those indirect emissions that would result from Poseidon's use of electricity generated by, and purchased from, SDG&E **(or any other entity from which the desalination facility may obtain all or part of its electricity in the future)**, and proposes mitigation for just those emissions. Similarly, the analyses in the Findings and in this memorandum are focused only on identifying, avoiding, reducing, offsetting, or otherwise mitigating just those indirect emissions rather than the full suite of emissions that would need to be addressed to determine whether the project was "carbon neutral".

the project and mitigates any effects ~~of the project's emissions~~ on coastal resources **<u>of the project's net GHG emissions</u>**..." The Plan was to ensure that the project would "avoid, minimize, or mitigate adverse impacts to a wide range of coastal resources, including public access, recreation, marine resources, wetlands, ESHA, agriculture, natural land forms, and existing development associated with its minimized and mitigated energy consumption." The Commission further found that, with such a Plan, the project would be consistent with the requirements of Section 30253(4)and other relevant Coastal Act provisions related to minimizing energy use and mitigating any adverse effects on coastal resources from greenhouse gas emissions.

2.1 APPLICABILITY OF AB 32

In reviewing the proposed Plan for conformity to ***Special Condition 10*** and the Commission's **<u>Permit</u>** Findings, staff used as guidance the state's primary statute applicable to greenhouse gas emissions reductions. The Global Warming Solutions Act of 2006 (AB 32)is California's landmark greenhouse gas (GHG)emissions reduction law (see Exhibit 2). It sets a statewide target to reduce GHG emissions in the state to 1990 levels by 2020. This target will be achieved through the implementation of regulations, policies, and programs that lead to maximum technically feasible and cost-effective emission reduction measures.

Role of the California Air Resources Board (CARB): AB 32 recognizes CARB as the agency primarily responsible for implementing its provisions. Last year, CARB adopted regulations that require certain entities to report and verify their GHG emissions and to monitor those emissions and enforce compliance.[9] In June 2008, CARB released its draft AB 32 implementation scoping plan. AB 32 also directs CARB to adopt regulations on GHG limits and emissions reductions measures by January 2011 and to implement those regulations by January 2012.

CARB is anticipating that it will first focus on developing regulations for the largest sources of GHGs and that it will phase in additional sources later. However, reaching the statewide target will also depend on GHG emitters that are not initially regulated to voluntarily undertake actions to reduce or mitigate their GHG emissions. In recognition of this need, AB 32 includes several provisions to adopt acceptable methods for verifying and quantifying voluntary emissions reductions that may be used to meet the AB 32 goals. For example, AB 32 requires CARB to adopt a plan by 2009 that identifies how the state will meet its goal of reducing emissions to their 1990 levels, and that plan is to, among other things, "identify opportunities for emission reductions measures from all verifiable and enforceable voluntary actions, including, but not limited to, carbon sequestration projects and best management practices".[10] Further, the regulations AB 32 requires be adopted by 2011 are to "ensure that entities that have voluntarily reduced their greenhouse gas emissions prior to the implementation of this section receive

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[9] *See* Air Resources Board, Mandatory Reporting of GHG Emissions, http://www.arb.ca.gov/regact/2007/ghg2007/ghg2007.htm (last visited June 30, 2008).

[10] See Section 38561(f).

appropriate credit for early voluntary reductions".[11] In support of this policy, AB 32 also requires CARB to adopt methods to quantify voluntary GHG emission reductions.[12]

Relevance of AB 32 to Special Condition 10 and Poseidon's proposed Plan: AB 32 clearly anticipates and applies to the types of emission reductions that will be needed from entities like Poseidon – that is, entities that may not initially be regulated directly through AB 32, but that are implementing measures meant to conform to other requirements and be consistent with AB 32. The statute applies to all sources of GHG emissions and, as mentioned above, explicitly includes electricity consumed in the state (see AB 32, Section 38530(b)(2)). Any new, large, significant electricity load will make reaching this statewide target more difficult. Poseidon's desalination facility will be a new, large, significant electricity consumer, thereby increasing the electricity sector's GHG emissions at a time when a statewide effort is underway to dramatically decrease this source of emissions. By implementing its proposed Plan using AB 32 guidance and regulations, Poseidon will likely minimize GHG emissions in a manner that is well integrated with AB 32's framework.

Poseidon's desalination facility is not anticipated to be included in the initial regulatory mechanism CARB plans to implement in 2012. Therefore, although Poseidon's proposed GHG emissions reduction measures are required pursuant to **Special Condition 10** of its coastal development permit, they would be reviewed as "voluntary" measures for purposes of AB 32. As noted above, AB 32 establishes provisions to ensure such "voluntary" measures meet AB 32 standards, and CARB has already adopted some regulations to ensure voluntary measures are consistent with AB 32, and is planning to adopt additional similar regulations. For example, CARB has established protocols for voluntary forestry projects meant to sequester carbon, and Commission staff and other agencies have recommended that Poseidon follow these protocols to implement its $1 million ~~purchase of trees for carbon sequestration~~ **payment for reforestation of areas in San Diego County burned by the 2007 wildfires**. These protocols will allow Poseidon's anticipated carbon "credits" to be quantified and verified and meet other applicable AB 32 provisions. CARB is expected to approve additional methodologies and protocols during the next several years that will allow Poseidon to participate in other verified emission reduction programs.

CARB is also scheduled in 2009 to require emission reporting from electricity-generating facilities, including San Diego Gas & Electric Company (SDG&E), from which Poseidon plans to purchase its electricity.[13] In recognition of this requirement, Commission staff recommended

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[11] See Section 38562(b)(3).

[12] Section 38571 states: *"The state board shall adopt methodologies for the quantification of voluntary greenhouse gas emission reductions. The state board shall adopt regulations to verify and enforce any voluntary greenhouse gas emission reductions that are authorized by the state board for use to comply with greenhouse gas emission limits established by the state board. The adoption of methodologies is exempt from the rulemaking provisions of the Administrative Procedure Act (Chapter 3.5 (commencing with Section 11340)of Part 1 of Division 3 of Title 2 of the Government Code)."*

[13] Personal communication between Commission staff and CARB staff on June 5, 2008. According to CARB staff, SDG&E will be required to report to CARB by June 2009 its 2008 GHG emissions. The emission report is to be

to Poseidon that the emission factors[14] and emission reductions in its Plan be based on the mandatory reports provided to CARB. For the period before these mandatory reports are required, Commission staff accepted Poseidon's proposal to use SDG&E's voluntary reports to the California Climate Action Registry.

AB 32 also recognizes the California Climate Action Registry (CCAR)as one of the mechanisms to be used to implement the state's GHG emission reduction programs. CCAR is a non-profit public organization initiated by the State of California to serve as a voluntary GHG registry to encourage and protect early actions to reduce GHG emissions. CCAR has established the Climate Action Reserve, which is specifically designed for the voluntary GHG emission reduction market and provides accurate and transparent measurement, verification, and tracking of GHG reduction projects and their inventories of GHG reduction tons, thus assuring a high degree of reliability. Commission staff ~~has~~ recommended that Poseidon join CCAR's Reserve and use it in implementing its proposed emission reduction measures.

Based on the above, it is appropriate for the Commission to use AB 32 and its implementing regulations, protocols**,** criteria, and mechanisms as the basis for its review and approval of **the provisions of** Poseidon's Plan **regarding offsetting the project's net GHG emissions, except for RECs. The Commission includes the Plan's identified on-site and project-related measures as part of Poseidon's calculation of the project's net GHG emissions and these measures therefore will not be subject to the Commission's requirement that Poseidon use CARB-, CCAR-, or Air District- approved AB 32 protocols regarding offsets for net GHG emissions.** This approach is supported by other agencies that have been involved in Commission staff's review, including CARB, the San Diego Air Pollution Control District (SDAPCD), the State Lands Commission (SLC), and the California Energy Commission (CEC), all of which requested that Poseidon use AB 32 provisions to develop and implement its Plan. ~~Staff believes that i~~Implementing Coastal Act requirements using the terms, criteria, and mechanisms provided through AB 32 would result in the Plan's conformity to **Special Condition 10**. Additionally, ~~staff believes~~ this would ensure the Plan is consistent with the state goals and targets expressed in AB 32, and would result in maximum credible and verifiable emissions reductions.

Relationship between AB 32 and the Coastal Act: ~~Staff believes t~~This approach would also be fully consistent with Coastal Act Section 30414. For example, Section 30414(c)states:

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verified by an accredited third party by December 2009, and by February 2010, annual reports will be available to the public.

[14] An emission factor represents the average amount of GHG emissions produced from an electricity generator's portfolio of energy sources as measured in pounds per megawatt-hour. Each type of electricity generator has a different emission factor – for example, a natural gas-fired power plant may produce 800 pounds of GHG emissions for every megawatt-hour of electricity it produces, and a coal-fired plant may produce 2000 pounds of GHG emissions for the same amount of electricity. SDG&E's emission factor varies each year based on where it purchases or generates its electricity – for example, its emission factor this year was about 780 pounds per megawatt-hour and its previous emission factor was less than 600 pounds per megawatt-hour. SDG&E currently certifies its annual emission factor using CCAR, and will be required to certify it through CARB starting in 2009.

The State Air Resources Board and any air pollution control district may recommend ways in which actions of the commission or any local government can complement or assist in the implementation of established air quality programs.

As noted above, both CARB and the SDAPCD are implementing provisions of AB 32 and have recommended the Commission and Poseidon use AB 32 as the basis of the proposed Plan**'s provisions regarding offsetting the project's net GHG emissions**. ~~Staff believes t~~**T**he Commission's action requiring the use of these provisions would also be consistent with Section 30414(a), which recognizes that CARB and the state's regional air pollution control districts are the principal agencies responsible for establishing air quality and emission standards. Section 30414 states, in relevant part, that the Coastal Act does not authorize the Commission "to establish any ambient air quality standard or emission standard, air pollution control program or facility, or to modify any ambient air quality standard, emission standard, or air pollution control program or facility which has been established by the state board or by an air pollution control district." The Commission's requirement that Poseidon implement **the offset provisions of** its Plan in a manner consistent with AB 32 ensures that the Plan is consistent with and supportive of programs established by CARB or the SDAPCD, and does not establish or modify emissions standards or programs. Further, this approach is consistent with AB 32's Section 38598(a), which states that "nothing in this division shall limit the existing authority of a state entity to adopt and implement greenhouse gas emissions reduction measures." As noted in the **Permit** Findings, the Commission determined that Poseidon must mitigate for its indirect GHG emissions and their effects on coastal resources.

Applicability of AB 32 goals, terms, criteria, and related mechanisms to ensure emissions reductions: Commission staff incorporated into its review several of the relevant terms defined in AB 32, including the following:

- "***Greenhouse gas***" or "***greenhouse gases***": Section 38505(g)states that greenhouse gas or gases "includes all the following gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexaflouride."

- "***Statewide greenhouse gas emissions***": Section 38505(m)defines these as "the total annual emissions of greenhouse gases in the state, including all emissions of greenhouse gases from the generation of electricity delivered to and consumed in California, accounting for transmission and distribution line losses, whether the electricity is generated in state or imported. Statewide emissions shall be expressed in tons of carbon dioxide equivalents."

  ~~Commission staff recognizes that t~~**T**he desalination facility will contribute to "statewide greenhouse gas emissions" because its baseline electricity use ~~will~~ **is expected to** result in about 90,000 tons of CO_2 each year. As noted in AB 32, any new, large, significant electricity load, such as that represented by Poseidon's desalination facility, will unless adequately mitigated, adversely affect the electricity sector's ability to achieve statewide targets.

- "***Emissions reduction measure***": Section 38505(f)defines these as "programs, measures, standards, and alternative compliance mechanisms authorized pursuant to this division, applicable to sources or categories of sources, that are designed to reduce emissions of greenhouse gases."

  Commission staff reviewed Poseidon's Plan based on this definition, which encompasses all the proposed measures, offsets, reductions, or other methods Poseidon proposes in its Plan – that is, all the measures Poseidon proposes to meet a "net zero" emission level for its use of purchased electricity are considered by AB 32 to be "emission reduction measures". As noted ~~throughout this memorandum~~ **previously in these Findings**, three of the **on-site** measures Poseidon currently proposes would not be subject to this review, because**, if implemented,** they **would** result in direct reductions of Poseidon's purchased electricity use and therefore reduce the amount of emissions that must be accounted for – these include Poseidon's installation of a high efficiency energy recovery system, its use of green building design components, and its installation of solar photovoltaics on the facility roof to generate electricity for Poseidon's use. **The Commission also finds that the project-related measures Poseidon identified in its Plan are not subject to this review. These measures are the use of recovered CO2 for injection into water produced at the facility, emissions avoided by reducing energy needs at the Carlsbad water reclamation facility, emissions avoided from the expected displacement of imported water, and sequestration from project-related wetland mitigation. The Commission is satisfied that these project-related measures will reduce the GHG emissions attributable to the project and that they therefore should be included in the calculations used to determine the project's net GHG emissions. This approach was supported by the Chair of the California Air Resources Board, the Executive Director of the California Energy Commission, and the General Manager of the Metropolitan Water District. Only the remaining provisions of the Plan intended to offset the project's net GHG emissions, except for RECs, are subject to CARB-, CCAR-, or Air District-approved AB 32 protocols.**

AB 32 also identifies six criteria to be used to determine whether proposed GHG emission reduction measures are adequate to ensure conformity to AB 32. The criteria, at Section 38562(d)require that any measures approved by CARB are "real", "permanent", "quantifiable", "verifiable", "enforceable", and are "in addition to" any GHG emission reduction otherwise required by law or regulation and any other GHG emissions reduction that otherwise would occur. While AB 32 does not define these criteria, CARB staff indicated that they are defined in other state air regulations and recommended those existing definitions be used, such as:[15]

- "Real" and "in addition to": Real or additional emission reductions are those that have actually occurred, not emissions that could have been emitted but were not or are avoided

[15] CARB staff stated examples of criteria definitions were available from various sources, such as 2008 modifications to its regulations for reporting GHG emissions at (17 CCR Subchapter 10), San Diego Air Pollution Control District's August 2004 operating permit regulations (Regulation XIV, Title V), August 2004 proposed rulemaking to control GHG emissions from motor vehicles, etc.

emissions. This means that the emission reductions result from actions taken that are beyond the course of normal activity such that the emission reductions are not considered "business as usual."

- "Permanent": Permanent means that the life of the emission reductions is reasonably established and commensurate with the proposed use of the credits. Projects should be "irreversible"; that is, the reductions achieved should not be subject to backsliding or vulnerable to changes in external conditions.
- "Quantifiable": Quantifiable means that the amount of the emission reductions can be measured with reasonable certainty.
- "Verifiable": Verification means the process used to ensure that an operator's emissions data report is free of material misstatement and complies with CARB's procedures and methods for calculating and reporting GHG emissions.
- "Enforceable": Enforceable means that the reductions can be independently verified and are legally binding. Enforcement is an essential element of any alternative compliance strategy. Projects thus must be accessible to inspection by California staff.

As recommended by CARB and other agencies, Commission staff provided in its review of Poseidon's proposed Plan an initial application of these six criteria to assess whether Poseidon's suggested emissions reduction measures might conform to AB 32. ~~Staff's conclusions,~~ **The Commission finds** in Section 4.0 of **these Findings that emission reduction measures to offset the project's net GHG emissions, except for RECs, must comply with CARB-, CCAR-, and/or Air District-approved measures and protocols and that Poseidon must purchase or implement these offsets through CCAR, CARB, or a California air district. If offsets cannot** ~~feasibly~~ **be acquired through these entities** ~~due to price or inadequate supply~~ **at a price that is reasonably equivalent to the price for offsets in the broader domestic market, Poseidon may request the Commission's Executive Director to approve purchases of offsets or implementation of projects from other entities. Poseidon may also, upon approval of the Executive Director or the Commission, deposit funds into an escrow account in lieu of purchasing offsets/RECs in the event that (i)offset/REC projects in an amount necessary to mitigate the Project's net indirect GHG emissions are not reasonably available; (ii)the "market price" for carbon offsets or RECs is not reasonably discernable; (iii)the market for offsets/RECs is suffering from significant market disruptions or instability; or, (iv)the market price has escalated to a level that renders the purchase of offsets/RECs economically infeasible to Poseidon. The funds placed in escrow will be paid in an amount equal to $10 per metric ton, adjusted for inflation from 2008, and will be used to fund offset projects as they become available, with the Executive Director or Commission determining the entities that may use these funds and the time periof for which this contingency may be used. With these modifications, the Plan is consistent with *Special Condition 10* and applicable Coastal Act requirements** ~~this memorandum, suggest that several of Poseidon's proposed measures would likely conform to the criteria; however, as~~

~~reflected in staff's recommendations, the actual assessment of Poseidon's proposals, should be done by a certified independent verifier as established through AB 32~~.

~~In sum, Commission staff, on advice from CARB and other agencies, have recommended that Poseidon implement its Plan consistent with the provisions, guidance, and regulations established pursuant to AB 32, and that the Commission base its approval and ongoing review of Poseidon's Plan on the guidance provided by AB 32.~~

3.0 PLAN DEVELOPMENT AND REVIEW

Between November 2007 and July 2008, Commission staff worked with Poseidon and with other agencies to develop an acceptable Plan to present for Commission review and approval. Commission staff's research included determining appropriate GHG accounting methods, evaluating current and pending legislation related to GHG emission reductions, identifying and assessing the effectiveness of various measures meant to avoid or reduce GHG emissions, and other similar issues. Commission staff met with Poseidon and agency representatives at various times during the process to discuss various proposed modifications to the Plan, determine the feasibility and effectiveness of proposed measures, and develop other aspects of the Plan. Throughout the process, Commission staff provided comments and guidance to Poseidon, and Poseidon provided several drafts of its proposed Plan.

This review process included Commission staff hosting a May 2, 2008 interagency meeting in Carlsbad. The purpose of the meeting was to inform other involved agencies about the status of Poseidon's Plan and to seek input and guidance from those agencies about the proposed approach, about potential mitigation projects for Poseidon to develop, and to establish contacts for ongoing review. Along with Commission staff and Poseidon, participants included:

California State Lands Commission
California Energy Commission
California State Parks
California Department of Forestry & Fire Protection
San Diego Air Pollution Control District
San Diego Association of Governments
San Diego County Water Authority
City of Carlsbad
City of Vista

Through this process, and with the assistance and guidance from these agencies as well as CARB, Commission staff developed the recommended modifications ~~described in Sections 1.1 and 4.0 of this memorandum for Poseidon to incorporate into in its Plan. The recommendations also provide the basis for the analyses herein~~ **<u>to Poseidon's Plan</u>**.

On July 7, 2008, Commission staff received a ~~the currently~~ proposed Plan for review by the Commission. **<u>After several conversations with Commission staff, Poseidon subsequently submitted a revised Plan on August 2, 2008. At its August 6, 2008 hearing, the Commission approved the revised Plan with modifications as described herein.</u>**

4.0 ANALYSIS FOR CONFORMITY TO ADOPTED FINDINGS & SPECIAL CONDITION 10

Special Condition 10 states:

- *PRIOR TO ISSUANCE OF THE PERMIT, the Permittee shall submit to the Commission a Revised Energy Minimization and Greenhouse Gas Reduction Plan that addresses comments submitted by the staffs of the Coastal Commission, State Lands Commission, and the California Air Resources Board. The permit shall not be issued until the Commission has approved a Revised Energy Minimization and Greenhouse Gas Reduction Plan after a public hearing.*

The **Permit** Findings state that this Plan is to ensure that Poseidon minimizes its ~~electricity~~ **energy** consumption and mitigates any effects ~~of indirect emissions resulting from the project's use of purchased electricity~~ on coastal resources **of the Project's net GHG emissions** to ensure conformity to Coastal Act Section 30253(4)and other applicable Coastal Act provisions.

Section 4.1 below provides a description of the submitted Plan's key elements. The Plan **submitted by Poseidon on August 2, 2008** is attached as Exhibit 1. ***Sections 4.2*** ~~through 4.4~~ describes ~~staff's recommended~~ **the** modifications ~~needed~~ to **the Plan adopted by the Commission that will** ensure the Plan conforms to the Adopted **Permit** Findings and ***Special Condition 10***. ~~Each section also includes concerns Poseidon expressed about the recommendations and staff's response to those concerns.~~ Briefly, the ~~recommended~~ modifications described herein are:

- **Section 4.2:** Implement the Plan**'s provisions regarding offsetting the project's net GHG emissions** using the protocols, criteria, and mechanisms provided by Assembly Bill 32 (AB 32):
  - o ***Section 4.2.1*** – Use CARB-**,** ~~and/or~~ CCAR-**, and/or California Air District-** approved protocols and mechanisms for all emission reduction measures **(except for RECs)** proposed to ~~ensure emissions from Poseidon's purchased electricity are "net zero"~~ **offset the net GHG emissions from Poseidon's purchased electricity are "net zero". On-site and project-related measures in the Plan are used to calculate the project's net GHG emissions and therefore are not subject to CARB, CCAR, or Air District requirements for offsetting the net GHG emissions.**[16]

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[16] **On-site measures consist of:**

- **Poseidon's installation of a high efficiency energy recovery system;**
- **Its use of green building design components; and,**
- **Installation of solar photovoltaics on the facility's roof to generate electricity for Poseidon's use.**

Each of these measures, if implemented, would result in the facility needing less purchased electricity, which would therefore reduce the GHG emissions for which Poseidon's emission reduction measures would be needed.

- o ***Section 4.2.2*** – Join the CCAR "Climate Action Reserve" and other entities that require the use of CARB-, ~~or~~ CCAR-**, or California Air District**-approved protocols to implement the Plan's emission reduction measures and provide necessary accounting of those measures**, except for RECs**.

- ~~**Section 4.3:** Submit annual reports for Executive Director review and approval that show the results of Poseidon's verified emission reduction measures as determined pursuant to AB 32-approved review processes.~~

- ~~**Section 4.4:** Modify the Plan's GHG template to conform to AB 32-based review processes.~~

~~**The key recommended modifications are those in Section 4.2 related to the Plan's use of AB 32. Poseidon states that parts of its Plan are meant to be consistent with AB 32, and although staff's analysis shows that the Plan, as submitted, is not yet consistent with AB 32's protocols regarding reducing and offsetting GHG emissions, staff believes it would be if modified as recommended in Section 4.2. The recommendations in Sections 4.3 and 4.4 would change the process Poseidon has proposed for Plan review in a manner consistent with AB 32 provisions and in a way that would ensure the Commission has adequate certainty and oversight over ongoing condition compliance. Similarly, staff's recommendation in Section 1.1 that Poseidon submit a revised Plan that incorporates these modifications would assist the Commission in ensuring conformity to its decision.**~~

4.1 PLAN DESCRIPTION

Poseidon's submitted Plan include~~s~~d three main steps for the desalination facility to accomplish "net zero" emissions from its electricity use:

1) Identify the amount of indirect GHG emissions: determine by multiplying annual electricity use (as measured by electric meter readings of delivered electricity)by the annual emission factor certified by CARB or CCAR.

2) Identify on-site and project-related reduction of indirect GHG emissions. This includes seven proposed measures to reduce emissions.

3) Identify mitigation options to offset any remaining indirect GHG emissions. These include:

   - A proposed process for obtaining, reviewing, approving, and validating emission reduction projects, including formation of a committee and database.
   - An annual process to "true-up" emission reduction credits

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The "project-related" measures Poseidon identified in its Plan are recovery of CO2 for injection into produced desalinated water, emission reductions from reducing electricity used at the Carlsbad water treatment facility, avoided emissions expected from imported water offsets, and carbon sequestration in the project's wetland mitigation site(s).

- A contingency approach if Poseidon determines no GHG emission reduction projects are reasonably available.
- A contingency approach if new GHG emission reduction regulatory programs are created.
- Examples of potential emission reduction projects.
- A general description of Poseidon's reforestation sequestration project.
- A table reflecting Poseidon's projected annual net-zero GHG emissions balance.
- An implementation schedule that includes an annual report to the Commission describing Poseidon's conformity to the above provisions.

The Plan's focus ~~is~~**was** on the process by which Poseidon will select and implement its emission reduction measures. Because Poseidon does not anticipate operating its facility for about three years, and because the policies, regulations, and acceptable emission reduction measures are expected to change significantly over the next three years and beyond, many of the measures described in the Plan are subject to change and additional review. Given these likely changes, **the** Commission ~~staff~~ concurs with Poseidon that the ~~Commission's approval~~ **Plan** should emphasize the process by which Poseidon will identify, select, and verify its emission reduction measures. However, as shown in the discussions below, ~~staff believes~~ **the Commission required** the Plan**'s provisions regarding offsetting the project's net GHG emissions,** ~~as submitted, is not adequate~~ **be modified** to ensure conformity to *Special Condition 10* ~~or~~ **and** the Commission's direction as expressed in the **Permit** Findings.

Section II.A of the Plan also requires the desalination facility to incorporate on-site energy minimization features including numerous Project components designed to ensure that the Project will use only the minimum energy necessary. These include energy efficiency measures like the state of the art "pressure exchanger" energy recovery technology that allows recovery and reuse of 33.9% of the energy associated with desalination's reverse osmosis process, as well as high efficiency and premium efficiency motors and variable frequency drives on the intake water pumps to improve their efficiency. As discussed below, the Commission finds that these energy minimization measures will reduce impacts to coastal resources that would have been caused through additional energy usage, and will minimize energy consumption consistent with Coastal Act section 30253(4)and other applicable Coastal Act policies.

4.2 ~~RECOMMENDATION – USE PROVISIONS~~ APPLICATION OF AB 32

~~Staff's~~ **A** central issue of concern is ~~an inability to verify~~ **verification of** the Plan's ~~emission reductions~~ **offsets of the net GHG emissions** against accepted protocols and criteria. ~~This results in a lack of assurance that the proposed~~**Adequate protocols and criteria are necessary to ensure that the** Plan**'s offset provisions** will provide the stated level of mitigation – that is, a "net zero" increase in indirect **net** GHG emissions from the facility's operations.

~~Staff's k~~**K**ey concerns include the following:

- **Poseidon had proposed using several sets of criteria and various third-party providers to implement its Plan.** The process proposed in the Plan would not ~~provide~~

~~verification for most of the proposed emission reduction measures, including those that Poseidon is relying on for the bulk of its emission reductions. The Plan creates a new category of emission reductions – "project-related" measures – and suggests these should be evaluated under criteria unique to this project. Staff believes these measures, regardless of the term used to describe them, would best be reviewed using~~ **necessarily use** the protocols, mechanisms, and criteria established by CARB**,** ~~or~~ CCAR**, or a California Air District** pursuant to implementation of AB 32.

- ~~The Plan would establish a committee to select and verify Poseidon's emission reduction measures; however, this committee would not provide the degree of third-party independence identified in AB 32 as necessary for emission reduction verification.~~

- The Plan ~~does~~ **as proposed would** not provide assurance that adequate emission reductions would ever be implemented due to its contingency provision that would allow Poseidon to forego mitigation when it deems market conditions to be unfavorable. In lieu of mitigation, Poseidon states that it would deposit $10 per ton of unmitigated GHG emissions into an escrow account, but the Plan does not describe how these funds would be used.

~~Staff's recommended modifications are meant to~~**The modifications adopted by the Commission** resolve these **and other** concerns and to ensure the Plan would conform to ***Special Condition 10*** **and Coastal Act requirements**. Further, ~~staff believes~~ these modifications will provide Poseidon with the certainty and flexibility needed for it to select and implement verifiable emission reduction measures to operate at its anticipated "net zero" level of indirect electricity-related emissions *and* to be credited for its efforts as part of the state's approach under AB 32. These are each described in detail below.

4.2.1 *Use CARB~~-~~, ~~and/or~~ CCAR~~-~~, and/or California Air District-approved protocols and mechanisms for emission reduction measures.*[17]

As noted in Section 2.0, AB 32 includes a number of provisions meant to apply to emission reductions measures such as those Poseidon is proposing **to offset its net GHG emissions**. ~~Staff's primary recommendation is~~**The Commission's primary modification is to require** that Poseidon's Plan use these provisions to ensure ~~its~~ **these** proposed emission reduction measures **(i.e., those needed to reach net zero emissions after on-site and project-related measures are factored in), except for RECs,** fit within the framework California has established for this type of project. The existing or anticipated protocols and mechanisms being implemented by CARB**,** ~~and~~ CCAR**, and/or California Air Districts** pursuant to AB 32 can be used to evaluate~~d~~ ~~Poseidon's~~ **these** proposed emission reduction measures**, except for RECs.**

The ongoing implementation of AB 32 has jumpstarted the voluntary emission reduction market in California, although similar to the situation elsewhere, it is not always clear that measures being proposed are real or verifiable. AB 32 addresses this issue by requiring CARB to develop approved methodologies and protocols for the voluntary market that meet the AB 32 criteria – that the emission reduction measures are real, permanent, quantifiable, verifiable, enforceable, and additional to any reduction that would otherwise occur. By 2012, CARB will have a list of CARB-approved project protocols and CARB-accredited verifiers to identify valid emission reductions. CARB has already approved a forestry-project protocol and is in the process of reviewing additional protocols.

CCAR, like CARB, also approves project protocols and third-party verifiers for the voluntary GHG emission reduction market, pursuant to AB 32.[18] CCAR currently has certified project protocols for forestry, landfill, and livestock projects. As mentioned above, CARB has already approved the forestry protocol and is in the process of reviewing the CCAR-approved livestock project protocol. CCAR estimates that by 2009 it will have approved several additional CCAR project protocols and it has just issued a Request for Proposals to begin work on ten new project

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[17] **As noted previously, T**~~t~~his would not include measures Poseidon implements at the desalination facility to avoid or reduce its need for purchased electricity~~. These measures include, for example~~:

- Poseidon's installation of a high efficiency energy recovery system;
- Its use of green building design components; and,
- Installation of solar photovoltaics on the facility's roof to generate electricity for Poseidon's use.

Each of these measures, if implemented, would result in the facility needing less purchased electricity, which would therefore reduce the GHG emissions for which Poseidon's emission reduction measures would be needed.

This would also not include the "project-related" measures Poseidon identified in its Plan – i.e., recovery of **CO2 for injection into produced desalinated water, emission reductions from reducing electricity used at the Carlsbad water treatment facility, avoided emissions expected from imported water offsets, and carbon sequestration in the project's wetland mitigation site(s).**

[18] Section 38530(b)(1)directs CARB to, "where appropriate and to the maximum extent feasible, incorporate the standards and protocols developed by the CCAR."

protocols. Staff notes that CCAR's approved protocols have received strong support within California.[19]

Poseidon is concerned that some of its proposals **for offsetting the project's net GHG emissions** do not yet have accepted protocols and it would not be able to get emission reduction credits for them – that is, Poseidon has proposed a number of emission reduction measures that cannot yet be quantified or verified using adopted protocols. ~~Staff notes, however, that o~~**O**ne of Poseidon's key proposals – its $1 million ~~tree purchase for sequestration~~ **payment for reforestation of areas in San Diego County affected by the 2007 wildfires** – does have approved protocols in place, and that other protocols are being developed over the next several years **and may be in place** before Poseidon plans to start operations. Further, and importantly, California's emission reduction framework is based on accepting only those emission reduction measures that can be verified. Verification relies on there being accepted protocols by which to determine the validity, extent, and effectiveness of any emission reduction measure. ~~For example, Poseidon has offered to verify the emission reductions it expects from its proposed imported water offsets by providing Commission staff a contract from the Metropolitan Water District that confirms the offsets; however, staff is uncertain as to whether this contract would adequately verify that these expected emission reductions would occur. Staff suggests, therefore, that the Commission address this concern *not* by accepting proposed measures for which there is a current lack of approved protocols, but by ensuring that whatever measures Poseidon proposes in its Plan are verified using approved protocols. Staff believes t~~**T**he best way to ensure Poseidon's Plan provides the intended result – that is, to mitigate for Poseidon's **net** indirect GHG emissions – is for the Plan**'s offset provisions** to be based on the protocols and mechanisms that are already approved or that will be approved pursuant to AB 32. ~~Staff therefore recommends that~~ **The Commission's approval therefore requires that, with respect to offsetting the project's net GHG emissions (i.e., for other than Poseidon's identified on-site and project-related measures), except for RECs,** Poseidon ~~to~~ **must** select emission reduction measures and project proposals for which there are CARB-**,** or CCAR-**, or California Air District**-approved project protocols and **must** purchase emission reduction **offsets or** credits**,** **except for RECs,** approved by CARB-**,** ~~or~~ CCAR-**, or California Air District**-accredited verifiers.

Additionally, for proposed emission reduction measures that may be unique to Poseidon and do not have approved protocols, there are mechanisms in place that would allow Poseidon to propose protocols for CARB to approve. CARB has already initiated this "one-off" process for ten projects, and this same process is available for Poseidon to ensure its proposed measures conform to provisions of AB 32.

[19] For example, the CARB Chair, Mary Nichols, has stated that, "the Registry's Forest Protocols are among the world's most accurate and environmentally sound, which led the State of California to adopt them." See also Climate Action Reserve at: http://www.climateregistry.org/resources/docs/press-releases/climate-action-reserve-release_final_1A.doc (last visited July 19, 2008), which includes statements of support from Linda Adams, Secretary of the California Environmental Protection Agency and Chair of CCAR, and others.

Poseidon has also stated that the AB 32 criteria are not meant to apply to some of its proposed measures, and has additionally contended that it is not required to adhere to those criteria. Its Plan references at least three different sets of criteria to apply to its various emission reduction proposals – those in AB 32, some based on the Kyoto Protocols, and a set of Evaluation Criteria developed for its Plan. It is not clear from the Plan which criteria would apply to the various proposed emission reduction measures, as the criteria sometimes overlap or are contradictory.

As noted above, AB 32's criteria are expected to apply to a wide range of emission reduction measures, including those implemented for both regulatory and voluntary efforts, which include Poseidon's. ~~Staff therefore recommends that Poseidon's~~ **The Commission has determined, therefore, that the** Plan **will** use one set of criteria – those established in AB 32 – to apply to ~~all~~ the **offset** measures it proposes to mitigate for **the net** indirect GHG emissions resulting from its use of purchased electricity.[20] This ~~would~~ allows Poseidon's Plan to ~~have~~ **use** a single, clear, and applicable set of criteria by which ~~some of~~ its ~~emission reduction~~ **offset** measures ~~could~~ **can** be verified and incorporated into California's emission reduction framework. Trying to implement the Plan using three sets of different and sometimes overlapping or conflicting criteria would likely cause confusion and uncertainty and would not allow some of Poseidon's proposed measures to be adequately reviewed and verified. By relying on these criteria and on CARB's and CCAR's implementation of AB 32, the Commission will have adequate assurance that Poseidon's modified Plan will conform to ***Special Condition 10***. The Commission will also be assured that its review will be consistent with the framework the state has selected for addressing the need to reduce GHG emissions, and Poseidon will be able to validate its GHG ~~emission reduction efforts~~ **offset** ~~measures, including RECs,~~ **purchases** as part of California's program.

Poseidon's Plan also includes a proposed contingency mechanism to be used if offset projects or mitigation measures are not reasonably available (see Section 3.h of the Plan, pages 24-25). ~~It suggests that Poseidon would not implement some emission reduction measures~~ **The Commission's approval modifies that contingency to allow Poseidon to request an Executive Director determination that GHG reduction projects are not reasonably available** under certain conditions: 1)if there are not enough projects available; 2)if the market price for offsets or RECs is not reasonably discernable; 3)if the market price for those mitigation measures is suffering from significant market disruptions or instability; or, 4)if the price of those measures has escalated to a level Poseidon deems economically infeasible. ~~If any of those circumstances occur, Poseidon proposes, instead of funding projects or offsets, to deposit money into an escrow account equal to $10 per ton of offsets needed.~~ **If the Executive Director determines that one or more of these conditions apply, Poseidon may deposit money into an escrow account to be expended on carbon offset projects. The Executive Director would have the authority to determine the duration of the escrow account and to approve Poseidon's proposal identifying one or more entities to use funds deposited into the escrow account to implement emission reduction projects. In the event of a dispute, Poseidon could appeal the Executive Director's determination to the Commission. The Commission**

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[20] **As stated previously, this requirement does not apply to the on-site and project-related measures identified in the Plan. These measures are instead factored into the determination of the net GHG emissions that Poseidon is responsible for offsetting. Nor does this requirement apply to RECs.**

also authorizes the Executive Director to approve, upon Poseidon's request, the use of emission reduction measures that may be available from entities other than CARB, CCAR, or the Air Districts if offsets are not available from CARB, CCAR or the Air Districts at a price that is reasonably equivalent to the price for offsets in the broader domestic market.

~~Staff believes this provision would prevent the Plan from conforming to **Special Condition 10**, as it could result in far fewer emission reductions than the Commission anticipates Poseidon will provide. The Plan does not define the terms used (e.g., "reasonably discernable", "market disruptions", etc.)and Poseidon has not established at what level various measures might become economically infeasible. Additionally, determining when the various conditions might occur appears to be solely under the purview of Poseidon. The Plan does not identify how funds in the escrow account would be used or who would decide their use. These characteristics each prevent the Commission from having the necessary level of assurance that Poseidon will adequately mitigate for its indirect GHG emissions. Further, because AB 32 requires CARB to consider cost-effectiveness in developing its regulations and protocols, this contingency is likely not necessary. The broad application of the AB 32 processes to a wide variety of projects should ensure that Poseidon's proposed measures are not held to a different standard than others in the emission reduction marketplace.~~

4.2.2 *Join CCAR's "Climate Action Reserve" or other entities u ing CARB- or CCAR-approved protocols*

~~Poseidon's Plan proposes that Poseidon form a committee to evaluate its emission reduction measures and account for its total emission reduction credits. The committee would include three members – Poseidon, the California Center for Sustainable Energy (CCSE), which is Poseidon's consultant, and a member from academia with expertise in energy or air regulatory policy and emission reduction. The committee would identify, evaluate, and select suitable projects, subject to Poseidon approval. Projects implemented would be included in an annual report to be presented to the SDAPCD and to Commission staff for review and approval. The Plan also proposes that the SDAPCD provide annual oversight of the committee's work and manage a publicly accessible database showing how the Plan is being implemented.~~

~~Staff believes this proposal is overly complex and is duplicative of procedures and mechanisms already available to Poseidon through CCAR. Additionally, the committee would not represent the independent third-party review identified in AB 32 as a necessary component for verifying emission reductions. Further, as currently proposed, the committee would be charged with implementing the Plan using its three sets of criteria, which, as described above, do not ensure adequate validation of the proposed measures. Staff notes, too, that Poseidon's proposal relies on the SDAPCD to perform a role for which it has not yet agreed, and staff therefore recommend the Commission not impose this requirement on the SDAPCD.~~

~~As an alternative, staff recommends~~ **The** **Commission modifies the Plan to require** that Poseidon join CCAR's Climate Action Reserve, which is a program within CCAR, so that it could ~~it implement~~ ~~**some of**~~ **acquire and verify offsets purchased under** its Plan through the Reserve. The Reserve was designed specifically for the voluntary GHG emission reduction market. The Reserve provides account holders accurate and transparent measurement, verification, and tracking of GHG reduction projects and inventories of their GHG ~~reductions~~ **offsets**, thus assuring a high degree of integrity.

Poseidon has been supportive of CCAR – it stated that it has already joined CCAR, and as noted in the ~~Adopted~~ **Permit** Findings, it used CCAR's certified emission factor in determining its total expected GHG emissions. By participating in CCAR's Reserve program, Poseidon will have at least two additional ways to pursue fully verified GHG emission reduction measures – it can elect to purchase CCAR-approved emission reduction credits, and it can request implementation of CCAR-approved emission reduction project proposals. For example, Poseidon could immediately begin implementing its forestry project in San Diego through the Reserve. The Reserve will ensure Poseidon follows CARB/CCAR-approved forestry protocols, will provide independent third-party verification of results, and will provide an accounting mechanism for emission reductions credits Poseidon accrues over time. Poseidon would maintain an account with the Reserve that provides verification of the amount of emission reduction credits it has accrued in the form of public reports available on the Reserve's website, which would provide a high level of transparency.

Poseidon has expressed concerns to Commission staff that the Reserve may not have enough emission reduction credits and project protocols available to meet Poseidon's needs. However, according to the Reserve, it has had available about 200,000 "carbon reduction tons"[21] so far in 2008 and expects to have at least five million available in 2012 when Poseidon plans to start operations.[22] ~~Even if Poseidon were to rely entirely on the Reserve for all its necessary emission reduction credits (about 90,000 tons per year), this would represent less than two percent of the Reserve's expected supply~~**This is well in excess of the amount of credits that Poseidon is expected to need (approximately 16,000 credits per year)**.

Summary and Conclusion: In sum, ~~staff recommends above that Poseidon's~~ **the Commission finds that the** Plan's **provisions regarding offsetting the project's net GHG emissions** ~~is~~ **are to** be implemented through the available and applicable provisions of AB 32, as carried out by CARB**,** ~~and~~ CCAR**, and California Air Districts**. This would ensure the Plan conforms to the provisions of the Commission's approval of Poseidon's coastal development permit and would allow Poseidon's Plan to be part of the state's approach to reducing its GHG emissions. In recognition of Poseidon's concerns that implementation of AB 32 may not proceed at a pace necessary to provide Poseidon with its needed emission reduction credits, Poseidon may at any time apply to the Commission for a permit amendment to modify its Plan to address this issue. Staff notes, however, that consultation with the various agencies has identified a number of AB 32-based protocols and mechanisms that are already in place or expected to be in place before Poseidon begins its operations and needs to implement its Plan. **As noted previously, the Commission has also authorized the Executive Director to approve, upon Poseidon's**

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[21] A "carbon reduction ton" or "CRT" is the Reserve's unit of measure used as a credit for reducing GHG emissions by one ton.

[22] Personal communication with the CCAR Reserve's Joel Levin, Vice President for Business Development, on July 22, 2008.

request, the use of offsets, credits, or other emission reduction measures that may be available from other sources.

The Commission finds that the Project's energy minimization features described above will minimize the Project's energy consumption in accordance with Coastal Act Section 30253(4)and reduce impacts to coastal resources. Additionally, the Plan will mitigate impacts from the desalination facility's net GHG emissions from electrical usage by requiring all such net GHG impacts of the project be offset, and the Commission finds that the Plan will mitigate to the maximum extent feasible impacts on coastal resources of the project's net GHG emissions, in accordance with applicable Coastal Act policies, including Section 30260.

~~4.3 SUBMIT ANNUAL REPORTS FOR COMMISSION STAFF REVIEW AND APPROVAL~~

~~Poseidon's Plan includes an annual review process to ensure that the Commission has an opportunity to review the results of Poseidon's implemented emission reduction measures each year and to determine conformity to *Special Condition 10*. Poseidon has agreed to provide an annual report for Executive Director review and approval (see Exhibit 1 insert: July 24, 2008, *Memorandum to File – Plan Modifications Agreed to By Poseidon and Commission Staff*). The type and amount of emission reductions is expected to vary each year based on the annual update of SDG&E's certified emission factor and the amount of electricity Poseidon purchases each year from SDG&E.~~

~~However, the current Plan proposes a complex reporting method involving different timelines, committee review, RFP submittals and approvals, accounting methods, and other elements. Staff's recommendation is that Poseidon's annual report submittal be based on the review and timing needed to conform to the particular AB 32-related review processes Poseidon chooses to implement its Plan. The report should describe and account for all approved emission reduction measures and include both an annual and cumulative balance of Poseidon's net emissions; however, the particular mechanisms to develop each year's report may vary. For example, as a member of the Reserve described above, Poseidon will have its own account that reflects the amount of emission reductions credits it owns. This accounting service negates the need for Poseidon's committee, SDAPCD, or Commission staff to perform this function. It also eliminates the need for the committee to serve as a third-party reviewer, as this would be provided by the Reserve.~~

~~If Poseidon were to join the Reserve and use its accounting services for the annual report, the review process would be simplified and would provide Commission staff with a full account of its emission reduction credits that are CARB and/or CCAR approved. This recommendation would also provide the Commission with the necessary level of assurance that Poseidon's Plan is conforming to **Special Condition 10** and meeting the Commission's expectations as expressed in its Findings.~~

~~4.4 MODIFY THE PLAN TEMPLATE TO CONFORM TO AB 32-BASED REVIEW PROCESSES.~~

~~Commission staff provided to Poseidon a template to use as the basis for its Plan. Staff's template included three main steps:~~

1) ~~Determine expected indirect GHG emissions based on electricity use.~~

2) ~~Identify measures that will reduce electricity use at the facility or use renewable energy and thereby reduce indirect GHG emissions.~~

3) ~~Identify emission reduction measures that will be used to offset any remaining indirect emissions.~~

~~In its submitted Plan, Poseidon modified the template in a manner that would remove some of its proposed emission reduction measures from the necessary review process. For example, Part II of staff's template was meant to include only those measures that would directly avoid or reduce the amount of electricity purchased for use at the desalination facility (such as those described in footnote xx of this memorandum). Poseidon modified this step to include "project-related" measures that involve potential electricity or emission reductions that may occur elsewhere or through the actions of other entities. The submitted Plan also suggests that these "project-related" measures added to Part II be automatically deducted from the facility's baseline electricity use to derive its net use and net GHG emission level. However, staff's review shows that these measures would not necessarily reduce electricity use or emissions from the facility and are therefore appropriate to include in Part III of the template to ensure they are verified through the elements of AB 32 described above in Section 4.2.2.~~

~~Similar to the previous recommendation, staff recommends Poseidon modify the template in a manner appropriate to the AB 32-approved processes Poseidon chooses to implement for its Plan. As long as the template shows that all emission reduction measures needed to account for the indirect emissions from Poseidon's purchased electricity use are reviewed using the protocols, mechanisms, criteria, and other elements approved pursuant to AB 32, the Commission will have the necessary level of assurance that ongoing implementation of the Plan can conform to the provisions of *Special Condition 10*.~~

CONCLUSION

The Commission finds that, as modified, Poseidon's Energy Minimization and Greenhouse Gas Emission Reduction Plan complies with *Special Condition 10* and with the Coastal Act's requirements to minimize energy consumption, protect coastal resources, and minimize the adverse environmental effects of coastal-dependent industrial facilities.

POSEIDON RESOURCES

December 5, 2008

Agenda Item
W 16b

VIA FEDEX

Chairman Kruer and Honorable Commissioners
California Coastal Commission
North Central Coast District
45 Fremont, Suite 2000
San Francisco, CA 94105-2219

RECEIVED
DEC 0 8 2008
CALIFORNIA
COASTAL COMMISSION

Re: Carlsbad Desalination Project CDP Application No. E-06-013
Energy Minimization and Greenhouse Gas Reduction Plan

Dear Chairman Kruer and Honorable Commissioners:

Poseidon Resources (Channelside) LLC ("Poseidon") submits this letter in response to the Coastal Commission Staff Report dated November 26, 2008 setting forth proposed revised findings ("Revised Findings") reflecting the Commission's August 6, 2008 approval of the Energy Minimization and Greenhouse Gas Reduction Plan ("Plan") pursuant to Special Condition 10 of the above-referenced Coastal Development Permit ("Permit") for the Carlsbad Seawater Desalination Facility (the "Project"). The Revised Findings are scheduled to be considered by the Commission at its December 10, 2008 meeting.

Poseidon believes that the Revised Findings conflict with the Commission's approval of the Plan in three important ways, as discussed below. However, based on discussions with Commission staff we understand that staff agrees with Poseidon on these points and will release an Addendum to the November 26, 2008 Staff Report early next week which will modify the proposed Revised Findings to address the inconsistencies with the Commission's approval of the Plan described below.

First, the Staff Report interprets the Plan to require Renewable Energy Credits ("RECs")[1] to be purchased from the California Air Resources Board ("CARB"), the California Climate Action Registry ("CCAR"), or an Air District, even though plain language in the approved Plan states that "[c]onsistent with Staff's recommendation, acquisition of RECs are not limited to purchase from CCAR, CARB, or any other Third Party Provider." The Commission adopted the

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1 A renewable energy credit represents proof that one MW of electricity was generated from renewable energy (wind, solar, geothermal or hydroelectric).

These materials have been provided to Coastal Commission Staff

Poseidon Resources Corporation
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Plan on August 6, 2008 without discussing RECs or modifying this language in any way. Further, because CCAR does not have verification protocols for RECs and does not intend to develop them in the near future, the Staff Report's position would effectively bar Poseidon from acquiring RECs and would thus favor post-emission mitigation over the development of renewable energy. The Revised Findings also would eliminate specific provisions in the Plan providing for the purchase of RECs, in particular from projects proposed in the San Diego Region, a number of which were specifically identified in the Plan. The interpretation of the Plan set forth in the Staff Report would therefore result in poor public policy while also being contrary to the plain language of the Plan and the intent of the Commission.

Second, the proposed Revised Findings in the Staff Report fail to incorporate a contingency in the Plan allowing Poseidon to acquire offsets from entities other than CARB, CCAR, or the Air Districts in the event that these entities cannot provide sufficient offsets at a price reasonably equivalent to the general domestic market price. To the contrary, the proposed Revised Findings state that this contingency is only available if offsets cannot "feasibly be acquired through these entities due to price or inadequate supply." This language provides no protection in the event that CARB, CCAR, or the Air Districts cannot provide offsets at a reasonable price; fails to describe the correlation in the contingency between the price of offsets provided by these entities and the price of offsets available on the broader domestic market; and could require Poseidon to purchase offsets at several times the domestic market price unless it could establish that it would be "infeasible" for Poseidon to do so. This would not conform to the contingency approved by the Commission, which will protect Poseidon from being required to purchase offsets at unreasonably high prices.

Third, in what we understand was an unintentional omission, the proposed Revised Findings state that the Plan "will mitigate to the extent feasible impacts on coastal resources of the project's net GHG emissions, in accordance with Section 30260", while Coastal Act section 30260 requires, where applicable, a finding that "adverse environmental effects are mitigated to the *maximum* extent feasible." (emphasis added). In making the requisite findings under section 30260 in connection with its November 15, 2007 adoption of the Permit, the Commission found that the Plan would result "in reduction in electrical use and reduction or offset of greenhouse gas emissions associated with the project's operations to the <u>maximum extent feasible</u> through Poseidon's agreement that the project will be net carbon neutral." It is critical that the Commission's Revised Findings reflect a finding that the Plan will mitigate to the <u>maximum</u> extent feasible the impacts of the Project's net GHG emissions on coastal resources, so that the Revised Findings accurately reflect the Commission's approval of the Permit and the Plan, as well as the administrative record for these approvals, which fully demonstrates that the Plan will minimize the Project's impacts from net GHG emissions to the "maximum extent feasible" through the imposition of energy minimization measures and a requirement that all net GHG emissions be offset.

Attached hereto as Exhibit A is a modified version of Staff's proposed Revised Findings which reflects the changes described above (Poseidon's revisions are in red font, with additions bolded and underlined and deletions in double strike-through). Exhibit A reflects Poseidon's understanding of modifications to the Revised Findings that will be incorporated in the Addendum to the November 26, 2008 Staff Report to be released in the near term. Poseidon respectfully requests that the Commission approve Revised Findings that are consistent with the modifications outlined above and set forth in Exhibit A.

Thank you for your consideration of these issues.

Sincerely,

Peter MacLaggan

Peter MacLaggan
Poseidon Resources

Enclosure

cc: Tom Luster (via email and FedEx)
Rick Zbur, Esq

Poseidon Resources
Carlsbad Desalination Project

Briefing Materials - GHG Plan Revised Findings

December 10, 2008

Agenda Item W16b

These materials have been provided to Coastal Commission Staff

Poseidon's Concerns with Staff's Proposed Revised Findings for the GHG Plan

- *Issue #1*: Staff's Proposed Revised Findings are inconsistent with the Commission's action by not incorporating the contingency that Poseidon may acquire offsets from entities other than CARB, CCAR or the Air Districts when they cannot provide sufficient offsets at a reasonable price, based on the generally domestic market price.
- *Issue #2*: Staff's Proposed Revised Findings are inconsistent with the Commission's action by requiring that Renewable Energy Credits ("RECs") be acquired from CARB, CCAR or the Air Districts.

Issue # 1: The Contingency Approved by the Commission Contemplates Cost Effectiveness

- Poseidon initially requested flexibility to purchase offsets from members of the Offset Quality Initiative, as well as CCAR/CARB, to ensure the availability of sufficient offsets at a reasonable price.
- At the August 6, 2008 hearing, Poseidon agreed to limit its offset purchases to offsets from CCAR, CARB, and the Air Districts if there was a contingency available to purchase from other entities if sufficient offsets were not available at the domestic market price.
- In response to Poseidon's proposal, the Commission approved a contingency, which allows Poseidon to purchase offsets from other entities where sufficient offsets are not available at the reasonable market price.

Staff's Proposed Findings Do Not Incorporate a Reasonable Cost Standard in the Contingency

- Staff's proposed findings state that the contingency measure is only applicable when "offsets cannot *feasibly* be acquired through" CARB/CCAR or the Air Districts.
- Staff's language provides no protection in the event that CARB/CCAR/Air Districts cannot provide sufficient offsets at a reasonable price.
- Under Staff's language, Poseidon could potentially have to purchase offsets at several times the domestic market price unless it could establish that it would be "infeasible" to do so.
- By subjecting Poseidon to purchasing offsets at unreasonably high prices, Staff's feasibility requirement would undercut the Commission's intent.

Feasibility Requirement is Not Consistent With the Record

- At the August 6, 2008 hearing, the Commissioners made clear their intent that the contingency measure was to ensure that offset costs would be reasonable:
  - **Rick Zbur**: ...really the key issue for us we are worried that we are not going to have enough credits, and we would actually like that the infeasibility issue be focused in part on ***whether the credits are available at a generally domestic market price***... (transcript p. 200) (emphasis added)
  - **Commissioner Hueso**: I am fine with CCAR being the first choice, and then having any other options available pursuant to the approval of the executive director, just so long as they have the opportunity just so long as they have the ***opportunity to look at other cost effective savings***...

    Executive Director Douglas: Okay, there are a couple of issues, just to make clear, because we don't want to come back and have an argument over this. Poseidon would only purchase from CCAR, unless the Executive Director approves other sources for acquisition because they don't have enough credits available. That is what I understood on that part of it.

    Chair Kruer: And, ***reasonably priced***. Price was one of the issues, too... they added a caveat on that. (transcript pp. 211-212) (emphasis added)

Issue # 2: The Commission's Intent Was to Treat RECs Differently than Carbon Offsets

- The Plan submitted to the Commission by Poseidon on August 2, 2008 stated that "[c]onsistent with Staff's recommendation, acquisition of RECs are not limited to purchase from CCAR, CARB, or any other Third Party Provider."

- At the August 6, 2008 hearing, the Commission adopted this version of the GHG Plan without discussing RECs or in any way modifying the above language.

- The GHG Plan approved by the Commission thus does not restrict Poseidon's purchases of RECs to CCAR, CARB, or the Air Districts.

Differences Between RECs and Offsets

- Renewable Energy Credits (RECs) are a special type of offset based on the environmental attributes of a renewable energy project (e.g., wind, solar, or geothermal).
- Each REC represents proof that 1 megawatt-hour of electricity was generated by an eligible renewable energy source.
- The quantity of carbon offsets from a REC are based on the carbon production otherwise associated with 1 megawatt-hour of electricity it is displacing.
- RECs are verified using the same basic AB 32 criteria applied to other voluntary offsets – they must be real, permanent, quantifiable, enforceable and additional.
- Not all offsets are RECs, and the terms are not interchangeable.

Staff Proposes to Limit the Acquisition of RECs to the Same Entities Providing Carbon Offsets

- Staff's Proposed Findings assert that the Commission intended to limit the acquisition of RECs in the same manner as offsets.

- The record does not support Staff's position.
  - Discussions that Staff cites in the hearing testimony about offsets concerned a specific contingency in the GHG Plan that only applied to offsets (it mentioned the Offset Quality Initiative), and not to RECs. Staff is applying the discussion at the hearing related to offsets to extend CCAR/CARB purchase limitations to RECs.

- The GHG Plan included specific REC projects that now would be disallowed under Staff's proposal, many of which are in San Diego County, when the Commission did not evidence any intent to preclude such options.

Funding of Local Projects Through RECs Contemplated by GHG Plan

- Staff's proposal eliminates San Diego County renewable energy projects, which were specifically included in the GHG Plan adopted by the Commission.

Table 5 – Potential Renewable Energy Partnerships

Desalination Project Public Partner / Location	Green Power Project Description	Annual Capacity of Green Energy Projected to be Generated by the Project (MWh/yr)
City of Encinitas	95 KW Solar Panel System Installed on City Hall Roof	160
Valley Center Municipal Water District	1,000 KW Solar Panel System	1,680
Rainbow Municipal Water District	250 KW Solar Panel System	420
Olivenhain Municipal Water District / Carlsbad Municipal Water District / City of Oceanside	Various solar and hydroelectric generation opportunities	To Be Determined
Santa Fe Irrigation District	Hydropower generation facility at R.E. Badger Filtration Plant	To Be Determined
	Total Renewable Power Generation Capacity (MWh/yr)	2,260

- There was no direction by the Commission to eliminate these projects.

ENVIRONMENTAL CONSIDERATIONS

In 1994, the U.S. Fish and Wildlife Service (USFWS) designated 1,980 miles of the Colorado River and its tributaries in Colorado, Utah, New Mexico, Arizona, California, and Nevada as critical habitat for four endangered species of native fish. In response to the 1994 designation, the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) was formed. The program is a partnership of federal agencies; state and local agencies in Arizona, California, and Nevada, including the Water Authority; Native American tribes; and other non-federal participants. The partnership is responding to the need to balance the legal use of lower Colorado River water resources and the conservation of threatened and endangered species and their habitats in compliance with the federal Endangered Species Act (ESA). Taking over ten years to develop, the LCR MSCP was approved in April 2005. The program is designed to benefit at least 26 species and restore a range of habitats along the lower Colorado River, including 8,132 acres of riparian, marsh, and backwater habitat. The $626 million program will be cooperatively funded and implemented by the partnership over the next 50 years. By meeting the needs of fish and wildlife under the ESA and preventing the listing of additional species, the program provides greater certainty of continued water and power supplies from the river for Nevada, California, and Arizona.


Photo: Bureau of Reclamation

The "endangered" Humpback chub

CURRENT SUPPLIES

Metropolitan currently has a firm supply from two sources: its fourth priority of 550,000 AF/YR, and the yield of a conservation program that Metropolitan completed with IID in 1988. This program currently yields about 106,000 AF/YR, giving Metropolitan a total supply of approximately 656,000 AF/YR. Under certain conditions, however, Metropolitan must provide 50,000 AF/YR of the conservation program water to the Coachella Valley Water District (CVWD). Thus, Metropolitan's firm supply is now about 606,000 AF/YR. The remaining 600,000 AF/YR of water needed to fill the CRA must come from the unused apportionments of other states or from surplus water.

QUANTIFICATION SETTLEMENT AGREEMENT AND FUTURE SUPPLIES

The Water Authority, together with CVWD, IID, and Metropolitan, entered into the QSA in October 2003. The QSA resolved longstanding disputes regarding Colorado River water use among the agencies, and established a water budget for the agricultural agencies. This permitted the implementation of several water conservation and transfer agreements, including the Water Authority's transfer agreement with IID.

Transfers from IID began in late-2003 with the signing of the QSA. The Water Authority will receive up to 200,000 AF of water per year after an initial 19-year ramp-up in the water deliveries. Other supplies include about 77,700 AF/YR from conservation projects to line the AAC and CC, located in Imperial and Coachella valleys.


The SWP's Banks Pumping Plant lifts water to the California Aqueduct.

6.2.2 STATE WATER PROJECT

Metropolitan's other water source, the SWP, is owned by the State of California and operated by the DWR. The project stretches more than 600 miles, from Lake Oroville in the north to Lake Perris in the south. Water is stored at Lake Oroville and released when needed into the Feather River, which flows into the Sacramento River and to the Sacramento-San Joaquin River Delta (Delta). In the north Delta, water is pumped into the North Bay Aqueduct for delivery to

Napa and Solano counties. In the south Delta, water is diverted into the SWP's Banks Pumping Plant, where it is lifted into the 444 mile-long California Aqueduct. Some of this water flows into the South Bay Aqueduct to serve areas in Alameda and Santa Clara counties. The remainder flows southward to cities and farms in central and southern California. In the winter, when demands are lower, water is stored at the San Luis Reservoir located south of the Delta. SWP facilities provide drinking water to 23 million Californians and 755,000 acres of irrigated farmland. **Figure 6-3** (on page 6-2) shows the California Aqueduct.

A big portion of the county's imported water moves through the Delta.

RELIABILITY ISSUES

The reliability of SWP supplies is limited by both the level of SWP supply development and pumping restrictions due to state and federal environmental regulations. Actions taken by the CALFED Bay-Delta Program have improved the situation. *(See below for more on the impact of CALFED on SWP supplies.)*

When approved by the voters in the 1960s, the SWP was planned to deliver 4.2 MAF to 32 contracting agencies. Subsequent contract amendments reduced total contracted deliveries to 4.13 MAF and the number of contracting agencies to 29. Metropolitan's contracted entitlement is 2,011,500 AF/YR, or almost 49 percent of the annual total. It is important to note that when voters approved construction of the SWP in 1960, state planners did not expect the full amount of contracted water to be needed for at least the first 20 years of the project. As such, the planners anticipated that the facilities needed to produce the full contracted amount would be constructed over time as demands on the system increased. However, decisions about these additional facilities were repeatedly deferred as public attitudes and environmental regulations changed and costs increased. New state and federal environmental laws put some potential water supply sources off limits to development. More stringent water quality standards adopted by the SWRCB to protect the San Francisco Bay/Sacramento-San Joaquin River Delta (Bay-Delta) have also reduced the amount of water available for diversion. At the same time, California's population and water demand continued to grow.

By the late 1980s, the SWP could not meet contractor demands during drought periods. During the initial years of the 1987 – 1992 drought, DWR maintained SWP deliveries using water stored at Lake Oroville and the San Luis Reservoir. In 1991, however, the SWP delivered only 549,113 AF of entitlement water. Of this amount, Metropolitan received 381,070 AF, or about 20 percent of its annual entitlement.

DWR's *Draft 2005 State Water Project Delivery Reliability Report* projected average SWP deliveries to increase slightly, and multiple dry-year deliveries to remain generally unchanged. Minimum SWP deliveries may be as low as 4% to 5% of the full Table A basic contract amount in the single driest year (1977 hydrology). However, DWR has suggested that adjustments would be made to reflect more realistic operations where carryover storage and other provisions would enhance SWP dry-year deliveries to a level that is comparable in quantity to the previous reliability report from DWR.

ENVIRONMENTAL CONSIDERATIONS

In recent years, actions taken to protect the ecosystem of the Bay-Delta have placed additional restrictions on SWP operations. The Bay-Delta is the largest estuary on the west coast and supports more than 750 plant and animal species. However, 150 years of human activity, dating back to 19th century gold mining, has taken its toll on the Bay-Delta ecosystem and the fish that live there. Between 1989 and 1999, the winter-run Chinook salmon was designated, or "listed," as an endangered species

Photo: USFWS

The "threatened" Chinook salmon

under the federal ESA and the Delta smelt, steelhead trout, and spring-run Chinook salmon were placed on the list of threatened species.

The degradation of the Bay-Delta ecosystem and the decline of Delta fisheries can be traced to numerous factors, including habitat loss, water diversions, pollution, over-fishing, and the introduction of non-native species. Regulatory protection efforts have nevertheless tended to focus on the operations of the SWP and the federal Central Valley Project (CVP).

For example, in 1999, the SWP was forced to reduce pumping by about 500,000 AF to protect Delta smelt and spring-run Chinook salmon. These pumping reductions were in addition to fish protection measures built into the water quality standards established by the SWRCB. Actions taken by CALFED have stabilized this situation over the past four years, but this situation is temporary unless further actions are taken to extend it over the longer-term.


Protecting habitats is part of the Bay-Delta Plan.

WATER QUALITY CONSIDERATIONS

Please see **Section 7** for water quality information.

CURRENT SUPPLIES

SWP delivery contracts were amended in 1995 to reflect principles developed under the December 1994 Monterey Agreement. Under the Monterey amendments, all SWP supplies are allocated to contractors in proportion to their contractual entitlements. Metropolitan's approximately 49 percent share of total SWP contract entitlements, entitles it to a proportionate share of SWP supplies. According to Metropolitan's RUWMP, Metropolitan received an average of 1.04 million AF/YR from the SWP from 1995-2004. From 2000-2004, the annual average was 1.46 MAF.

DWR's implementation of the Monterey Agreement was successfully challenged in court by the Planning and Conservation League and others. On September 15, 2000, the Third District Court of Appeal reversed a trial court ruling for DWR and ordered a new environmental impact report (EIR) and a trial on the validity of the agreement. DWR is conducting the new environmental review, which is due for completion in 2005.


A CALFED Bay-Delta Program goal is levee system integrity.

FUTURE SUPPLIES AND THE CALFED BAY-DELTA PROGRAM

Metropolitan's Integrated Water Resources Plan Update (IRP Update), adopted by the Metropolitan Board of Directors in July 2004, indicates that Metropolitan's SWP target for a dry year (based on 1977 hydrology) is 463,000 AF in 2010, and 650,000 AF in 2020. The IRP Update also estimates that in the 2020-2025 period, Metropolitan's annual supply range from the SWP will be between 418,000 AF and 1.74 MAF. This figure does not include another 75,000 to 200,000 AF estimated from San Luis Reservoir carryover storage, 200,000 AF from planned CALFED projects, and 45,000 AF from the Sacramento Valley Water Management Agreement (the latter two programs are still in development and subject to change). The 2005 RUWMP estimates that the SWP will be capable of serving 1.5 MAF to Metropolitan through 2030 in an average year.

Work being done by the CALFED Bay-Delta Program, which is administered by the California Bay-Delta Authority, is expected to provide the greatest opportunity for SWP supply reliability and water quality improvements. However, the outcome of this process remains uncertain. The state and federal governments organized the CALFED Program in 1995 to develop and implement a balanced, comprehensive, and long-term plan to restore the Bay-Delta's ecological health and improve water management for beneficial uses of the estuary. CALFED is working in four inter-related, over-arching categories: ecosystem restoration, levee stability, water quality improvement, and water supply reliability. The CALFED Program made the transition from planning to implementation in 2000 with the release of the Record Of Decision, final programmatic environmental EIS/EIR and *California's Water Future: A Framework for Action*.

The elements of the CALFED Program that have the greatest potential for increasing the reliability and quality of SWP supplies are included in the Delta Improvements Package (DIP), approved by the California Bay-Delta Authority in 2004 as the first major action by CALFED to implement its long-term Bay-Delta plan. Among the activities in the DIP, the most important are improvements to the existing Delta conveyance system, including expansion of the permitted capacity of the SWP pumping plant from its current level of 6,680 cfs to 8,500 cfs (and ultimately to 10,300 cfs subject to certain conditions). The conveyance system improvements would improve the reliability and quality of SWP supplies by allowing the SWP to increase pumping during those times of the year when additional water is available and when water quality is highest, and they would reduce pumping when endangered fish are migrating through the Delta. The improvements will also increase the amount of pumping capacity available for other purposes, such as water transfers.


CALFED has a long-term Bay-Delta plan.

The ability of CALFED to work with its member agencies to implement the DIP and other projects was called into question by a state appellate court decision issued on October 7, 2005, concerning CALFED's programmatic environmental impact report (PEIR), which served as the foundation of the Bay-Delta Program record of decision. While the court upheld the PEIR on a number of issues in the case, it concluded that the PEIR should have analyzed an alternative that reduced water exports from the Delta. The court also found that the PEIR inadequately discussed the environmental impacts of diverting water to meet CALFED's goals and did not include sufficient information about the Environmental Water Account. The state attorney general has asked the court for a rehearing of its ruling. If the decision stands, CALFED will have to draft a supplement to its PEIR that considers the "reduced exports" alternative, at the very least. It is currently unclear how much the ruling may affect programs and projects involving the Bay-Delta that are being undertaken by CALFED member agencies.

Another essential element of the CALFED Program is the Environmental Water Account (EWA), a pilot program that provides water at critical times for meeting ecosystem needs while minimizing water supply impacts on water-users. In addition, new surface and groundwater storage could also enhance the reliability and quality of SWP supplies. The CALFED framework calls for the construction of up to 4.75 MAF of new surface and groundwater storage over the life of the CALFED Program; however, it is not known whether any of the new storage would be constructed as part of the SWP.

The amount of water produced through the proposed conveyance improvements will depend on how the individual facilities are operated and on the level of assurances provided by the state and federal regulatory agencies. The EWA provides the SWP and CVP with regulatory assurances intended to ensure that the projects will not face additional water supply impacts due to regulatory actions taken under the federal ESA or other federal or state laws or regulations. However, while the EWA has been extended as a pilot program through 2007, it has not yet been made permanent. If CALFED succeeds in its mission of restoring stability to the Bay-Delta system, and the EWA, and the regulatory assurances, are extended beyond the initial four-year period, then the improvements described in the DIP have the potential to increase Metropolitan's share of average SWP supplies by between 93,000 and 168,000 AF/YR. If CALFED is not successful, and the Bay-Delta system continues to decline, Metropolitan's SWP supplies could even decrease in size and quality relative to existing levels.

SECTION 7 WATER QUALITY

The Act requires that the Updated 2005 Plan include information, to the extent practicable, on the quality of existing supply sources and the manner in which water quality affects water supply reliability. This section summarizes water quality issues associated with supplies serving the San Diego region. Information on Colorado River and SWP supplies came in part from Metropolitan's 2005 RUWMP.

The Colorado River

SECTION 7.1 COLORADO RIVER

High salinity levels and perchlorate contamination represent two areas of concern regarding the quality of Colorado River supplies. In Moab, Utah, a pile of radioactive waste near the Colorado River is also considered to be a potential threat to the Colorado River's water quality. Research on the potential impact to water quality is inconclusive, but removal of the radioactive waste is being investigated.

SALINITY

The salts in the Colorado River System are indigenous and pervasive, mostly resulting from saline sediments in the basin that were deposited in prehistoric marine environments. They are easily eroded, dissolved, and transported into the river system. Agricultural development and water diversions over the past 50 years increase the already high naturally occurring levels of TDS.

Water imported via the CRA has a TDS averaging around 650 mg/l during normal water years. During the high water flows of 1983-1986, salinity levels in the CRA dropped to a historic low of 525 milligrams per liter (mg/l). However, during the 1987-1990 drought, higher salinity levels returned. During an extreme drought, CRA supplies could exceed 900 mg/l. High TDS in water supplies leads to high TDS in wastewater, which lowers the usefulness of the water and increases the cost of recycled water. (Refer to **Section 7.5** for details on salinity impacts to water recycling.) In addition to the link between water supply and water quality, high levels of TDS in water supplies can damage water delivery systems and home appliances.

To reduce the effects of high TDS levels on water supply reliability, Metropolitan approved a Salinity Management Policy in April 1999. One of the policy goals is to blend Colorado River supplies with lower-salinity water from the SWP to achieve delivered water salinity levels less than 500 mg/l TDS. In addition, to foster interstate cooperation on this issue, the seven basin states formed the Colorado River Basin Salinity Control Forum (Forum). To lower TDS levels in Colorado River supplies, the Forum develops programs designed to prevent a portion of the abundant salt supply from moving into the river system. The Colorado River Basin Salinity Control Program targets the interception and control of non-point sources, such as surface runoff, as well as wastewater and saline hot springs.

PERCHLORATE

Ammonium perchlorate is used as the main component in solid rocket propellant, and it can also be found in some types of munitions and fireworks. Ammonium perchlorate and other perchlorate salts are readily soluble in water, dissociating into the perchlorate ion, which does not readily interact with the soil matrix or degrade in the environment. The primary human health concern related to perchlorate is its effects on the thyroid. Perchlorate has been detected at low levels in Metropolitan's CRA water supply.

Because of the growing concerns over perchlorate levels in drinking water, in 2002 Metropolitan adopted a Perchlorate Action Plan. Objectives include expanded monitoring and reporting programs and continued tracking of remediation efforts in the Las Vegas Wash. Metropolitan has been conducting monthly monitoring of Colorado River supplies. The perchlorate originates in the Las Vegas Wash, and the most likely source was a chemical manufacturing site located in Henderson, Nevada. The Nevada Department of Environmental Protection manages a comprehensive groundwater remediation program in the Henderson area. As of December 2004, the amount of perchlorate entering the Colorado River system from Henderson has been reduced from approximately 900 pounds per day (lb/day) to less than 150 lb/day.

SECTION 7.2 STATE WATER PROJECT


The Delta

The quality of SWP water as a drinking water source is affected by a number of factors, most notably seawater intrusion and agricultural drainage from peat soil islands in the Delta. SWP water contains relatively high levels of bromide and total organic carbon, two elements that are of particular concern to drinking water agencies. Bromide and total organic carbon combine with chemicals used in the water treatment process to form disinfection by-products that are strictly regulated under the federal Safe Drinking Water Act (SDWA). Wastewater discharges from cities and towns surrounding the Delta also add salts and pathogens to Delta water, and they reduce its suitability for drinking and recycling.

MEETING WATER STANDARDS

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to customers. However, source water of poor quality will make it increasingly expensive and difficult to meet such standards. The California Urban Water Agencies (CUWA) retained the assistance of a panel of drinking water quality and treatment experts to evaluate the source water quality necessary to allow agencies treating Delta water to comply with future drinking water regulations under a plausibly conservative regulatory scenario. The expert panel identified target bromide and total organic carbon concentrations of 50 parts per billion (ppb) and 3 parts per million (ppm), respectively. These targets were written into the Record Of Decision (ROD) adopted by CALFED in 2000.

The ROD states that CALFED will either achieve these targets at Clifton Court Forebay and drinking water intakes in the south and central Delta, or it will achieve an "equivalent level of public health protection using a cost-effective combination of alternative source waters, source control, and treatment technologies." CALFED did not establish a similar target for the salinity of Delta water, a particular concern in Southern California, because of the high salinity levels in Colorado River water, but the 2004 CALFED Drinking Water Quality Program Plan lists two "numeric targets," less than 220 ppm over a 10-year average and less than 440 ppm as a monthly average.

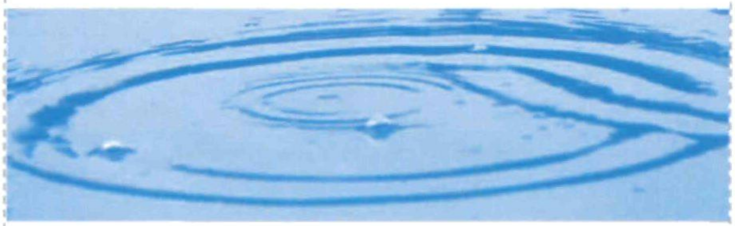
Actions to protect Delta fisheries have exacerbated existing water quality problems by forcing the SWP to shift its diversions from the springtime to the fall, when salinity and bromide levels are higher. Closure of the Delta Cross-Channel gates to protect migrating fish has also degraded SWP water quality by reducing the flow of higher quality Sacramento River water to the SWP pumps at critical times.


The State Water Project

Water supplies from the SWP have significantly lower TDS levels than the Colorado River, averaging 250 mg/l in water supplied through the East Branch and 325 mg/l on the West Branch. Because of this lower salinity, Metropolitan blends SWP water with high salinity CRA water to reduce the salinity levels of delivered water. However, both the supply and the TDS levels of SWP water can vary significantly in response to hydrologic conditions in the Sacramento-San Joaquin watersheds.

The TDS levels of SWP water can also vary widely over short periods of time. These variations reflect seasonal and tidal flow patterns, and they pose an additional problem to blending as a management tool to lower the higher TDS from the CRA supply. For example, in the 1977 drought, the salinity of SWP water reaching Metropolitan increased to 430 mg/l, and supplies became limited. During this same event, salinity at the Banks pumping plant exceeded 700 mg/l. Under similar circumstances, Metropolitan's 500 mg/l salinity objectives could only be achieved by reducing imported water from the CRA. Thus, it may not be possible to maintain both salinity standards and water supply reliability unless salinity levels of source supplies can be reduced.

The CALFED Bay-Delta Program's EIS/EIR, Technical Appendix, July 2000 Water Quality Program Plan identified targets that are consistent with TDS objectives in Article 19 of the SWP Water Service Contract: a ten-year average of 220 mg/l and a maximum monthly average of 440 mg/l. These objectives were set in the 1960s when Metropolitan expected to obtain a greater proportion of its total supplies from the SWP. Because of reductions in expected SWP deliveries, Metropolitan's Board believes that this standard is no longer appropriate, so it has adopted a statement of needs from the Bay-Delta. Under the drinking water quality and salinity targets element, the Board states its need "to meet Metropolitan's 500 mg/l salinity-by-blending objective in a cost-effective manner while minimizing resource losses and ensuring the viability of recycling and groundwater management programs."



SECTION 7.3 SURFACE WATER

The region's water quality is influenced by a variety of factors depending on its source. As stated above, water from the Colorado River and from Northern California are vulnerable to a number of contributors to water quality degradation. Regional surface and groundwater are primarily vulnerable to increasing urbanization in the watershed, agriculture, recreational uses, wildlife, and fires.

Source water protection is fundamentally important to all of California. The DHS requires large utilities delivering surface water to complete a Watershed Sanitary Survey every five years to examine possible sources of drinking water contamination. The survey includes suggestions for how to protect water quality at the source.

A similar requirement from the United States Environmental Protection Agency (EPA) calls for utilities to complete a Source Water Assessment (SWA). Information collected in SWAs is used to evaluate changes in potential sources of contamination and to help determine if more protection measures are needed. The EPA requires utilities to complete a SWA that uses information collected in the sanitary surveys. The SWA is also used to evaluate the vulnerability of water sources to contamination and also helps determine whether more protective measures are needed.

The monitoring of key constituents in source waters is critical in helping to identify constituents that should be controlled at the source and to determine the best ways to operate the water system so as to improve the quality of water delivered to the consumer. The effect of urban runoff on receiving water quality is a recently recognized problem. Most of the work up to the present has centered on characterizing urban runoff: measuring concentrations of various constituents, attempting to relate these concentrations to such factors as land use type and rainfall intensity, and studying the effects of these constituents on street surfaces.

It appears that considerable quantities of contaminants, heavy metals in particular, may enter the receiving waters through urban runoff. The federal Water Pollution Control Act Amendments of 1972 stress future "control of treatment of all-point and non-point sources of pollution." Thus, the federal government has concluded that non-point sources, such as urban runoff, are indeed harmful to the aquatic environment and that measures should be taken to control such emissions.

There are four basic approaches to controlling pollution from urban runoff:

- Prevent contaminants from reaching urban land surfaces;
- Improve street cleaning and cleaning of other areas where contaminants may be present;
- Treat runoff prior to discharge to receiving waters; and
- Control land use and development.

Which approach or combination of approaches is most effective or economical has not yet been studied extensively. Thus, only the basic characteristics of each approach can be discussed. In addition to these direct approaches, measures to reduce the volume of runoff from urban areas are also available.

The fourth approach, control land use and development, is to encourage controls on urbanization in order to reduce the volume of runoff. The usual pattern is that increased urbanization leads to higher runoff coefficients, reflecting the many impervious surfaces associated with development. Roof drains to storm sewers, paved parking lots and streets, installation of storm sewers, filling of natural recharge areas, and increased efficiency in realigned and resurfaced stream channels all are characteristics of urban growth.

Urban growth impacts surface water.

Development near streams and on steep slopes harms water resources. It is less disruptive to develop the lower portions of a watershed than the headwater areas, both from the standpoint of the length of channel affected and the extent of channel enlargement necessary to convey storm water. Use of porous pavements and less reliance on roof connections to storm drains and more emphasis on local recharge would reduce the peak volume of runoff from storms. An area's mass emissions of urban drainage constituents should be quantified. Urban planning should be more cognizant of land constraints to permit greater natural recharge where possible and feasible, and to discourage intensive development of steep land, particularly in headwater areas.

To address the issues associated with surface water quality, the Water Authority, the City of San Diego, and the County of San Diego formed a Regional Water Management Group to coordinate development of an Integrated Regional Water Management Plan (IRWMP) for the San Diego region. An important element in the IRWMP is to protect and enhance the region's local surface water quality. As part of this process, projects will be identified and implemented to assist in watershed protection, and thereby protect the quality of surface water supplies.

Integrated Regional Water Management Plan

In the past, regional surface water quality has been considered good to excellent. Water quality can vary with imported water inflows and surface water contamination. Source water protection is considered a key element in regional water quality. The Water Authority and its member agencies are working together to improve watershed awareness and management. Currently, the most significant water quality issue that affects the public is algae blooms, which can create taste and odor problems.

In San Diego County, DHS has primacy over the implementation of the SDWA. The SDWA regulates source water protection to ensure public health through the multiple barrier approach, an approach that anticipates that the public will participate in source water protection. Member agencies in the Water Authority's service area that have surface water have a good, long-standing, working relationship with DHS.

SECTION 7.4 GROUNDWATER

Two water quality parameters that can affect reliability of groundwater resources in San Diego County are contamination from Methyl Tertiary Butyl Ether (MTBE) and high salinity levels.

SALINITY

Increased TDS in groundwater basins occurs either when basins near the ocean are over drafted, leading to seawater intrusion, or when agricultural and urban

Groundwater demineralization facility

return flows add salts to the basins. Much of the water used for agricultural or urban irrigation infiltrates into the aquifer, so where high TDS irrigation water is used or where the water transports salts from overlying soil, the infiltrating water will increase the salinity of the aquifer. Using this resource requires costly demineralization projects. (Refer to **Section 5.2.1** for discussion on groundwater recovery projects.)

To protect the quality of these basins, the Regional Board often places restrictions on the salinity levels of water used for basin recharge or for irrigation of lands overlying the aquifers. Where these restrictions are in place, water reuse and aquifer recharge may be restricted, or expensive mitigation measures may be required.

METHYL TERTIARY BUTYL ETHER

Until recently, MTBE was the primary oxygenate in virtually all the gasoline used in California. In January 2004, the Governor's executive order to remove MTBE from gasoline became effective, and now ethanol is the primary oxygenate. MTBE is very soluble in water and has low affinity for soil particles, thus allowing the chemical to move quickly in the groundwater. MTBE is also resistant to chemical and microbial degradation in water, making treatment more difficult than the treatment of other gasoline components.

MTBE presents a significant problem to local groundwater basins. Leaking underground storage tanks and poor fuel-handling practices at local gas stations may provide a large source of MTBE. Improved underground storage tank requirements and monitoring, and the phase-out of MTBE as a fuel additive, will probably decrease the likelihood of MTBE groundwater problems in the future.

SECTION 7.5 RECYCLED WATER

Water quality, as it pertains to high salinity supplies, is a significant implementation issue for recycled water projects. High TDS source water poses a special problem for water recycling facilities because conventional treatment processes are designed to remove suspended particles, but not dissolved particles. TDS removal, or demineralization, requires an advanced treatment process, which can increase project costs significantly.

Residential use of water typically adds 200 to 300 mg/l of TDS to the wastewater stream. Self-regenerating water softeners can add another 60 to 100 mg/l. Infiltration of brackish groundwater into sewer lines can also cause an increase in TDS. If an area receives a water supply with TDS of more than 700 mg/l, and residents add 300 mg/l or more through normal use, the recycling facility will produce recycled water with a TDS concentration of 1,000 mg/l or higher.

Figure 7-1 shows the average TDS at several of the existing and projected water recycling treatment plants. In general, TDS concentrations over 1,000

Treatment Plant Average Effluent TDS (MG/L)

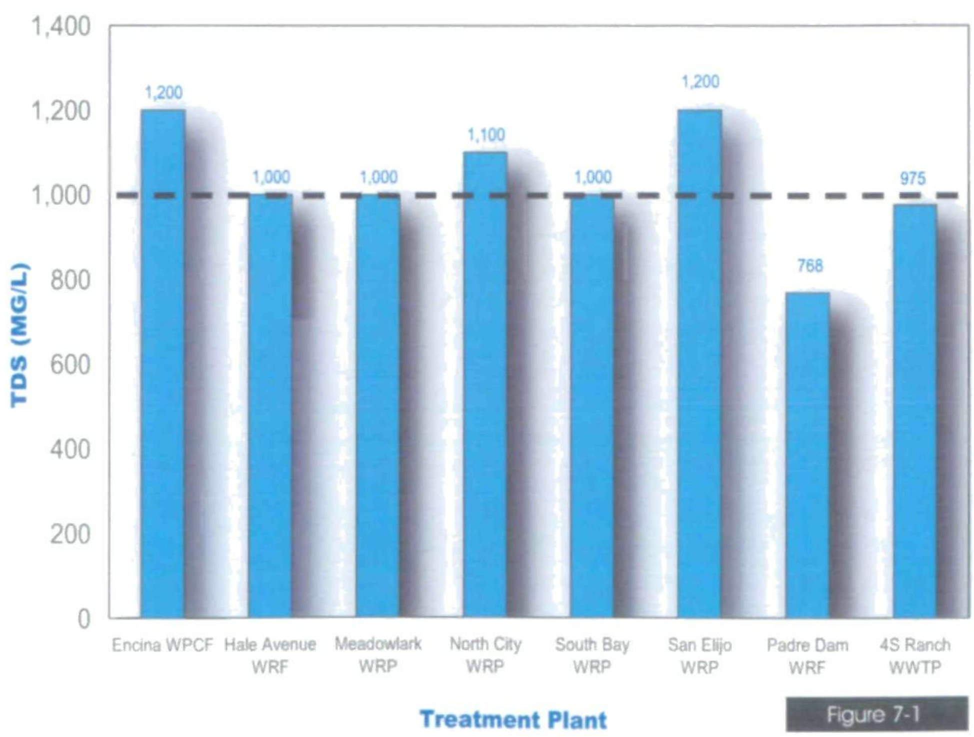
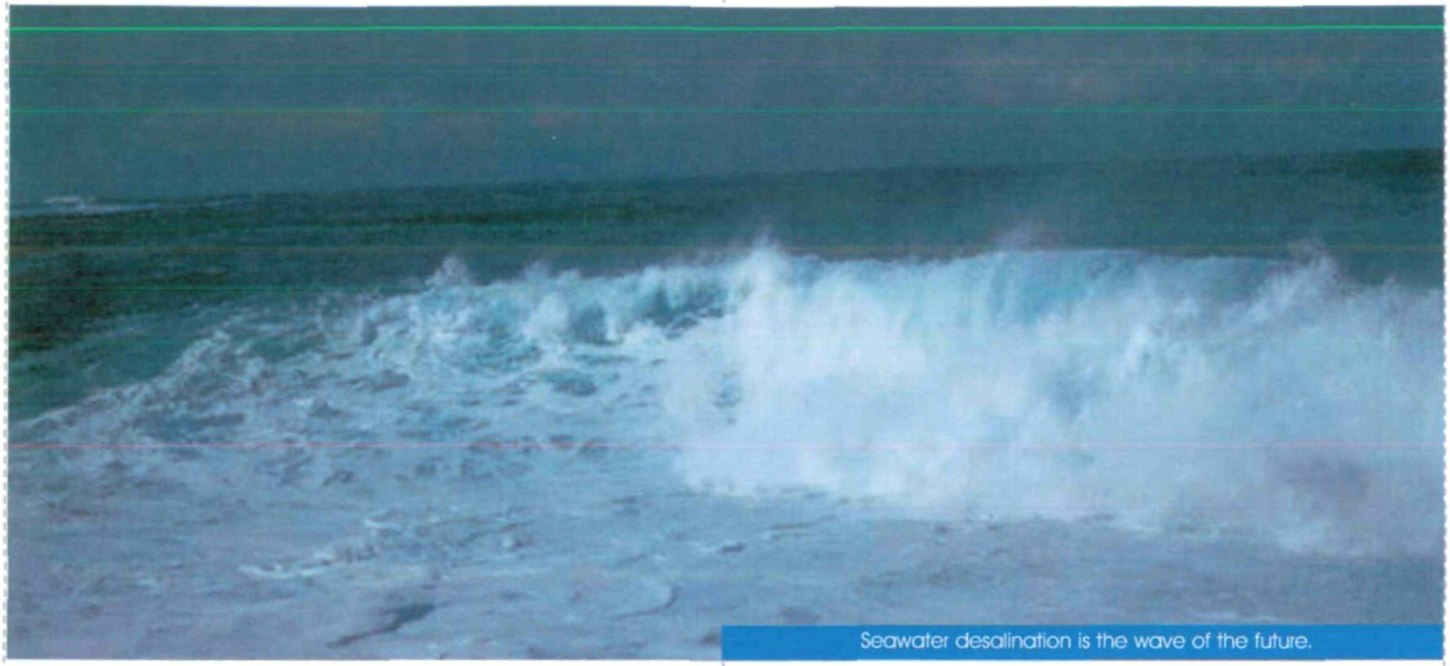


Figure 7-1



Seawater desalination is the wave of the future.

mg/l become problematic for irrigation and industrial reuse customers. This problem greatly limits the potential uses and marketability of recycled water, particularly for agricultural purposes, because certain crops and nursery stock cannot be irrigated with high-TDS water.

SECTION 7.6 SEAWATER DESALINATION

The feedwater source for the proposed regional seawater desalination project at the Encina Power Station in Carlsbad is the Pacific Ocean. The salinity of the Pacific Ocean in San Diego County is fairly stable, with a TDS concentration around 34,000 mg/l. To address TDS concentrations at this level, the desalination facility will use a RO membrane treatment process to reduce the TDS to less than 350 mg/l, resulting in approximately 99 percent removal of TDS and a supply that meets drinking water standards.

Prior to the RO process, the feedwater will be pretreated to remove suspended solids, including organic material. The RO process will then remove the dissolved solids. Next, the product water will be post-treated to prevent corrosion in the distribution system and improve the aesthetic quality of the water. This process generally involves adding alkalinity to the treated water. The final step, a disinfection process, provides a disinfection residual in the treated water.

A single-pass RO process of seawater generally results in about 50 percent recovery of treated water. The remaining 50 percent is discharged as concentrate, with about twice the salinity of the original feedwater. The concentrate will be diluted to avoid negative impacts to the marine environment from the elevated salinity levels at the point of discharge.

SECTION 8 WATER SUPPLY RELIABILITY

As stated in the Act, every urban water supplier shall include, as part of its plan, an assessment of the reliability of its water supply. The water supply and demand assessment must compare the total projected water use with the expected water supply over the next 20 years in 5-year increments. This reliability assessment is required for normal, single dry-year, and multiple dry water years. The assessment contained in the Updated 2005 Plan projects reliability through the next 25 years to correspond with the growth forecast developed by SANDAG and ensure compliance with Senate Bills 610 and 221. In addition to the expected mix of resources utilized in the reliability assessment, a resources goal has been established. The goal includes the expected supplies plus other potential projects that are important to maximizing development of local resources, but are still in the conceptual phase. This section presents a summary of the water demands and supplies within the Water Authority's service area along with the reliability assessment and resources goal.

SECTION 8.1 DEVELOPMENT OF PROJECTED WATER RESOURCES MIX

In summary, development of the projected mix of resources to meet future demands was based on the following factors:

I. Local agency information on projected water recycling, groundwater, surface water, and local seawater desalination supplies (**Section 5**);

II. Update of the Water Authority's 2000 Plan to reflect Board action taken over the last five years related to the following items:

a. Adoption of QSA related agreements (**Section 6.2.1**);
b. Fourth Amendment to the Transfer Agreement (**Section 4.1**); and
c. Agreement between Metropolitan and the Water Authority regarding assignment of agreements related to the AAC and CC Lining Projects (**Section 4.2**).

SECTION 8.2 NORMAL WATER YEAR ASSESSMENT

Table 8-1 shows the normal year assessment, summarizing the total water demands for the Water Authority through the year 2030, along with the supplies necessary to meet demands under normal conditions. **Section 2** contains a discussion of the normal year water demands in the Water Authority's service area. If the Water Authority and member agency supplies are developed as planned, along with implementation of Metropolitan's IRP, no shortages are anticipated within the Water Authority's service area in a normal year through 2030.

Table 8-1: Normal Water Year Supply and Demand Assessment (AF/YR)[1]

	2010	2015	2020	2025	2030
Water Authority Supplies					
IID Water Transfer	70,000	100,000	190,000	200,000	200,000
AAC and CC Lining Projects	77,700	77,700	77,700	77,700	77,700
Subtotal	147,700	177,700	267,700	277,700	277,700
Member Agency Supplies					
Surface Water	59,649	59,649	59,649	59,649	59,649
Water Recycling	33,668	40,662	45,548	46,492	47,584
Groundwater	17,175	18,945	19,775	19,775	19,775
Groundwater Recovery	11,400	11,400	11,400	11,400	11,400
Seawater Desalination	0	34,689	36,064	37,754	40,000
Subtotal	121,892	165,345	172,436	175,070	178,408
Metropolitan Water District Supplies	445,858	399,855	311,374	342,870	372,922
TOTAL PROJECTED SUPPLIES	715,450	742,900	771,510	795,640	829,030
TOTAL ESTIMATED DEMANDS w/Conservation	715,450	742,900	771,510	795,640	829,030

1 Normal water year demands based on 1960 – 2002 hydrology.

SECTION 8.3 DRY WATER YEAR ASSESSMENT

In addition to a normal water year assessment, the Act requires an assessment to compare supply and demands under single dry and multiple dry water years over the next 20 years, in five-year increments. **Section 2** describes the derivation of the dry water year demands. **Table 8-2** shows the single dry-year assessment. The projected groundwater and surface water yields shown in the table are based on historic 1991 supplies during the 1987-1992 drought years. The supplies available from projected recycling and groundwater recovery projects are assumed to experience little, if any, reduction in a dry-year. The Water Authority's existing and planned supplies from the IID transfer, canal lining projects, and seawater desalination are also considered "drought-proof" supplies as discussed in **Section 4**. Therefore, estimated normal yields from these supplies are also included in the analysis.

In accordance with the Act, **Tables 8-3, 8-4, 8-5, 8-6,** and **8-7** show the multiple dry water year assessments in five-year increments. The member agencies' surface and groundwater yields shown in these tables are reflective of supplies available during the 1987-92 drought in years 1990, 1991 and 1992.

As shown in the above tables, if the projected Water Authority and member agency supplies are developed as planned, along with implementation of Metropoli-

Table 8-2: Single Dry Water Year Supply and Demand Assessment
Five Year Increments (AF/YR)

	2010	2015	2020	2025	2030
Water Authority Supplies					
IID Water Transfer	70,000	100,000	190,000	200,000	200,000
AAC and CC Lining Projects	77,700	77,700	77,700	77,700	77,700
Subtotal	147,700	177,700	267,700	277,700	277,700
Member Agency Supplies					
Surface Water	22,284	22,284	22,284	22,284	22,284
Water Recycling	33,668	40,662	45,548	46,492	47,584
Groundwater	10,838	10,838	10,838	10,838	10,838
Groundwater Recovery	11,400	11,400	11,400	11,400	11,400
Seawater Desalination	0	34,698	36,064	37,754	40,000
Subtotal	78,190	119,882	126,134	128,768	132,106
Metropolitan Water District Supplies	541,760	498,388	431,726	442,142	473,224
TOTAL PROJECTED SUPPLIES	767,650	795,970	825,560	848,610	883,030
TOTAL ESTIMATED DEMANDS w/Conservation	767,650	795,970	825,560	848,610	883,030

Multiple Dry Water Year Supply and Demand Assessment
5-Year Increments (AF/YR)

Table 8-3

	2006	2007	2008
Water Authority Supplies	40,000	71,500	71,500
Member Agencies	56,670	60,230	80,900
Metropolitan Supplies	647,850	618,050	602,630
TOTAL ESTIMATED SUPPLIES	744,520	749,780	755,030
TOTAL ESTIMATED DEMANDS	744,520	749,780	755,030

Table 8-4

	2011	2012	2013
Water Authority Supplies	157,700	167,700	177,700
Member Agencies	101,012	100,431	116,970
Metropolitan Supplies	512,698	500,149	488,480
TOTAL ESTIMATED SUPPLIES	771,410	777,280	783,150
TOTAL ESTIMATED DEMANDS	771,410	777,280	783,150

Table 8-5

	2016	2017	2018
Water Authority Supplies	177,700	177,700	207,700
Member Agencies	109,214	108,149	124,194
Metropolitan Supplies	514,116	521,301	481,376
TOTAL ESTIMATED SUPPLIES	801,030	807,150	813,270
TOTAL ESTIMATED DEMANDS	801,030	807,150	813,270

Table 8-6

	2021	2022	2023
Water Authority Supplies	277,700	277,700	277,700
Member Agencies	114,752	112,960	128,288
Metropolitan Supplies	438,228	445,180	435,022
TOTAL ESTIMATED SUPPLIES	830,680	835,840	841,010
TOTAL ESTIMATED DEMANDS	830,680	835,840	841,010

Table 8-7

	2026	2027	2028
Water Authority Supplies	277,700	277,700	277,700
Member Agencies	117,524	115,873	131,343
Metropolitan Supplies	463,256	472,057	463,727
TOTAL ESTIMATED SUPPLIES	858,480	865,630	872,770
TOTAL ESTIMATED DEMANDS	858,480	865,630	872,770

tan's IRP, no shortages are anticipated within the Water Authority's service area under single dry-year or multiple dry water years through 2030. However, the Water Authority is at risk for shortages should the supplies identified in Metropolitan's IRP not be developed as planned or a Metropolitan member agency such as the City of Los Angeles invoke its Section 135, Preferential Right to Water (discussed in **Section 6.1.1**). To alleviate this risk, the Water Authority is pursuing the following options: 1) the development of additional storage; and 2) development of additional seawater desalination. Storage opportunities include local carryover storage facilities to accumulate and store water during periods of availability, as well as the acquisition of out-of-the-region conjunctive-use facilities to develop additional groundwater storage (refer to **Section 1.5.1** for discussion on the Water Authority's proposed carryover storage project). A combination of storage and new supply appears to provide the most reliable solution to alleviating risks during a dry period.

SECTION 8.4 RELIABILITY OF SUPPLY

The previous sections identify the diverse mix of resources planned to meet future demands in both a normal and dry-year. Implementation of this regional resource mix will require development of projects and programs by the Water Authority, its member agencies, and Metropolitan. The Water Authority coordinated with its member agencies and Metropolitan during preparation of the Updated 2005 Plan on the future demands and supplies projected for the region. The steps being taken by the member agencies and Metropolitan to develop supplies are addressed in their respective urban water management plans. **Section 4** contains the steps taken and remaining actions necessary to develop and maintain the Water Authority supplies.

The Act requires that, for any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, that the agency describe, to the extent practicable, plans to replace that source with alternative sources or water demand management measures. As stated throughout the Updated 2005 Plan, the Water Authority and its member agencies are planning to develop a diverse supply of resources. The unavailability of any one supply source will be buffered because of the diversity of the supplies; the region is not reliant on a single source. To replace or supplement an existing supply, the Water Authority could take steps to increase development of transfers or seawater desalination. Member agencies could also further maximize development of recycled water, groundwater, and seawater desalination. With a successful conservation program already in place, the Water Authority and its member agencies could effectively implement extraordinary conservation measures to assist in ensuring reliability. Another element of reliability is Metropolitan's IRP planning buffer, described in **Section 6.1.2**, which identifies an additional increment of water that could be potentially developed if other supplies are not implemented as planned. A combination of these resources would be necessary to ensure a reliable supply.

Quail Botanical Gardens irrigates with recycled water.

As stated in **Section 4.3.1** and **5.3**, seawater desalination remains a key component of the region's diversification strategy. However, because there are a number of factors that could affect implementation of seawater desalination, alternative options are being considered. This includes accelerating construction of an additional imported water conveyance pipeline, Pipeline 6, that would allow for additional supply deliveries from Metropolitan. With a regional seawater desalination project in place, Pipeline 6 would not be needed until approximately 2023. To meet demands without seawater desalination, preliminary results from Metropolitan's draft System Overview Study show that Pipeline 6 would be needed by 2018 and that it would take an estimated nine years to construct. A decision on implementation of a seawater desalination project prior to 2009 would allow adequate time to construct the facility.

Activities associated with implementation of Pipeline 6 include the following:

- Coordination between Metropolitan and the Water Authority regarding planning and design of the pipeline is ongoing; and
- An alignment for the entire approximately 30-mile pipeline was identified in the original 1993 Environmental Impact Report. Metropolitan is conducting a feasibility study to re-visit the 1993 alignment and evaluate alternative alignments north of the San Luis Rey River in light of changed conditions since 1993. The Water Authority plans to conduct a similar feasibility study of Pipeline 6 alignments south of the San Luis Rey River. Based on these updated feasibility studies, an updated environmental analysis for the project is also planned.

SECTION 8.5 REGIONAL WATER SUPPLY GOALS

As stated in **Sections 4 and 5**, those projects with adequate documentation regarding implementation and supply utilization or existing projects already planned for expansion were considered for inclusion in the assessments discussed in **Sections 8.2 and 8.3**. In addition to these verifiable projects, the Water Authority and its member agencies have conceptually identified other potential projects. Combining the verifiable projects and these conceptual projects forms the regional water supply goals.

These supply goals are critical to the region for a number of reasons. The Water Authority and member agencies must continue to strive to develop cost-effective local resources that can further diversify

2030 Water Supply Goals

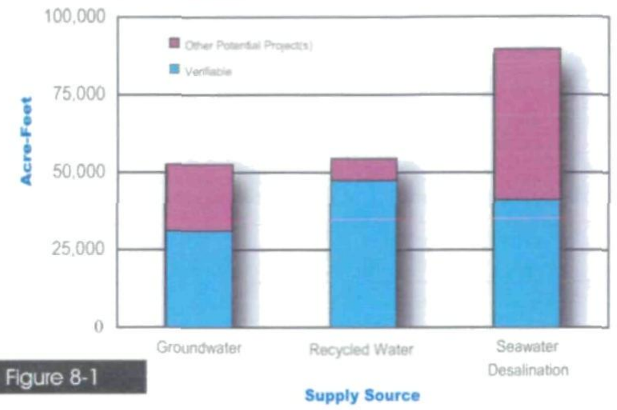


Figure 8-1

the region's supplies and reduce demands for imported water from Metropolitan. They provide objectives for the region to work towards by resolving any funding, regulatory, and other constraints associated with implementation. **Figure 8-1** shows the water supply goals for groundwater, recycled water, and seawater desalination.

The Water Authority worked with its member agencies to determine the verifiable supplies to be included in the assessment and those projects to be included in the supply goals. Including the verifiable supplies contained in the assessment, the regional groundwater production goal is 52,575 AF/YR by 2030. The recycled water goal is 54,413 AF/YR by 2030. The specific local projects are listed in **Table F-2** and **F-4** in **Appendix F**.

The total regional seawater desalination goal for 2030 is 89,600 AF/YR. The goal is achieved through implementation of 40,000 AF/YR of verifiable supply from the local project at the Encina Power Station, based on the contracted amounts and supply utilization, 16,000 AF/YR of additional local supply from the same project, and 33,600 AF/YR of regional supply (Water Authority goal). Refer to **Sections 4.3** and **5.4** for additional information on the derivation of the verifiable and goal supply figures.

SECTION 9 SHORTAGE CONTINGENCY ANALYSIS

The Act requires that urban water agencies conduct a water shortage contingency analysis as part of their Updated 2005 plan. This section includes the Water Authority's analysis, which addresses a catastrophic shortage situation and drought management.

SECTION 9.1 CATASTROPHIC WATER SHORTAGE

A catastrophic water shortage occurs when a disaster, such as an earthquake, results in insufficient available water to meet the region's needs or eliminates access to imported water supplies. The following section describes the Water Authority's Emergency Response Plan (ERP) and the ESP, both developed to protect public health and safety and to prevent or limit economic damage that could occur from a severe shortage of water supplies.

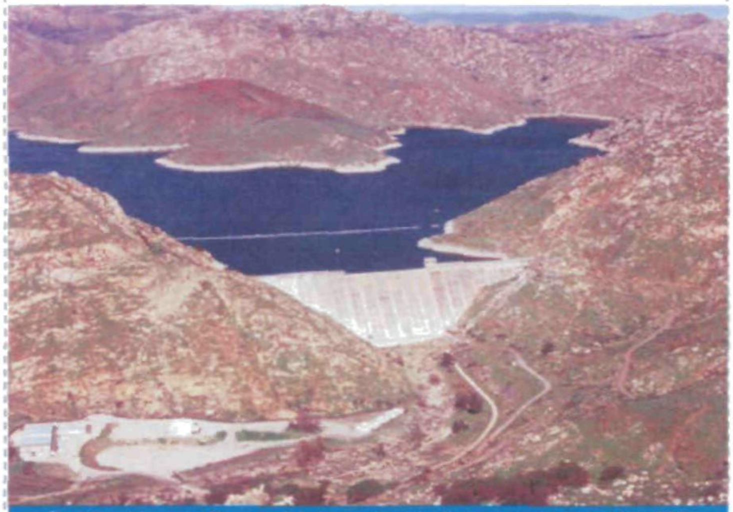
9.1.1 EMERGENCY RESPONSE PLAN

The Water Authority's ERP provides staff with the information necessary to respond to an emergency that causes severe damage to the Water Authority's water distribution system or impedes the Water Authority's ability to provide reliable water service to its member agencies. The ERP describes the situations and incidents that will trigger the activation of the Water Authority's ERP and Emergency Operations Center (EOC). It also provides direction and strategies for responding to a crisis.

The Water Authority's ERP includes:

- Authorities, policies, and procedures associated with emergency response activities;
- EOC activities – including EOC activation and deactivation guidelines;
- Multi-agency and multi-jurisdictional coordination, particularly between the Water Authority, its member agencies, and Metropolitan in accordance with Standardized Emergency Management System (SEMS) guidelines;
- Emergency staffing, management, and organization required to assist in mitigating any significant emergency or disaster;
- Mutual Aid Agreements and covenants that outline the terms and conditions under which mutual aid assistance will be provided;
- Pre-emergency planning and emergency operations procedures.

In addition, the Water Authority's ERP Manual uses a step-by-step approach to emergency response planning by providing such procedural tools as action checklists, resource and information lists, personnel rosters, and listings of established policies and procedures. The Water Authority's plan parallels many of the same plan components contained in the Unified San Diego County Emergency Services Organization's "Operational Area Emergency Plan" (OAEP). In turn, the OAEP serves to support and supplement the Water Authority's ERP.



The San Vicente Reservoir is important to the next phase of the ESP.

9.1.2 WATER AUTHORITY'S EMERGENCY STORAGE PROJECT

In June, 1998, the Water Authority's Board authorized implementation of the ESP to reduce the risk of potential catastrophic damage that could result from a prolonged interruption of imported water due to earthquake, drought, or other disasters.

The ESP is a system of reservoirs, pipelines, and other facilities that will work together to store and move water around the county in the event of a natural disaster. The facilities are located throughout San Diego County and are being constructed in phases. The entire project is expected to be complete by 2012. Its initial phase includes the recently completed 318-foot-high Olivenhain Dam and accompanying 24,789 AF Olivenhain Reservoir. When completed, the ESP will provide 90,100 AF of stored water for emergency purposes to meet the county's needs through at least 2030.

In sizing the ESP, the Water Authority assumed a 75 percent level of service to all Water Authority member agencies during an outage and full implementation of the water conservation BMPs.

The following steps from the final draft of the August 2002 Emergency Water Delivery Plans show the methodology for calculating the allocation of ESP supplies to member agencies in a prolonged outage situation without imported supplies:

1. Estimate the duration of the emergency (i.e. time needed to repair damaged pipelines);
2. Determine each member agency's net demand during the emergency period by adding M&I water demands and agricultural water demands and then subtracting recycled water supplies;
3. Determine each member agency's useable local supplies during the emergency period (local supplies include surface water and groundwater);
4. Determine each member agency's level of service based on usable local supplies and net demand;
5. Adjust the allocation of ESP supplies based on a member agency's participation in the IAWP. IAWP customers will be required to take a reduction in deliveries during a water shortage due to an emergency at double the system-wide reduction up to a maximum of 90%. Water not delivered to IAWP customers will be redistributed to member agencies based on the "system-wide" level of service targets;
6. Determine the amount of local supplies that can be transferred between member agencies, with transfers occurring only after a member agency has a level of service greater than 75% based on their usable local supplies; and
7. Allocate delivery of useable ESP storage supplies and Metropolitan supplies to member agencies with the goal of equalizing the level of service among the member agencies.

The Board of Directors may authorize that supplies from the ESP be used in a prolonged drought situation where imported and local supplies do not meet 75 percent of the Water Authority's member agencies M&I demands.

SECTION 9.2 DROUGHT MANAGEMENT PLANNING

9.2.1 INTRODUCTION

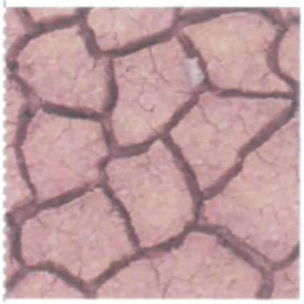
The last major drought in California occurred between 1987 and 1992 and caused severe water supply shortages throughout the state. During early March 1991, at the peak of the drought, Metropolitan's SWP supplies were reduced by 90 percent. Subsequently, Metropolitan voted to impose a 50 percent reduction in imported deliveries to the Water Authority. The results of Metropolitan's cutback would have been devastating to the Water Authority's businesses and residents except for the miracle March rainfall that occurred later that month. These rains allowed the SWP to reduce its level of cutback to 80 percent, and Metropolitan later rolled back its call for reduction from 50 to 31 percent. Even at this level the Water Authority was impacted more than other Metropolitan members because of its high dependence upon imported supplies from Metropolitan.

Since the 1987-1992 drought, the Water Authority and its member agencies have developed plans and implemented projects to reduce reliance on a single supply source. As mentioned in **Section 8**, if projected supplies are developed as planned and Metropolitan's IRP is fully implemented, no shortages are anticipated within the Water Authority's service area through 2030. While the region has plans to provide a high level of reliability, there will always be some level of uncertainty associated with maintaining and developing local and imported supplies. Therefore, the Water Authority developed a comprehensive Drought Management Plan (DMP) in the event that the region faces supply shortages due to drought conditions. The sections below describe the development of the DMP. A copy of the DMP is included in this Updated 2005 Plan as **Appendix G**.


Drought-tolerant plants thrive if water is scarce.

In 1999, Metropolitan adopted the Water Surplus and Drought Management Plan (WSDM Plan) to integrate planned operational actions with respect to both surplus and shortage situations. (For further details on the WSDM Plan actions, refer to Metropolitan's 2005 RUWMP.) The WSDM Plan's final action, to be taken in an extreme shortage stage, is the implementation of an allocation plan. An allocation plan was not developed as part of the WSDM Plan, and it is not known when Metropolitan will consider and adopt such a plan. During development of the DMP, the Water Authority made assumptions regarding the Metropolitan supplies available during drought stages. The Water Authority will adjust the DMP as necessary following Metropolitan's adoption of an allocation plan.

One of the requirements of the shortage contingency analysis included in the Act is an estimate of the minimum supplies available during each of the next three years. **Table 8-3** of **Section 8.3** shows this estimate. The sections below address other requirements of the Act applicable to the Water Authority.



9.2.2 DMP PURPOSE

The DMP provides the Water Authority and its member agencies with a series of actions to take when faced with a shortage of imported water supplies from Metropolitan due to drought conditions. The potential actions will help the region minimize the impacts of shortages and ensure an equitable allocation of supplies.

The DMP includes a drought response matrix containing actions to be taken by the Water Authority at different drought stages. One of the actions, if warranted, is an allocation of available supplies. The Water Authority developed an allocation methodology to include in the DMP. This methodology determines the supplies available to member agencies and how local resources will be handled. A communication strategy was also prepared to help the Water Authority and its member agencies implement the DMP actions. When ultimately faced with a supply shortage, there may be factors unknown at this time that could influence the actions taken. The DMP will provide guidance on how to move forward and minimize the impacts of a shortage situation.

9.2.3 DMP TECHNICAL ADVISORY COMMITTEE

Preparing and implementing a DMP for the San Diego region required input and support from the Water Authority's member agencies. Recognizing the importance of member agency involvement, the Water Authority formed a TAC – Technical Advisory Committee – to provide input on development of the DMP. The TAC included a representative from each of the member agencies. The meetings were facilitated to ensure full involvement from all participants.

To gain an initial understanding of the TAC members' positions on the DMP elements, each member completed a questionnaire. Results from this questionnaire provided valuable information used to develop a set of principles for preparing the DMP.

Proposed elements of the DMP that were developed through the DMP TAC meetings are presented in **Sections 9.2.4, 9.2.5,** and **9.2.6**.

9.2.4 DMP PRINCIPLES

The TAC developed principles to provide guidance to the Water Authority and its member agencies in developing and implementing the DMP. The principles are grouped under elements of the DMP.

Overall Plan

1. The DMP will be developed in cooperation with the member agencies and include all aspects of drought planning - including steps to avoid rationing, drought response stages, allocation methodology, pricing, and communication strategy.

Communication Strategy

2. An on-going, coordinated and regional public outreach program shall be developed by the Water Authority that provides a clear and consistent message to the public regarding water supplies and specific conservation measures. The outreach program will also recognize and support member agency communication efforts that address specific retail level allocations.
3. A Drought Coordination Team, made up of one representative from each member agency, will be established to assist the Water Authority in implementation of the DMP. This includes items such as formulation and implementation of the public outreach program, timing of drought stages, selection of drought supply actions, and addressing potential issues surrounding implementation of the shortage allocation methodology.
4. The drought management plan should specify actions and timing of communications.

Drought Supply Enhancement

5. The Water Authority and its member agencies will work cooperatively to avoid and/or minimize rationing during droughts through supply enhancement and voluntary demand reduction measures.

6. Future Water Authority carryover storage supplies will be managed and utilized to assist in meeting demands during drought periods. Member agencies will be encouraged to develop carryover storage.
7. The Water Authority will consider securing option and/or spot water transfers to meet the reliability goal set by the Board. The cost of this regional supply will be melded into the Water Authority's supply costs for all classes of service that benefit.
8. Subject to the Water Authority's wheeling policy, if a member agency purchases transfer water from a source other than the Water Authority, the full cost of the transfer, including, but not limited to, purchase costs, wheeling costs, and administrative costs, will be borne by said member agency.
9. ESP supplies may be available when any member agency's non-interruptible firm demands drop below a 75 percent service level.
10. The quantities of supplies from the ESP to be removed from storage will be based on a minimum amount necessary to meet essential health, safety, and firefighting needs, and maximum amount based on the need to ensure adequate supplies remain for a catastrophic event (e.g. earthquake).

Drought Response Stages

11. Develop drought response stages, which at a minimum, accomplish the following:
    - Can be easily communicated to the public;
    - Flexible to handle unexpected changes in demand and supply conditions;
    - Includes percent reduction (voluntary or mandatory) per stage; and
    - Includes both supply augmentation and emergency demand reduction methods.
12. Targets for achieving the emergency demand reduction measures should take into account the region's already aggressive long-term water conservation program.
13. The decision on when, and in which sequence drought augmentation supplies will be utilized during different stages will include consideration of the following factors:
    - Location – Out-of-region supplies will be utilized in the earlier stages, prior to in-county storage, because these supplies are more vulnerable to implementation risks such as seismic events;
    - Cost – Priority will be given to maximizing supply reliability and at the same time using the most cost-effective supplies; and
    - Limitations – Potential restrictions on the use of drought augmentation supplies is a factor in determining supply availability (e.g. potential restrictions on ESP supplies).

Allocation Methodology

14. The allocation methodology will be equitable, easy to administer, contain financial penalties and pricing signals, and a communication strategy to ensure member agencies and the public are informed and understand the need to conserve.
15. In order to protect the economic health of the entire region, it is very important for the allocation methodology to avoid large, uneven retail impacts across the region. The methodology should include a minimum level of retail agency reliability to ensure equitable allocation among the member agencies.
16. With the exception of allocating water from the ESP, the Water Authority shall make no distinction among customers paying the same M&I rate (e.g. non-Interim Agricultural Water Program (IAWP) agriculture, residential, commercial, and industrial).
17. Additional IAWP cutbacks beyond the initial 30 percent faced by IAWP customers should be equally applied to both IAWP and M&I customers.
18. A member agency that has developed local projects and instituted conservation measures should not be penalized in the computation of allocations.
19. To help balance out the financial costs and risks associated with development of local resources, the shortage allocation methodology should provide an incentive to those member agencies that have developed local supplies.
20. The base-year, upon which allocations will be derived, will be based on historic demands. Adjustments to the base-year will be made for demographic changes, growth, local supplies, demand hardening, and supplies allocated under interruptible service programs.
21. A member agency's base-year will be adjusted to reflect the regional financial contribution from the Water Authority for development of local projects. The adjustment will take into account the risks associated with developing the local projects.
22. A member agency will not be able to market its unused allocation to other agencies within the Water Authority's service area at a cost higher than the Water Authority's charges for those supplies.
23. Penalty rates, along with other demand reduction measures, will be used by the Water Authority to encourage conservation during a drought.

9.2.5 DROUGHT RESPONSE MATRIX

The Act requires information on the stages of action to be undertaken in response to water supply shortages, including up to a 50 percent reduction in water supply. To meet the requirements, the Water Authority, with input from the TAC, developed a *regional drought response matrix. The matrix* provides guidance to the Water Authority and member agencies in selecting potential regional actions to lessen the severity of shortage conditions. Member agencies will independently adopt retail-level actions to manage potential shortages.

As shown in **Table 9-1**, the matrix proposes three main stages and identifies potential actions available to the Water Authority at each stage. To determine the specific actions that should be taken at each stage, the Water Authority and its member agencies will evaluate conditions specific to the timing and supply availability along with other pertinent variables. Numerous variables can influence the reduction levels adopted during a drought. These variables include, but are not limited to, SWP allocation, conditions on the Colorado River, Water Authority supplies, local storage, local demands, and timing.

MATRIX STAGES AND ACTIONS

Three drought stages have been identified in the matrix. The first stage of the drought response matrix is considered voluntary. The voluntary stage would likely occur when Metropolitan has been experiencing shortages in its imported water supply (from either the Colorado River or the SWP, or both) and is withdrawing water from storage due to the drought conditions to meet normal demands. Actions initiated at this stage include monitoring supply conditions and storage levels, calling for voluntary conservation, and utilizing a prudent amount of supplies from Water Authority planned carryover storage. These actions would continue throughout the drought stages.

The second stage, supply enhancement, could occur in year three or four of a dry period and represents that point in time when Metropolitan reduces water deliveries to its member agencies. The Water Authority's Board of Directors will then consider the potential actions in this stage, or others that may surface, to eliminate any cutbacks to the member agencies from the reduction in Metropolitan supplies.

The final stage follows once both Metropolitan and the Water Authority Board have exhausted all supply enhancement options due to lack of supplies and/or increasing costs, and mandatory cutbacks are required. The actions taken at this stage include implementation of the allocation methodology and potential utilization of ESP supplies. As stated in the DMP Principles, ESP supplies may be available when any member agency's non-interruptible firm demands drop below a 75 percent service level. In addition, the quantities of supplies utilized from ESP storage will be based on a minimum amount necessary to meet essential health, safety, and

Table 9-1: Drought Response Matrix — Firm Demands

	STAGES		
Potential SDCWA Drought Actions	Voluntary	SDCWA Supply Enhancement	Mandatory Cutbacks
Ongoing BMP implementation	X	X	X
Communication strategy	X	X	X
Monitoring supply conditions & storage levels	X	X	X
Call for voluntary conservation	X	X	X
Draw from SDCWA carryover storage	X	X	X
Secure transfer option contracts	X	X	X
Buy phase 1 spot transfers (cost at or below Tier 2 rate)		X	X
Call transfer options		X	X
Buy phase 2 spot transfers (cost at or above Tier 2 rate)		X	X
Implement allocation methodology			X
Utilize ESP Supplies			X

firefighting needs, and maximum amount based on the need to ensure adequate supplies remain for a catastrophic event (e.g. earthquake).

9.2.6 SUPPLY ALLOCATION METHODOLOGY

With the implementation of the member agencies' local projects, the Water Authority's core supplies, and potential drought supply enhancement supplies, the impact from supply shortages from Metropolitan on M&I customers will be reduced and potentially avoided. Preparing a supply allocation methodology is important in order to be prepared for situations that warrant an allocation of supplies to the member agencies. Implementing a supply allocation plan is part of the Water Authority's drought response matrix.

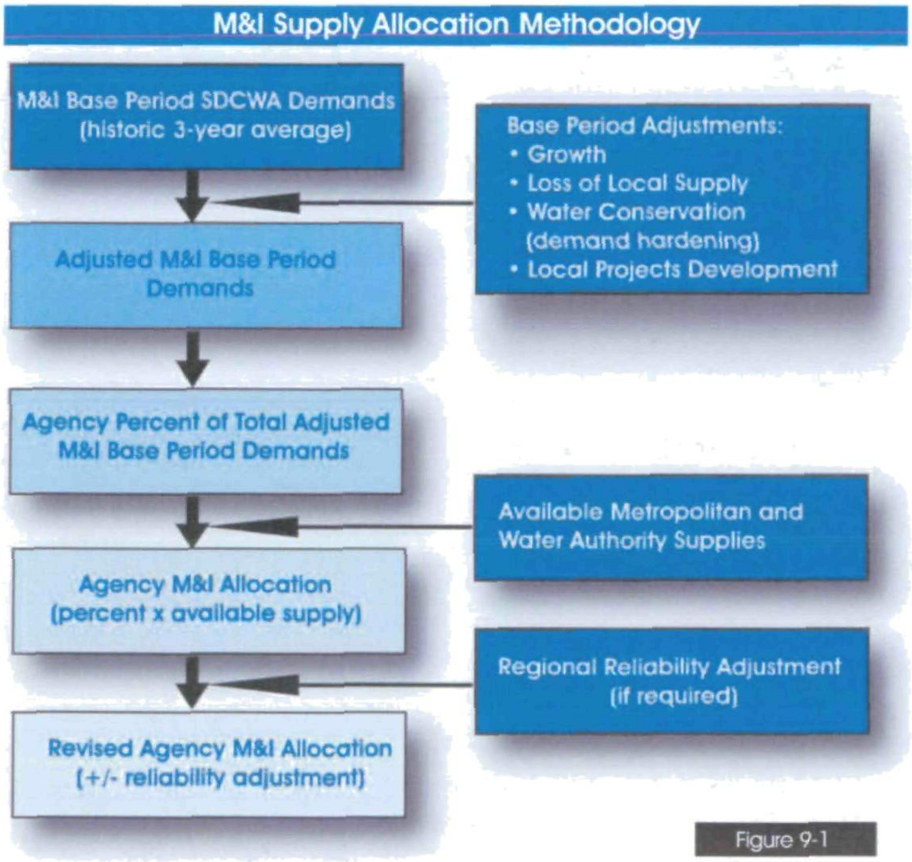


Figure 9-1

Starting with the accepted principles listed in **Section 9.2.4,** the Water Authority worked with the TAC to develop a methodology that is equitable and that recognizes the investments made by agencies that have developed local supplies. The Water Authority's current rate structure notes two classes of service, M&I and IAWP. They receive different levels of service based on the rate paid and are managed separately in the allocation methodology.

IAWP customers have agreed to a reduced level of service in exchange for a discounted supply rate from Metropolitan. Metropolitan prepared draft IAWP Reduction Guidelines that state that IAWP customers will be cut by 30 percent prior to cutbacks to M&I customers. The guidelines do not specify stages and/or levels of cutbacks beyond 30 percent. Based on the guidelines and Principle 17, up to a 30 percent cut will be made to the IAWP base prior to M&I cutbacks. Beyond 30 percent, supplies will be allocated equally between IAWP and M&I. In preparing the allocation methodology for the DMP, the Water Authority incorporated the conditions included in the guidelines.

The Water Authority developed a separate allocation methodology for those customers paying the M&I rate. They include residential, commercial, industrial, and non-IAWP agricultural customers. **Figure 9-1** provides the general approach to allocate supplies to M&I customers in a shortage situation.

The elements of the proposed allocation methodology:

HISTORICAL BASE PERIOD

A historic base period demand is required to establish an agency's pre-allocation demand on the Water Authority. Base period M&I demands are calculated using data from the three most recently completed fiscal years immediately preceding the year in which an allocation process is needed due to supply shortages. Each agency's base period M&I demand is established by calculating their three-year average of demand.

Base period demands for agriculture are certified through Metropolitan's IAWP program and are calculated using a different approach. For IAWP demands, only the most recently completed single fiscal year prior to the imposition of an allocation is considered. This calculation is required by Metropolitan's Draft IAWP Reduction Guidelines.

ADJUSTMENTS

M&I adjustments to be applied to the base period were developed to equitably account for relevant factors in calculating each agency's allocation. Such factors include growth, demand hardening levels due to conservation, local supply availability from groundwater and surface reservoirs, and efforts taken by local agencies to develop reliable local projects such as recycled water, groundwater recovery, and seawater desalination. The adjustments are intended to acknowledge unique agency characteristics and provide an incentive for agencies to decrease their reliance on imported supplies over the long-term. Consistent with the Draft IAWP Reduction Guidelines, no adjustments are made to the IAWP base demand.

ADJUSTED BASE PERIOD

An agency's adjusted base period M&I demand is calculated by adding the applicable adjustments to their initial base period M&I demand. The adjusted base period M&I demand amount is then used to generate an agency's pro-rata percent share of the total adjusted base period M&I demand. It is this percentage that is used to calculate an agency's imported M&I supply allocation volume.

ALLOCATION OF AVAILABLE SUPPLIES

To determine the amount of the Water Authority and Metropolitan supplies that will be available to each member agency, a member agency's percent share of the total M&I adjusted base period is calculated. This percent is then applied to supplies available for M&I demands to derive an allocation for each member agency. For IAWP customers, a percent share of the total IAWP base-year demands is calculated. This percent is applied to the IAWP supplies available following the initial 30 percent cutback and subsequent cutbacks to calculate an allocation of IAWP supplies for each member agency.

REGIONAL RELIABILITY ADJUSTMENT (IF NEEDED)

In accordance with Principle 15, which states, *"In order to protect the economic health of the entire region, it is very important for the allocation methodology to avoid large, uneven retail impacts across the region. The methodology should include a minimum level of retail agency reliability to ensure equitable allocation among the member agencies,"* a regional M&I reliability floor was established. The floor, if needed, is set at 5% below the region's total M&I level of service and is triggered when the net cutback to total Water Authority supplies reaches or exceeds 30 percent. Taking into account the supply development by the Water Authority, its member agencies, and Metropolitan, this level of cutback is very unlikely.

9.2.7 REVENUE IMPACTS

The Water Authority has taken significant steps to reduce potential revenue impacts resulting from fluctuating water sales. In FY 1990, the Water Authority created a Rate Stabilization Fund (RSF) to provide funds that would mitigate the need for rate increases in the event of an unexpected decline in water sales. The RSF is structured in accordance with Board policy to maintain a minimum balance of at least 25 percent of the Water Authority's net water sales revenue. RSF is constrained by a maximum balance of 100 percent of the average annual water sales projected over a four-year period. As a result, the RSF is a crucial water rate management tool.

Additionally, on January 1, 2003, the Water Authority implemented a new rate structure that substantially increased the percentage of water revenues generated from fixed charges. This increase replaced the previous variable "postage stamp" rate, which historically generated as much as 80 percent or more of total annual revenues, with two fixed charges, and one variable rate. These new fixed charges – Customer Service and Storage – are key components to the Water Authority's future revenue stability.

9.2.8 MANDATORY WATER USE PROHIBITIONS

The Water Authority's powers to enforce restrictions on use are constrained by the provision of the County Water Authority Act, which states, "If available supplies become inadequate to fully meet the needs of its member agencies, the board shall adopt reasonable rules, regulations, and restrictions so that the available supplies are allocated among its member agencies for the greatest public interest and benefit." (West's Cal. Wat. C, Append. § 45-5, para. (11).) Pursuant to this authority, the Water Authority developed a drought management plan that includes rules and regulations for water allocation among its member agencies during a water shortage. These rules take into consideration whether its member agencies have developed shortage management plans to meet targeted reductions in total water demand during a shortage. Because the Water Authority's member agencies, not the Water Authority, have the direct customer service relationship with water users, the member agencies have responsibility to address mandatory use prohibitions during water shortages in their individual urban water management plans.

9.2.9 PENALTIES FOR EXCESSIVE WATER USE

Should the Water Authority have to allocate imported water supplies from Metropolitan due to drought conditions, as identified in Section 5 of the Water Authority's DMP (**Appendix G**), Metropolitan can impose surcharges (penalty pricing) on water consumption in excess of the Water Authority's imported water allocation from Metropolitan. Penalties are expected to be severe, as much as three times Metropolitan's full service water rate. See **Appendix G, page D-9**, for more information on Metropolitan's Water Surplus and Drought Management Plan (WSDM Plan).

The Water Authority's Board of Directors has the authority to adjust water rates to reflect any penalties imposed by Metropolitan under Metropolitan's WSDM Plan or other allocation programs as determined necessary by the Board of Directors. Rates may also be adjusted based on any other allocation program implemented by the Water Authority as determined necessary by the Board of Directors. The Water Authority may also reduce the amount of water it allocates to a member agency if the member agency fails to adopt or implement water use restrictions.

SECTION 9.3 SUMMARY

The shortage contingency analysis included in this section and in **Appendix G** demonstrates that the Water Authority and its member agencies, through the ERP and ESP, are taking actions to prepare for and appropriately handle a catastrophic interruption of water supplies. The analysis also described the coordinated development of a DMP for the San Diego region. The DMP identifies the actions to be taken by the Water Authority to minimize the impacts of a supply shortage due to a drought and includes an allocation methodology to be used if cutbacks are necessary. The analysis and **Appendix G** address the appropriate requirements of the Act that are applicable to the Water Authority.

25

Federal Register

Tuesday,
December 18, 2001

Part II

Environmental Protection Agency

40 CFR Parts 9, 122, et al.

National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 9, 122, 123, 124, and 125

[FRL–7105–4]

RIN 2040–AC34

National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Today's final rule implements section 316(b) of the Clean Water Act (CWA) for new facilities that use water withdrawn from rivers, streams, lakes, reservoirs, estuaries, oceans or other waters of the United States (U.S.) for cooling purposes. The final rule establishes national technology-based performance requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities. The national requirements establish the best technology available, based on a two-track approach, for minimizing adverse environmental impact associated with the use of these structures.

Based on size, Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain waterbodies (referred to as "proportional-flow requirements"). It also requires the permit applicant to select and implement design and construction technologies under certain conditions to minimize impingement mortality and entrainment. Track II allows permit applicants to conduct site-specific studies to demonstrate to the Director that alternatives to the Track I requirements will reduce impingement mortality and entrainment for all life stages of fish and shellfish to a level of reduction comparable to the level the facility would achieve at the cooling water intake structure if it met the Track I requirements.

EPA expects that this final regulation will reduce impingement and entrainment at new facilities. Today's final rule establishes requirements that will help preserve aquatic organisms and the ecosystems they inhabit in waters used by cooling water intake structures at new facilities. EPA has considered the potential benefits of the rule; these include a decrease in expected mortality or injury to aquatic organisms that would otherwise be subject to entrainment into cooling water systems or impingement against screens or other devices at the entrance of cooling water intake structures. Benefits may also accrue at population, community, or ecosystem levels of ecological structures. The preamble discusses these benefits to the extent possible in qualitative terms.

DATES: This regulation shall become effective January 17, 2002. For judicial review purposes, this final rule is promulgated as of 1:00 p.m. Eastern Standard Time (EST) on January 2, 2002, as provided in 40 CFR 23.2.

ADDRESSES: The public record for this rule is established under docket number W–00–03. Copies of comments received, EPA responses, and all other supporting documents (except for information claimed as Confidential Business Information (CBI)) are available for review in the EPA Water Docket, East Tower Basement, Room EB–57, 401 M Street, SW., Washington, DC 20460. The record is available for inspection from 9:00 a.m. to 4:00 p.m. Monday through Friday, excluding legal holidays. For access to the docket materials, please call (202) 260–3027 to schedule an appointment.

FOR FURTHER INFORMATION CONTACT: For additional technical information contact Deborah G. Nagle at (202) 260–2656. For additional biological information contact Debbi Hart at (202) 260–0905. For additional economic information contact Ghulam Ali at (202) 260–9886. The e-mail address for the above contacts is *rule.316b@epa.gov*.

SUPPLEMENTARY INFORMATION:

What Entities Are Regulated by This Action?

This final rule applies to new greenfield (defined by example in section I. of this preamble) and stand alone facilities that use cooling water intake structures to withdraw water from waters of the U.S. and that have or require a National Pollutant Discharge Elimination System (NPDES) permit issued under section 402 of the CWA. New facilities subject to this regulation include those that have a design intake flow of greater than two (2) million gallons per day (MGD) and that use at least twenty-five (25) percent of water withdrawn for cooling purposes. Generally, facilities that meet these criteria fall into two major groups: new steam electric generating facilities and new manufacturing facilities. If a new facility meets these conditions, it is subject to today's final regulations. If a new facility has or requires an NPDES permit but does not meet the two MGD intake flow threshold or uses less than 25 percent of its water for cooling water purposes, the permit authority will implement section 316(b) on a case-by-case basis, using best professional judgment. This final rule defines the term "cooling water intake structure" to mean the total physical structure and any associated constructed waterways used to withdraw water from a water of the U.S. The cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to and including the intake pumps. Today's rule does not apply to existing facilities including major modifications to existing facilities that would be "new sources" in 40 CFR 122.29 as that term is used in the effluent guidelines and standards program. Although EPA has not finished examining the costs of technology options at existing facilities, the Agency anticipates that existing facilities would have less flexibility in designing and locating their cooling water intake structures than new facilities and that existing facilities might incur higher compliance costs than new facilities. For example, existing facilities might need to upgrade or modify existing intake structures and cooling water systems to meet requirements of the type contained in today's rule, which might impose greater costs than use of the same technologies at a new facility. Retrofitting technologies at an existing facility might also require shutdown periods during which the facility would lose both production and revenues, and certain retrofits could decrease the thermal efficiency of an electric generating facility. Site limitations, such as lack of undeveloped space, might make certain technologies infeasible at existing facilities. Accordingly, EPA does not intend that today's rule or preamble serve as guidance for developing section 316(b) requirements for existing facilities. Permit writers should continue to apply best professional judgment in making case-by-case section 316(b) determinations for existing facilities, based on existing guidance and other legal authorities. EPA will address existing facilities fully in Phase II and Phase III rulemakings.

The following table lists the types of entities that EPA believes are potentially subject to this final rule. This table is not intended to be exhaustive; rather, it provides a guide for readers regarding entities likely to be regulated by this action. Other types of entities not listed in the table could also be regulated. To determine whether your facility is regulated by this action, you should carefully examine the applicability criteria at § 125.81 of the rule. If you have questions regarding the applicability of this action to a particular entity, consult one of the persons listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

Category	Examples of regulated entities	Standard Industrial Classification (SIC) Codes	North American Industry Classification System (NAICS) Codes
Federal, State and Local Government.	Operators of steam electric generating point source dischargers that employ cooling water intake structures.	4911 and 493	221111, 221112, 221113, 221119, 221121, 221122, 221111, 221112, 221113, 221119, 221121, 221122.
Industry	Operators of industrial point source dischargers that employ cooling water intake structures.	See below	See below.
	Steam electric generating	4911 and 493	221111, 221112, 221113, 221119, 221121, 221122, 221111, 221112, 221113, 221119, 221121, 221122.
	Agricultural production	0133	111991, 11193.
	Metal mining	1011	21221.
	Oil and gas extraction (excluding offshore and coastal subcategories).	1311, 1321	211111, 211112.
	Mining and quarrying of nonmetallic minerals.	1474	212391.
	Food and kindred products	2046, 2061, 2062, 2063, 2075, 2085	311221, 311311, 311312, 311313, 311222, 311225, 31214.
	Tobacco products	2141	312229, 31221.
	Textile mill products	2211, 2261	31321.
	Lumber and wood products, except furniture.	2415, 2421, 2436, 2493	321912, 321113, 321918, 321999, 321212, 321219.
	Paper and allied products	2611, 2621, 2631, 2676, 2679	3221, 322121, 32213, 322121, 322122, 32213, 322291.
	Chemical and allied products	28 (except 2822, 2835, 2836, 2842, 2843, 2844, 2861, 2895, 2893, 2851, and 2879).	325 (except 325182, 32591, 32551, 32532).
	Petroleum refining and related industries.	2911, 2999	32411, 324199.
	Rubber and miscellaneous plastics products.	3011, 3069	326211, 31332, 326192, 326299.
	Stone, clay, glass, and concrete products.	3241	32731.
	Primary metal industries	3312, 3313, 3315, 3316, 3317, 3334, 3339, 3353, 3357.	324199, 331111, 331112, 331492, 331222, 332618, 331221, 22121, 331312, 331419, 331315, 331521, 331524, 331525.
	Fabricated metal products, except machinery and transportation equipment.	3421, 3499	332211, 337215, 332117, 332439, 33251, 332919, 339914, 332999.
	Industrial and commercial machinery and computer equipment.	3523, 3531	333111, 332323, 332212, 333922, 22651, 333923, 33312.
	Transportation equipment	3724, 3743, 3764	336412, 333911, 33651, 336416.
	Measuring, analyzing, and controlling instruments; photographic, medical, and optical goods; watches and clocks.	3861	333315, 325992.
	Electric, gas, and sanitary services	4911, 4931, 4939, 4961	221111, 221112, 221113, 221119, 221121, 221122, 22121, 22133.
	Educational services	8221	61131.
	Engineering, Accounting, Research, Management, and Related Services.	8731	54171.

Supporting Documentation

The final regulation is supported by two major documents:

1. *Economic Analysis of the Final Regulations Addressing Cooling Water Intake Structures for New Facilities* (EPA–821–R–01–035), hereafter referred to as the *Economic Analysis*. This document presents the analysis of compliance costs, barrier to entry, and energy supply effects. In addition, the document provides an assessment of potential benefits.

2. *Technical Development Document for the Final Regulations Addressing Cooling Water Intake Structures for New Facilities* (EPA–821–R–01–036), hereafter referred to as the *Technical Development Document*. This document presents detailed information on the methods used to develop unit costs and describes the set of technologies that may be used to meet the rule's requirements.

How To Obtain Supporting Documents

You can obtain the *Economic Analysis* and *Technical Development Document* from the Agency's 316(b) website (http://www.epa.gov/ost/316b). The documents are also available from the National Service Center for Environmental Publications, P.O. Box

42419, Cincinnati, OH 45242–2419; telephone (800) 490–9198 and the Water Resource Center , U.S. EPA, 1200 Pennsylvania Avenue, N.W. (RC 4100), Washington D.C. 20460 (202) 260–2814.

Organization of This Document

I. Scope of This Rulemaking

Today's final rule establishes technology-based performance requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities under section 316(b) of the Clean Water Act. The rule establishes the best technology available for minimizing adverse environmental impact associated with the use of these structures. Today's final rule also partially fulfills EPA's obligation to comply with a consent decree entered in the United States District Court, Southern District of New York in *Riverkeeper Inc., et al. v. Whitman*, No. 93 Civ. 0314 (AGS). (For a more detailed discussion of the consent decree, see II.C.2).

This final rule applies to new greenfield or stand alone facilities: (1) that use a newly constructed cooling water intake structure, or a modified existing cooling water intake structure whose design capacity is increased that withdraws water from waters of the U.S.; and (2) that has or is required to have a National Pollutant Discharge Elimination System (NPDES) permit issued under section 402 of the CWA. Specifically, the rule applies to you if you are the owner or operator of a facility that meets all of the following criteria:

- Your greenfield or stand alone facility meets the definition of new facility specified in § 125.83 of this rule;
- Your new facility uses a newly constructed or modified existing cooling water intake structure or structures, or your facility obtains cooling water by any sort of contract or arrangement with an independent supplier who has a cooling water intake structure;
- Your new facility's cooling water intake structure(s) withdraw(s) water from waters of the U.S. and at least twenty-five (25) percent of the water withdrawn is used for contact or noncontact cooling purposes;
- Your new facility has a design intake flow of greater than two (2) million gallons per day (MGD); and
- Your new facility has an NPDES permit or is required to obtain one.

If a new facility meets these conditions, it is subject to today's final regulations. If a new facility has or requires an NPDES permit but does not meet the two MGD intake flow threshold or the twenty-five percent cooling water use threshold, it is not subject to permit conditions based on today's rule; rather, it is subject to permit conditions implementing section 316(b) of the CWA set by the permit director on a case-by-case basis, using best professional judgment.

A. What Is a New Facility?

A new facility subject to this regulation is any facility that meets the definition of "new source" or "new discharger" in 40 CFR 122.2 and 122.29(b)(1), (2), and (4); commences construction after January 17, 2002; and uses either a newly constructed cooling water intake structure, or an existing cooling water intake structure whose design capacity is increased; or obtains cooling water by any sort of contract or arrangement with an independent supplier who has a cooling water intake structure. The term "commence construction" is defined in 40 CFR 122.29(b)(4).

As stated above, this rule applies to only "greenfield" and "stand-alone" facilities. A greenfield facility is a facility that is constructed at a site at which no other source is located, or that totally replaces the process or production equipment at an existing facility (see 40 CFR 122.29(b)(1)(i) and (ii)). A stand-alone facility is a new, separate facility that is constructed on property where an existing facility is located and whose processes are substantially independent of the existing facility at the same site (see 40 CFR 122.29(b)(1)(iii)). An example of total replacement is as follows: The power plant or manufacturer demolishes the power plant or manufacturing facility and builds a new plant or facility in its place. The pumps of the existing cooling water intake structure are replaced with new pumps that increase design capacity to accommodate additional cooling water needs, but the intake pipe is left in place. In this situation, the facility would be a new facility. Modifications to an existing cooling water intake structure that do not serve the cooling water needs of a greenfield or stand-alone facility in 40 CFR 122.2 and 122.29(b)(1), (2), and (4) (i.e., a facility that meets the definition of new source or new discharger and commences construction after the effective date of the rule) do not constitute a new facility subject to this rule. Thus, the definition of new facility under this rule is narrower than the definition of new source under section 306 of the CWA.

The definition of new facility also requires that the greenfield or stand-alone facility use "a newly constructed cooling water intake structure or an existing cooling water intake structure whose design capacity is increased to accommodate the intake of additional cooling water." This means a facility that would otherwise be a "new facility" would *not* be treated as a new facility under this rule if it withdraws water from an existing cooling water intake structure whose design capacity has not been increased to accommodate the intake of additional cooling water. Routine maintenance and repair, such as replacement of pumps that does not increase the capacity of the structure, cleaning in response to biofouling, and repair or replacement of moving parts at a cooling water intake that is part of a greenfield or stand-alone facility, and that occur simply for operation and maintenance purposes, would not be a modification of that intake structure. One way to distinguish whether replacement of the pipes or the pumps is for maintenance and repair purposes or whether it is to accommodate construction of a new facility is to determine whether the replacement increases the original design capacity. Today's rule specifies that changes to a cooling water intake structure are considered modifications for purposes of this rule only if such changes result in an increase in design capacity. Thus, routine maintenance or repair of the cooling water intake structure, including the pumps, that does not result in an increase in design capacity does not modify a cooling water intake structure. However, if a change is made to the cooling water intake structure, including the pumps, that increases design capacity to any extent, then the cooling water intake structure has been modified; use of this structure by a greenfield or stand-alone facility would make the facility a new facility subject to this rule.

B. What Is a Cooling Water Intake Structure?

For the purposes of this rule a "cooling water intake structure" is defined as the total physical structure and any associated constructed waterways used to withdraw water from waters of the U.S. The cooling water intake structure extends from the point at which water is withdrawn from waters of the U.S. up to and including the intake pumps. EPA has defined "cooling water" as water used for contact or noncontact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content. The Agency has specified that the intended use of cooling water is to absorb waste heat from production processes or auxiliary operations. In addition, for the final rule EPA has amended the definition of cooling water to ensure that the rule does not discourage the reuse of cooling water as process water. As such, heated cooling water that is subsequently used in a manufacturing process is considered process water for the purposes of calculating the percentage of a new facility's intake flow that is used for cooling purposes.

C. What Cooling Water Use and Design Intake Flow Thresholds Result in a New Facility Being Subject to This Final Rule?

This rule applies to new facilities that (1) withdraw cooling water from waters of the U.S. and use at least twenty-five (25) percent of the water withdrawn for cooling purposes and (2) have a cooling water intake structure with a design intake capacity of greater than or equal to two (2) million gallons per day (MGD) of source water. See 40 CFR 125.81 of this rule. The percentage of total water withdrawn that is used for cooling purposes is to be measured on an average monthly basis over a period of one year. See 40 CFR 125.81(c) of this rule. A new facility meets the 25 percent cooling water use threshold if, on the basis of the new facility's design when measured over a period of one year, any monthly average percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn. Waters of the U.S. include the broad range of surface waters that meet the regulatory definition at 40 CFR 122.2, which can include lakes, ponds, reservoirs, nontidal rivers or streams, tidal rivers, estuaries, fjords, oceans, bays, and coves.

Some commenters questioned whether the discussion of cooling ponds in the preamble to the proposal (65 FR 49067, col. 2) meant that EPA considers cooling ponds to be "waters of the United States." EPA did not intend that discussion to change the regulatory status of cooling ponds. Cooling ponds are neither categorically included nor categorically excluded from the definition of "waters of the United States" at 40 CFR 122.2. EPA interprets 40 CFR 122.2 to give permit writers discretion to regulate cooling ponds as "waters of the United States" where cooling ponds meet the definition of "waters of the United States." The determination whether a particular cooling pond is or is not "waters of the United States" is to be made by the permit writer on a case-by-case basis, informed by the principles enunciated in *Solid Waste Agency of Northern Cook County* v. *US Army Corps of Engineers*, 531 U.S. 159 (2001).

D. Does This Rule Apply to My Facility If It Does Not Have a Point Source Discharge Subject to an NPDES Permit?

Today's final rule applies only to new facilities as defined in § 125.83 that have an NPDES permit or are required to obtain one because they discharge or might discharge pollutants, including storm water, from a point source to waters of the United States. Requirements for minimizing the adverse environmental impact of cooling water intake structures will continue to be applied through NPDES permits.

E. What Requirements Must I Meet Under the Final Rule?

Today's final rule establishes a two-track approach for regulating cooling water intake structures at new facilities. Track I establishes uniform requirements based on facility cooling water intake capacity. Track II provides dischargers with the opportunity to establish that alternative requirements will achieve comparable performance. The regulated entity has the opportunity to choose which track it will follow. The Track I and Track II requirements are summarized below.

Under Track I, new facilities with a design intake flow equal to or greater than 10 MGD, must meet the following requirements:

(1) Cooling water intake flow must be at a level commensurate with that achievable with a closed-cycle,

recirculating cooling system; (40 CFR 125.84(b)(1))

(2) Through-screen intake velocity must be less than or equal to 0.5 feet per second; (40 CFR 125.84(b)(2))

(3) Location- and capacity-based limits on proportional intake flow must be met (for fresh water rivers or streams, intake flow must be less than or equal to 5 percent of the mean annual flow; for lakes or reservoirs, intake flow may not disrupt natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies); for estuaries or tidal rivers, intake flow must be less than or equal to 1 percent of the tidal excursion volume; for oceans, there are no proportional flow requirements); (40 CFR 125.84(b)(3)) and

(4) Design and construction technologies for minimizing impingement mortality and entrainment must be selected and implemented if certain conditions exist where the cooling water intake structure is located. (40 CFR 125.84(b)(4) and (5))

Under Track I, new facilities with a design intake flow equal to or greater than 2 MGD, but less than 10 MGD, must meet the following requirements:

(1) Through-screen intake velocity must be less than or equal to 0.5 feet per second; (40 CFR 125.84(c)(1))

(2) Location- and capacity-based limits on proportional intake flow must be met (for fresh water rivers or streams, intake flow must be less than or equal to 5 percent of the mean annual flow; for lakes or reservoirs, intake flow may not disrupt natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies); for estuaries or tidal rivers, intake flow must be less than or equal to 1 percent of the tidal excursion volume; for oceans, there are no proportional flow requirements); (40 CFR 125.84(c)(2)) and

(3) Design and construction technologies for minimizing impingement mortality must be selected if certain conditions exist where the cooling water intake structure is located 125.84(c)(3); and design and construction technologies for minimizing entrainment must be selected and implemented. (40 CFR 125.84(c)(4))

Under Track II, new facilities must meet the following requirements:

(1) Employ technologies that will reduce the level of adverse environmental impact to a comparable level to that which would be achieved under the Track I requirements (as demonstrated in a Comprehensive Demonstration Study); (40 CFR 125.84(d)(1))

(2) The same proportional intake flow limitations as in Track I, based on the intake source water, must be met; (40 CFR 125.84(d)(2)).

Section IV.B and V. of this preamble provides a more detailed discussion of the requirements included under this two-track approach. The two-track approach provides new facilities with a well-defined set of requirements that constitute best technology available (BTA) for minimizing adverse environmental impact and can be implemented relatively quickly. This approach also provides flexibility to operators who believe alternative or emerging technologies would be just as effective at reducing impingement and entrainment.

II. Legal Authority, Purpose and Background of Today's Regulation

A. Legal Authority

Today's final rule is issued under the authority of sections 101, 301, 304, 306, 308, 316, 401, 402, 501, and 510 of the Clean Water Act (CWA), 33 U.S.C. 1251, 1311, 1314, 1316, 1318, 1326, 1341, 1342, 1361, and 1370. This rule partially fulfills the obligations of the U.S. Environmental Protection Agency (EPA) under a consent decree in *Riverkeeper Inc., et al.* v. *Whitman*, United States District Court, Southern District of New York, No. 93 Civ. 0314 (AGS).

B. Purpose of Today's Regulation

Section 316(b) of the CWA provides that any standard established pursuant to section 301 or 306 of the CWA and applicable to a point source must require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact. Today's final rule defines a cooling water intake structure as the total physical structure, including the pumps, and any associated constructed waterways used to withdraw water from waters of the U.S. Cooling water absorbs waste heat from processes employed or from auxiliary operations on a facility's premises. Single cooling water intake structures might have multiple intake bays. Today's final rule establishes requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities that withdraw at least two (2) million gallons per day (MGD) and use at least twenty-five (25) percent of the water they withdraw for cooling purposes. Today's final rule establishes best technology available for minimizing adverse environmental impact associated with the intake of water from waters of the U.S. at these structures. See part III for further discussion of the environmental impact associated with cooling water intake structures.

C. Background

1. The Clean Water Act

The Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), 33 U.S.C. 1251 *et seq.*, seeks to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." 33 U.S.C. 1251(a). The CWA establishes a comprehensive regulatory program, key elements of which are (1) a prohibition on the discharge of pollutants from point sources to waters of the U.S., except as authorized by the statute; (2) authority for EPA or authorized States or Tribes to issue National Pollutant Discharge Elimination System (NPDES) permits that regulate the discharge of pollutants; and (3) requirements for EPA to develop effluent limitation guidelines and standards and for States to develop water quality standards that are the basis for the limitations required in NPDES permits.

Today's final rule implements section 316(b) of the CWA as it applies to "new facilities" as defined in this rule. 316(b) addresses the adverse environmental impact caused by the intake of cooling water, not discharges into water. Despite this special focus, the requirements of section 316(b) are closely linked to several of the core elements of the NPDES permit program established under section 402 of the CWA to control discharges of pollutants into navigable waters. For example, section 316(b) applies to facilities that withdraw water from the waters of the United States for cooling through a cooling water intake structure and are point sources subject to an NPDES permit. Conditions implementing section 316(b) are included in NPDES permits and will continue to be included in NPDES permits under this final rule.

Section 301 of the CWA prohibits the discharge of any pollutant by any person, except in compliance with specified statutory requirements. These requirements include compliance with technology-based effluent limitation guidelines and new source performance standards, water quality standards, NPDES permit requirements, and certain other requirements.

Section 402 of the CWA provides authority for EPA or an authorized State or Tribe to issue an NPDES permit to any person discharging any pollutant or combination of pollutants from a point source into waters of the U.S. Forty-four States and one U.S. territory are authorized under section 402(b) to administer the NPDES permitting program. NPDES permits restrict the types and amounts of pollutants, including heat, that may be discharged from various industrial, commercial, and other sources of wastewater. These permits control the discharge of pollutants primarily by requiring dischargers to meet effluent limitations and other permit conditions. Effluent limitations may be based on promulgated federal effluent limitation guidelines, new source performance standards, or the best professional judgment of the permit writer. Limitations based on these guidelines, standards, or best professional judgment are known as technology-based effluent limits. Where technology-based effluent limits are inadequate to ensure compliance with water quality standards applicable to the receiving water, more stringent effluent limits based on applicable water quality standards are required. NPDES permits also routinely include monitoring and reporting requirements, standard conditions, and special conditions.

Sections 301, 304, and 306 of the CWA require that EPA develop technology-based effluent limitation guidelines and new source performance standards that are used as the basis for technology-based minimum discharge requirements in wastewater discharge permits. EPA issues these effluent limitation guidelines and standards for categories of industrial dischargers based on the pollutants of concern discharged by the industry, the degree of control that can be attained using various levels of pollution control technology, consideration of various economic tests appropriate to each level of control, and other factors identified in sections 304 and 306 of the CWA (such as non-water quality environmental impacts including energy impacts). EPA has promulgated regulations setting effluent limitation guidelines and standards under sections 301, 304, and 306 of the CWA for more than 50 industries. See 40 CFR parts 405 through 471. Among these, EPA has established effluent limitation guidelines that apply to most of the industry categories that use cooling water intake structures (e.g., steam electric power generation, iron and steel manufacturing, pulp and paper manufacturing, petroleum refining, chemical manufacturing).

Section 306 of the CWA requires that EPA establish discharge standards for new sources. For purposes of section 306, new sources include any source that commenced construction after the promulgation of applicable new source performance standards, or after proposal of applicable standards of performance if the standards are promulgated in accordance with section 306 within 120 days of proposal. CWA section 306; 40 CFR 122.2. New source performance standards are similar to the technology-based limitations established for existing sources, except that new source performance standards are based on the best available demonstrated technology instead of the best available technology economically achievable. New facilities have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. Therefore, Congress directed EPA to consider the best demonstrated process changes, in-plant controls, and end-of-process control and treatment technologies that reduce pollution to the maximum extent feasible. In addition, in establishing new source performance standards, EPA is required to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements. As stated above, a "new source" under CWA section 306 applies to a broader set of facilities than the group of facilities subject to this rule.

2. Consent Decree

Today's final rule partially fulfills EPA's obligation to comply with an amended Consent Decree entered in the United States District Court, Southern District of New York, in *Riverkeeper Inc., et al.* v. *Whitman*, No. 93 Civ 0314 (AGS), a case brought against EPA by a coalition of individuals and environmental groups. The consent decree as entered on October 10, 1995, provided that EPA propose regulations implementing section 316(b) by July 2, 1999, and take final action with respect to those regulation by August 13, 2001. Under subsequent orders and an amended consent decree, EPA has divided the rulemaking into three phases and is working under new deadlines. In addition to taking final action on this rule governing new facilities by November 9, 2001, EPA must propose regulations for, at a minimum, existing power plants that use large volumes of cooling water by February 28, 2002, and take final action 18 months later. EPA must propose regulations for, at a minimum, smaller-flow power plants and factories in four industrial sectors (pulp and paper making, petroleum and coal products manufacturing, chemical and allied manufacturing, and primary metal manufacturing) by June 15, 2003.

3. What Prior EPA Rulemakings Addressed Cooling Water Intake Structures?

In April 1976 EPA published a rule under section 316(b) that addressed cooling water intake structures. 41 *FR* 17387 (April 26, 1976), proposed at 38 *FR* 34410 (December 13, 1973). The rule added a new § 401.14 to 40 CFR Chapter I that reiterated the requirements of CWA section 316(b). It also added a new part 402, which included three sections: (1) § 402.10 (Applicability), (2) § 402.11 (Specialized definitions), and (3) § 402.12 (Best technology available for cooling water intake structures). Section 402.10 stated that the provisions of part 402 applied to "cooling water intake structures for point sources for which effluent limitations are established pursuant to section 301 or standards of performance are established pursuant to section 306 of the Act." Section 402.11 defined the terms "cooling water intake structure," "location," "design," "construction," "capacity," and "Development Document." Section 402.12 included the following language:

> The information contained in the Development Document shall be considered in determining whether the location, design, construction, and capacity of a cooling water intake structure of a point source subject to standards established under section 301 or 306 reflect the best technology available for minimizing adverse environmental impact.

In 1977, fifty-eight electric utility companies challenged these regulations, arguing that EPA had failed to comply with the requirements of the Administrative Procedure Act (APA) in promulgating the rule. Specifically, the utilities argued that EPA had neither published the development document in the **Federal Register** nor properly incorporated the document into the rule by reference. The United States Court of Appeals for the Fourth Circuit agreed and, without reaching the merits of the regulations themselves, remanded the rule. *Appalachian Power Co.* v. *Train*, 566 F.2d 451 (4th Cir. 1977). EPA later withdrew part 402. 44 *FR* 32956 (June 7, 1979). 40 CFR 401.14 remains in effect.

4. How Is Section 316(b) Being Implemented Now?

Since the Fourth Circuit remanded EPA's section 316(b) regulations in 1977, NPDES permit authorities have made decisions implementing section 316(b) on a case-by-case, site-specific basis. EPA published draft guidance addressing section 316(b) implementation in 1977. See *Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92–500* (U.S. EPA, 1977). This draft guidance describes the studies recommended for evaluating the impact of cooling water intake structures on the aquatic environment and recommends a basis for determining the best technology available for minimizing adverse environmental impact. The 1977 section 316(b) draft guidance states, "The environmental-intake interactions in question are highly site-specific and the decision as to best technology available for intake design, location, construction, and capacity must be made on a case-by-case basis." (Section 316(b) Draft Guidance, U.S. EPA, 1977, p. 4). This case-by-case approach also is consistent with the approach described in the 1976 development document referenced in the remanded regulation.

The 1977 section 316(b) draft guidance suggests the general process for developing information needed to support section 316(b) decisions and presenting that information to the permitting authority. The process involves the development of a site-specific study of the environmental effects associated with each facility that uses one or more cooling water intake structures, as well as consideration of that study by the permitting authority in determining whether the facility must make any changes for minimizing adverse environmental impact. Where adverse environmental impact is present, the 1977 draft guidance suggests a stepwise approach that considers screening systems, size, location, capacity, and other factors.

Although the draft guidance describes the information that should be developed, key factors that should be considered, and a process for supporting section 316(b) determinations, it does not establish national standards based on the best technology available for minimizing adverse environmental impact. Rather, the guidance leaves the decisions on the appropriate location, design, capacity, and construction of each facility to the permitting authority. Under this framework, the Director determines whether appropriate studies have been performed and whether a given facility has minimized adverse environmental impact. The Director's determinations of whether the appropriate studies have been performed or whether a given facility has minimized adverse environmental impact have often been subject to challenges that can take a long time to resolve and may impose significant resource demands on permitting agencies, the public, and the permit applicant.

5. Proposed New Facility Rule

On August 10, 2000, EPA published proposed requirements for cooling water intake structures at new facilities to implement section 316(b) of the Clean Water Act. EPA proposed a tiered approach for reducing adverse environmental impact, with three degrees of stringency based on EPA's view of the relative vulnerability of each category of waterbody. EPA received numerous comments and data submissions concerning the proposal. See 65 *FR* 49060.

6. Notice of Data Availability

On May 25, 2001, EPA published a Proposed Rule Notice of Data Availability (NODA). This notice presented a summary of the data EPA had received or collected since proposal, an assessment of the relevance of the data to EPA's analysis, some modified technology options suggested by commenters, and an alternative regulatory approach suggested by a trade group representing the utility industry as well as EPA's ideas about how it might modify this suggested approach. See 66 *FR* 28853. On July 6, 2001, EPA reopened the comment period for certain documents and issues related to those documents. See 66 *FR* 35572.

7. Public Participation

EPA has worked extensively with stakeholders from the industry, public interest groups, State agencies, and other Federal agencies in the development of this final rule. In addition to comments received during the comment periods of the original proposal, the NODA, and the reopened comment period for certain documents referenced in the NODA, EPA conducted two public meetings: in June 1998, in Arlington, Virginia (63 *FR* 27958) and in September, 1998, in Alexandria, Virginia (63 *FR* 40683). In addition, in September 1998, EPA staff participated in a technical workshop sponsored by the Electric Power Research Institute on issues relating to the definition and assessment of adverse environmental impact. EPA staff have participated in other industry conferences, met upon request on numerous occasions with industry representatives, and met on a number of occasions with representatives of environmental groups. EPA has also met with stakeholders, attended conferences and held workshops concerning topics related to the existing source rulemaking effort.

In the months leading up to publication of the proposed rule, EPA conducted a series of stakeholder meetings to review the draft regulatory framework for the proposed rule and invited stakeholders to provide their recommendations for the Agency's consideration. EPA managers have met with the Utility Water Act Group, Edison Electric Institute, representatives from an individual utility, and with representatives from the petroleum refining, pulp and paper, and iron and steel industries. EPA conducted meetings with environmental groups attended by representatives from between 3 and 15 organizations. EPA also met with the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA) and, with the assistance of ASIWPCA, conducted a conference call in which representatives from 17 states or interstate organizations participated. After publication of the proposed rule, EPA continued to meet with stakeholders at their request. These meetings are summarized in the record.

III. Environmental Impact Associated With Cooling Water Intake Structures

The proposed rule provided an overview of the magnitude and type of environmental impacts associated with cooling water intake structures, including several illustrative examples of documented environmental impacts at existing facilities (see 65 *FR* 49071 through 4). The majority of biological impacts associated with intake structures are closely linked to water withdrawals from the various waters in which the intakes are located.

Based on preliminary estimates from a questionnaire sent to more than 1,200 existing power plants and factories, industrial facilities in the United States withdraw more than 279 billion gallons of cooling water a day from waters of the U.S. The withdrawal of such large quantities of cooling water affects vast quantities of aquatic organisms annually, including phytoplankton (tiny, free-floating photosynthetic organisms suspended in the water column), zooplankton (small aquatic animals, including fish eggs and larvae, that consume phytoplankton and other zooplankton), fish, crustaceans, shellfish, and many other forms of aquatic life. Aquatic organisms drawn into cooling water intake structures are either impinged on components of the cooling water intake structure or entrained in the cooling water system itself.

Impingement takes place when organisms are trapped against intake screens by the force of the water passing through the cooling water intake structure. Impingement can result in starvation and exhaustion (organisms are trapped against an intake screen or other barrier at the entrance to the cooling water intake structure), asphyxiation (organisms are pressed against an intake screen or other barrier at the entrance to the cooling water intake structure by velocity forces that prevent proper gill movement, or organisms are removed from the water for prolonged periods of time), and descaling (fish lose scales when removed from an intake screen by a wash system) and other physical harms.

Entrainment occurs when organisms are drawn through the cooling water intake structure into the cooling system. Organisms that become entrained are normally relatively small benthic,[1] planktonic,[2] and nektonic[3] organisms, including early life stages of fish and shellfish. Many of these small organisms serve as prey for larger organisms that are found higher on the food chain. As entrained organisms pass through a plant's cooling system they are subject to mechanical, thermal, and/or toxic stress. Sources of such stress include physical impacts in the pumps and condenser tubing, pressure changes caused by diversion of the cooling water into the plant or by the hydraulic effects of the condensers, sheer stress, thermal shock in the condenser and discharge tunnel, and chemical toxemia induced by antifouling agents such as chlorine. The mortality rate of entrained organisms varies by species and can be high under normal operating conditions.[4][5] In the case of either impingement or entrainment, a substantial number of aquatic organisms are killed or subjected to significant harm.

In addition to impingement and entrainment losses associated with the operation of the cooling water intake structure, EPA is concerned about the cumulative overall degradation of the aquatic environment as a consequence of (1) multiple intake structures operating in the same watershed or in the same or nearby reaches and (2) intakes located within or adjacent to an impaired waterbody. Historically, impacts related to cooling water intake structures have been evaluated on a facility-by-facility basis. The potential cumulative effects of multiple intakes located within a specific waterbody or along a coastal segment are largely unknown (one relevant example is provided for the Hudson River; see discussion below). There is concern, however, about the effects of multiple intakes on fishery stocks. As an example, the Atlantic States Marine Fisheries Commission has been requested by its member States to investigate the cumulative impacts on commercial fishery stocks, particularly overutilized stocks, attributable to cooling water intakes located in coastal regions of the Atlantic.[6] Specifically, the study will focus on revising existing fishery management models so that they accurately consider and account for fish losses from intake structures.

EPA analyses suggest that over 99 percent of the existing facilities with cooling water withdrawal that EPA surveyed in its section 316(b) survey of existing facilities are located within 2 miles of waters that are identified as impaired and listed by a State or Tribe as needing development of a total maximum daily load (TMDL) to restore the waterbody to its designated use. EPA notes that the top four leading causes of waterbody impairment (siltation, nutrients, bacteria, and metals) affect the aquatic life uses of a waterbody. The Agency believes that cooling water intakes potentially contribute additional stress to waters already showing aquatic life impairment from other sources such as industrial discharges and urban stormwater.

EPA is also concerned about the potential impacts of cooling water intake structures located in or near habitat areas that support threatened, endangered, or other protected species. Although limited information is available on locations of threatened or endangered species that are vulnerable to impingement or entrainment, such impacts do occur. For example, EPA is aware that from 1976 to 1994, approximately 3,200 threatened or endangered sea turtles entered enclosed cooling water intake canals at the St. Lucie Nuclear Generating Plant in Florida.[7] The plant developed a capture-and-release program in response to these events. Most of the entrapped turtles were captured and released alive; however, approximately 160 turtles did not survive. More recently, the number of sea turtles being drawn into the intake canal increased to approximately 600 per year; this increase led to a requirement for barrier nets to minimize entrapment.

Finally, in the proposed rule EPA expressed concern about environmental impacts associated with the construction of new cooling water intake structures. Three main factors contribute to the environmental impacts: displacement of biota and habitat resulting from the physical placement of a new cooling water intake structure in an aquatic environment, increased levels of turbidity in the aquatic environment, and effects on biota and habitat associated with aquatic disposal of materials excavated during construction. Existing programs, such as the CWA section 404 program, National Environmental Policy Act (NEPA) program, and programs under State/Tribal law, include requirements that address many of the environmental impact concerns associated with the construction of new intakes (see Section VII. G for applicable Federal statutes). EPA recognizes that impacts related to construction of cooling water intake structures can occur and defers to the regulatory authority provided within the above-listed programs to evaluate the potential for impacts and minimize their extent.

In the proposed rule and NODA, EPA provided a number of examples of impingement and entrainment impacts that can be associated with existing facilities. It is important to note that these examples were *not* meant to predict effects at new facilities but rather to illustrate that the number of organisms impinged and entrained by a facility can be substantial. EPA also

[1] Refers to bottom dwellers that are generally small and sessile (attached) such as mussels and anemones, but can include certain large motile (able to move) species such as crabs and shrimp. These species can be important members of the food chain.

[2] Refers to free-floating microscopic plants and animals, including the egg and larval stages of fish and invertebrates that have limited swimming abilities. Plankton are also an important source of food for other aquatic organisms and an essential component of the food chain in aquatic ecosystems.

[3] Refers to free-swimming organisms (e.g., fish, turtles, marine mammals) that move actively through the water column and against currents.

[4] Mayhew, D.A., L.D. Jensen, D.F. Hanson, and P.H. Muessig. 2000. A comparative review of entrainment survival studies at power plants in estuarine environments. *Environmental Science and Policy* 3:S295–S301.

[5] EPRI. 2000. Review of entrainment survival studies: 1970–2000. Prepared by EA Engineering Science and Technology for the Electric Power Research Institute, Palo Alto, CA.

[6] Personal communication, telephone conversation between D. Hart (EPA) and L. Kline (ASMFC), 2001.

[7] Florida Power and Light Company. 1995. Assessment of the impacts at the St. Lucie Nuclear Generating Plant on sea turtle species found in the inshore waters of Florida.

notes that these are examples of the types of impacts that may occur without controls, that these examples are not representative of all sites whose facilities use cooling water intake structures, and that these examples may not reflect subsequent action that may have been taken to address these impacts on a site-specific basis. With these notes, EPA provides the following examples, illustrating that the impacts attributable to impingement and entrainment at individual facilities may result in appreciable losses of early life stages of fish and shellfish (*e.g.*, three to four billion individuals annually [8]), serious reductions in forage species and recreational and commercial landings (*e.g.*, 23 tons lost per year [9]), and extensive losses over relatively short intervals of time (*e.g.*, one million fish lost during a three-week study period [10]).

Further, some studies estimating the impact of impingement and entrainment on populations of key commercial or recreational fish have predicted substantial declines in population size. This has lead to concerns that some populations may be altered beyond recovery. For example, a modeling effort evaluating the impact of entrainment mortality on a representative fish species in the Cape Fear estuarine system predicted a 15 to 35 percent reduction in the species population.[11]

In addition, studies of entrainment at five Hudson River power plants during the 1980s predicted year-class reductions ranging from six percent to 79 percent, depending on the fish species.[12] An updated analysis of entrainment at three of these power plants predicted year-class reductions of up to 20 percent for striped bass, 25 percent for bay anchovy, and 43 percent for Atlantic tom cod, even without assuming 100 percent mortality of entrained organisms.[13] The New York Department of Environmental Conservation concluded that these reductions in year-class strength were "wholly unacceptable" and that any "compensatory responses to this level of power plant mortality could seriously deplete any resilience or compensatory capacity of the species needed to survive unfavorable environmental conditions."[14]

The following are summaries of other, documented examples of impacts occurring at existing facilities sited on a range of waterbody types. Also, see the discussion of the benefits of today's final rule in Section IX.

Brayton Point Generating Station. The Brayton Point Generating Station is located on Mt. Hope Bay, in Somerset, Massachusetts, within the northeastern reach of Narragansett Bay. Because of problems with electric arcing caused by salt drift and lack of fresh water for the closed-cycle recirculating cooling water system, the company converted Unit 4 from a closed-cycle, recirculating system to a once-through cooling water system in July 1984. The modification of Unit 4 resulted in a 41 percent increase in coolant flow, amounting to an intake flow of approximately 1.3 billion gallons per day and increased thermal discharge to the bay.[15] An analysis of fisheries data by the Rhode Island Division of Fish and Wildlife using a time series-intervention model showed an 87 percent reduction in finfish abundance in Mt. Hope Bay coincident with the Unit 4 modification.[16] The analysis also indicated that, in contrast, species abundance trends have been relatively stable in adjacent coastal areas and portions of Narragansett Bay that are not influenced by the operation of Brayton Point station.

San Onofre Nuclear Generating Station. The San Onofre Nuclear Generating Station (SONGS) is located on the coastline of the Southern California Bight, approximately 2.5 miles southeast of San Clemente, California.[17] The marine portions of Units 2 and 3, which are once-through, open-cycle cooling systems, began commercial operation in August 1983 and April 1984, respectively.[18] Since then, many studies evaluated the impact of the SONGS facility on the marine environment.

In a normal (non-El Niño) year, an estimated 121 tons of midwater fish (primarily northern anchovy, queenfish, and white croaker) are entrained at SONGS, of which at least 57 percent are killed during plant passage.[19] The fish lost include approximately 350,000 juveniles of white croaker, a popular sport fish; this number represents 33,000 adult individuals or 3.5 tons of adult fish. Within 3 kilometers of SONGS, the density of queenfish and white croaker in shallow-water samples decreased by 34 and 36 percent, respectively. Queenfish declined by 50 to 70 percent in deepwater samples.[20] A subsequent EPA review of the SONGS 316(b) demonstration concluded that although the plant incorporated technologies for minimizing adverse environmental impact, operations at SONGS cause adverse impacts to organisms in the cooling water system and to biological populations and communities in the vicinity of the intake and discharge locations for the plant.[21] These effects included mortality of fish, especially losses of millions of eggs and larvae, that are taken into the plant with cooling water and creation of a sometimes turbid plume that affects kelp, fish, and invertebrates in the San Onofre kelp bed.[22]

Pittsburg and Contra Costa Power Plants. The Pittsburg and Contra Costa Power Plants are located in the San Francisco Estuary, California. Because the San Francisco Bay Delta ecosystem has changed dramatically over the past century, several local species (e.g., Delta smelt, Sacramento splittail, chinook salmon, and steelhead) have been listed as threatened or endangered. Facility estimates for one of these species,

[8] EPA Region IV. 1979. Brunswick Nuclear Steam Electric Generating Plant of Carolina Power and Light Company, historical summary and review of section 316(b) issues.

[9] EPA Region IV. 1986. Findings and determination under 33 U.S.C. 1326, In the Matter of Florida Power Corporation Crystal River Power Plant Units 1, 2, and 3, NPDES permit no. FL0000159.

[10] Thurber, N.J and D. J. Jude. 1985. Impingement losses at the D.C. Cook Nuclear Power Plant during 1975–1982 with a discussion of factors responsible and possible impact on local populations. Special report no. 115 of the Great Lakes Research Division. Great Lakes and Marine Waters Center, University of Michigan.

[11] EPA Region IV. 1979. Brunswick Nuclear Steam Electric Generating Plant of Carolina Power and Light Company, historical summary and review of section 316(b) issues.

[12] Boreman J. and P. Goodyear. 1988. Estimates of entrainment mortality for striped bass and other fish species inhabiting the Hudson River Estuary. *American Fisheries Society Monograph* 4:152–160.

[13] Consolidated Edison Company of New York. 2000. Draft environmental impact statement for the state pollutant discharge elimination system permits for Bowline Point, Indian Point 2 & 3, and Roseton steam electric generating stations.

[14] New York Department of Environmental Conservation (NYDEC). 2000. Internal memorandum provided to the USEPA on NYDEC's position on SPDES permit renewals for Roseton, Bowline Point 1 & 2, and Indian Point 2 & 3 generating stations.

[15] Metcalf & Eddy. 1992. Brayton Point station monitoring program technical review. Prepared for USEPA.

[16] Gibson, M. 1995 (revised 1996). Comparison of trends in the finfish assemblages of Mt. Hope Bay and Narragansett Bay in relation to operations of the New England Power Brayton Point station. Rhode Island Division of Fish and Wildlife, Marine Fisheries Office.

[17] Southern California Edison. 1988. Report on 1987 data: marine environmental analysis and interpretation, San Onofre Nuclear Generating Station.

[18] Ibid.

[19] Swarbrick, S. and R.F. Ambrose. 1989. Technical report C: entrapment of juvenile and adult fish at SONGS. Prepared for Marine Review Committee.

[20] Kastendiek, J. and K. Parker. 1989. Interim technical report: midwater and benthic fish. Prepared for Marine Review Committee.

[21] SAIC. 1993. Draft review of Southern California Edison, San Onofre Nuclear Generating Station (SONGS) 316(b) demonstration. Prepared for USEPA Region IX.

[22] Ibid.

chinook salmon, indicate that the Pittsburg and Contra Costa intakes have the potential to impinge and entrain up to 36,567 chinook salmon each year.[23] Based on restoration costs, EPA estimates that losses for this species alone can be valued at $25–40 million per year.

Power Plants with Flows Less Than 500 MGD. The following information from facility studies documents impingement and entrainment losses for facilities with lower flows than the previous examples:

1. The Pilgrim Nuclear Power Station, located on Cape Cod Bay, Massachusetts, has an intake flow of 446 MGD.[24] The average annual total losses of fish (all life stages) was 26,800 due to impingement and 3.92 billion due to entrainment[25]

2. The Coleman Power Plant, located on the Ohio River in Henderson, Kentucky, has an intake flow of 337 MGD[25] and combined average impingement and entrainment losses of 702,630,800 fish per year (30,800 impinged and 702,600,000 entrained).[26]

Existing and historical studies like those described in this section may provide only a partial picture of the severity of environmental impact associated with cooling water intake structures. Most important, the methods for evaluating adverse environmental impact used in the 1970s and 1980s, when most section 316(b) evaluations were performed, were often inconsistent and incomplete, making detection and consideration of all impacts difficult in some cases, and making cross-facility comparison difficult for developing a national rule. For example, some studies reported only gross fish losses; others reported fish losses on the basis of species and life stage; still others reported percent losses of the associated population or subpopulation (e.g., young-of-year fish). Recent advances in environmental assessment techniques provide new and in some cases better tools for monitoring impingement and entrainment and detecting impacts associated with the operation of cooling water intake structures.[27 28] EPA acknowledges that these new assessment techniques may in some cases provide additional rather than better tools and perspectives.

IV. Summary of the Most Significant Revisions to the Proposed Rule

A. Data Updates

1. Number and Characteristics of New Facilities

Chapter 5 of the *Economic Analysis* provides a detailed discussion of the data and methodology used to estimate the number of new electric generating facilities and new manufacturing facilities subject to the final section 316(b) new facility rule. This section provides a summary of primary revisions to the analyses since the proposal. The section discusses new combined-cycle facilities, new coal facilities, and new manufacturing facilities separately.

a. New Combined-Cycle Facilities

The general approach for estimating the number of new combined-cycle facilities subject to the final section 316(b) new facility rule has not changed since proposal. However, and as discussed in the notice of data availability (NODA), EPA has used new data, which have become available since the proposal, to update the analysis. As a result, the number of new combined-cycle facilities now projected to be in scope of this rule has increased from 24 in the proposed rule analysis to 69 in the updated analysis for the final rule.

(1) Proposed Rule

For the proposal analysis, EPA used a three-step approach to estimating the number of new combined-cycle facilities: (1) Determination of future combined-cycle capacity additions; (2) estimation of the percentage of all regulated combined-cycle facilities that are in-scope; and (3) estimation of the number of new facilities. EPA used the *Annual Energy Outlook 2000* (AEO2000), prepared and published by the Energy Information Administration (EIA) of the U.S. Department of Energy, as the basis for the projected number of new in-scope combined-cycle facilities. The AEO2000 forecast 131 gigawatts (GW) of new combined-cycle capacity to begin operation between 2001 and 2020. Since the AEO does not have any information on the number of new facilities, their size, or their cooling water characteristics, EPA used the January 2000 version of Resource Data International's NEWGen Database to determine the in-scope percentage of new combined-cycle facilities and their facility and cooling water characteristics.

In the January 2000 NEWGen database, 94 of 466 projects met the following screening criteria: (1) New facility; (2) located in the United States; (3) active project (*i.e.*, not canceled or tabled); (4) anticipated date of initial commercial operation after August 13, 2001; and (5) steam electric prime mover. All 94 facilities were included in the analysis of new combined-cycle facilities. EPA then consulted permitting authorities, other public agencies, and company websites to obtain data on the planned facility cooling water use. EPA obtained sufficient data to assess the in-scope status for 56 of the 94 facilities. Seven of the 56 facilities, or 12.5 percent, were found to be in scope of the proposed rule; 49 were found to be out of scope. To estimate the total number of new in-scope combined-cycle facilities projected to begin operation between 2001 and 2020, EPA applied the average facility size of the seven in-scope NEWGen facilities (723 MW) and the in-scope percentage (12.5 percent) to EIA's forecast of new combined-cycle capacity additions. EPA made the conservative assumption that all new combined-cycle capacity would be built at new facilities rather than at existing facilities. These calculations resulted in an estimate of 24 new in-scope combined-cycle facilities over the 2001–2020 period (see also Exhibit 1 below).

(2) Final Rule

For the final rule analysis and as discussed in the NODA, EPA used the same general methodology but obtained updated information. In particular, EPA used the forecast of capacity additions from the U.S. Department of Energy's *Annual Energy Outlook* (AEO2001) and the February *2001 NEWGen Database*. AEO2001's forecast of new combined-cycle capacity additions between 2001 and 2020 was 204 GW, compared with 131 GW in the AEO2000. Similarly, the February 2001 NEWGen Database contains considerably more new energy projects than the version used for the proposed rule analysis: The database contains 941 new projects, of which 361 met the screening criteria discussed above. Of the 361 facilities, 320 are combined-cycle facilities. To increase the number of facilities upon which facility and cooling water use characteristics are based, EPA excluded the anticipated date of initial commercial operation as a screening criterion. The analysis for the final rule

[23] Southern Energy. 2000. Habitat conservation plan for the Pittsburg and Contra Costa Power Plants.

[24] Edison Electric Institute. 1994. EEI Power Statistics Database. Prepared by the Utility Data Institute.

[25] Data compiled by EPA from annual reports of impingement and entrainment losses from the Pilgrim Nuclear Power Station for the years 1991–1999.

[26] Hicks, D.B. 1977. Statement of findings for the Coleman Power Plant, Henderson, Kentucky.

[27] Schmitt, R.J. and C.W. Osenberg. 1996. *Detecting Ecological Impacts*. Academic Press, San Diego, CA.

[28] EPRI. 1999. Catalog of assessment methods for evaluating the effects of power plant operations on aquatic communities. TR–112013, EPRI, Palo Alto, CA.

therefore includes all facilities that meet the other four screening criteria, even if a facility will already have begun construction when the rule is promulgated and will therefore not be subject to the final rule.

EPA again consulted permitting authorities, other public agencies, and company websites to obtain data on the facilities' planned cooling water use. EPA obtained sufficient data to assess the cooling water characteristics for 199 of the 320 combined-cycle facilities. Of the 199 facilities, 57, or 28.6 percent, were found to be in scope of the final rule; 142 were found to be out of scope. The average size of all 199 facilities with cooling water information was approximately 741 MW. The average size of the 57 in-scope facilities was 747 MW. EPA made one other revision in estimating the total number of new in-scope combined-cycle facilities projected to begin operation between 2001 and 2020: Instead of assuming that all new combined-cycle capacity would be built at new facilities, EPA used information on combined-cycle capacity additions at existing facilities from the NEWGen Database to determine the actual share of capacity that will be built at new facilities. The database showed that 88 percent of new combined-cycle capacity is proposed at new facilities. EPA used the Department of Energy's estimate of new combined-cycle capacity additions (204 GW) and multiplied it by the percentage of capacity that will be built at new facilities (88 percent) to determine that 179 GW of new capacity will be constructed at new facilities. EPA then divided this value by the average facility size (741 MW) to determine that there would be a total of 241 potential new combined-cycle facilities (both in scope and out of scope of today's final rule). Finally, on the basis of EPA's estimate of the percentage of facilities that meet the two (2) MGD flow threshold (28.6 percent), EPA now estimates there will be 69 new in-scope combined-cycle facilities over the 2001–2020 period. Exhibit 1 summarizes the data differences for combined-cycle facilities between the proposal and the final rule analyses.

EXHIBIT 1.—SUMMARY OF COMBINED-CYCLE FACILITY RESEARCH (2001 TO 2020)

Information category	Proposed rule analysis	Final rule analysis
AEO2000 combined-cycle capacity additions	135 GW[a]	
AEO2001 combined-cycle capacity additions		204 GW
Percentage of combined-cycle capacity additions from new facilities	100%	88%
Capacity additions from new facilities	135 GW	179 GW
Average size of all combined-cycle facilities	723 MW	741 MW
Total number of new combined-cycle facilities	187	241
In-scope percentage	12.5%	28.6%
Number of new in-scope combined-cycle facilities	24	69
Average size of in-scope combined-cycle facilities	723 MW	747 MW

[a] Includes 4 GW of new coal capacity additions for 2001–2010.

The final step in the costing analysis for the final rule was to project cooling water characteristics of the 69 new in-scope combined-cycle facilities on the basis of the characteristics of the 57 in-scope NEWGen facilities. EPA developed six model facility types based on three main characteristics: (1) The facility's type of cooling system (once-through or recirculating system); (2) the type of water body from which the intake structure withdraws (freshwater or marine water); and (3) the facility's steam-electric generating capacity. The model facility characteristics were then applied to the 69 projected new combined-cycle facilities. EPA estimated that 64 new in-scope combined-cycle facilities will employ a recirculating system and only five will employ a once-through system. Of the 64 facilities with a recirculating system, 58 will withdraw from a freshwater body and six will withdraw from a marine water body. All five facilities with a once-through system are projected to withdraw from a marine water body.

b. New Coal Facilities

The general approach for estimating the number of new coal facilities subject to this final rule has not changed since proposal. However, as discussed in the NODA, EPA has used new data, which have become available since the proposal, to update the analysis. As a result, the number of new coal facilities projected to be in scope of this rule, decreased slightly, from 16 in the proposed rule analysis to 14 in the final rule analysis. However, most of the new in-scope coal facilities are now expected to begin operation earlier than under the proposal analysis.

(1) Proposed Rule

For the years 2001–2010, the AEO2000 projected limited new coal-fired steam electric generating capacity. In addition, the January 2000 NEWGen Database included no new coal-fired generating facilities. EPA therefore did not project any new coal facilities for 2001–2010. For the years 2011–2020, EPA used EIA's projected new capacity addition from coal-fired facilities, 17 GW, and information from the following sources to estimate the number and cooling water characteristics of new coal-fired power facilities subject to the rule: Form EIA–767 (Steam Electric Plant Operation and Design Report, Energy Information Administration, U.S. Department of Energy, 1994, 1997); Form EIA–860 (Annual Electric Generator Report, Energy Information Administration, U.S. Department of Energy, 1994, 1997); and Power Statistics Database (Utility Data Institute, McGraw-Hill Company, 1994). EPA estimated that 16 new coal facilities of 800 MW each would be subject to the proposed section 316(b) new facility rule and would begin operation between 2011 and 2020. Of these, 12 were projected to operate a recirculating system in the baseline, while four were projected to operate a once-through system.

(2) Final Rule

EPA used a similar methodology for the final rule analysis but obtained updated information and added data from the section 316(b) industry survey of existing facilities (*Industry Screener Questionnaire: Phase I Cooling Water Intake Structures, Detailed Industry Questionnaire: Phase II Cooling Water Intake Structures, and Industry Short Technical Questionnaire: Phase II Cooling Water Intake Structures).* To be consistent with the analysis for combined-cycle facilities, EPA used the forecast of capacity additions from the

AEO2001, which predicts 22 GW of new coal capacity between 2001 and 2020. In contrast to the proposal analysis, EPA considered the entire 2001–2020 period for the final rule analysis. In addition, EPA used information from the section 316(b) industry survey to determine the average size, in-scope percentage, and cooling water characteristics of new coal plants. The three surveys identified 111 unique coal-fired facilities that began commercial operation between 1980 and 1999. The facilities have a combined generating capacity of 53 GW, with an average of 475 MW each. The surveys further showed that 45 of the 111 facilities, or 40.5 percent, would be in scope of today's final rule if they were new facilities. These 45 facilities have an average generating capacity of 763 MW.

Information in the February 2001 version of the NEWGen Database on capacity additions at new and existing facilities showed that approximately 76 percent of new coal capacity will be built at new facilities. Applying this percentage (76 percent), as well as the average facility size (475 MW) and the in-scope percentage (40.5 percent), to EIA's forecast of new coal capacity additions resulted in 14 new in-scope coal facilities, with an average capacity of 763 MW, over the 2001–2020 period. Exhibit 2 summarizes the data differences for coal facilities between the proposal and the final rule analyses.

EXHIBIT 2.—SUMMARY OF COAL FACILITY RESEARCH

	Proposed rule analysis (2011–2020)	Final rule analysis (2001–2020)
AEO2000 coal capacity additions	17 GW	
AEO2001 coal capacity additions		22 GW
Percentage of coal capacity additions from new facilities	82%	76%
Capacity additions from new faciliteis	14 GW	17 GW
Average size of all coal facilities	800 MW	475 MW
Total number of new coal facilities	18	35
In-scope percentage	99.0%	40.5%
Number of new in-scope coal facilities	16	14
Average size of in-scope coal facilities	800 MW	763 MW

EPA projected cooling water characteristics of the 14 new in-scope coal facilities using data for recently-constructed plants from the section 316(b) industry survey. Similar to the combined-cycle facility analysis, EPA developed eight model facility types based on three main characteristics: (1) The facility's type of cooling system (once-though or recirculating system); (2) the type of water body from which the intake structure withdraws (freshwater or marine water); and (3) the facility's steam-electric generating capacity. The model facility characteristics were then applied to the 14 projected new coal facilities. EPA estimated that 10 new in-scope coal facilities will employ a recirculating system and three will employ a once-through system. One coal facility has a recirculating cooling pond and will exhibit characteristics more like a once-through facility. Of the10 facilities with a recirculating system, nine will withdraw from a freshwater body and only one facility will withdraw from a marine water body. All three facilities with a once-through system and the one facility with a cooling pond are projected to withdraw from a freshwater body.

c. Manufacturing Facilities

The general methodology used to estimate the number of new manufacturing facilities subject to the final section 316(b) new facility rule has not changed since proposal. However, on the basis of comments, EPA has altered some estimates and used new data to update the analysis. As a result, the number of new manufacturing facilities projected to be in scope of this rule has decreased from 58 at proposal to 38 in the final rule analysis.

(1) Proposed Rule

In the proposal analysis, EPA used three industry-specific estimates to project the number of new in-scope manufacturing facilities: (1) Industry growth forecasts; (2) the estimated percentage of the projected capacity growth accounted for by new facilities; and (3) data on the cooling water use at existing facilities. EPA used the projected growth of value of shipments in each industry to estimate likely future growth in capacity. A number of sources provided growth forecasts, including the annual U.S. Industry & Trade Outlook, *AEO2001*, and other sources specific to each industry. EPA assumed that the growth in capacity will equal growth in value of shipments, except where industry-specific information supported alternative assumptions. Not all industry growth, however, is expected to occur at new facilities: Some of the projected growth in capacity may result from increased utilization of existing capacity or capacity additions at existing facilities. Where information on the share of growth from new facilities was available, EPA used these data. For example, EIA projected that all increases in petroleum shipments will result from expanded capacity at existing facilities. Where this information was not available, EPA made the conservative estimate that 50 percent of the projected growth in capacity will be attributed to new facilities. Finally, EPA assumed that the cooling water use characteristics of new facilities in each industry, including the in-scope percentage, would be similar to those of existing facilities. Cooling water use data for existing facilities came from the *Industry Screener Questionnaire: Phase I Cooling Water Intake Structures*. To calculate the total number of new in-scope manufacturing facilities, EPA applied the industry-specific growth rate and the percentage of capacity growth from new facilities to the sample-weighted number of in-scope screener facilities in each industry.

(2) Final Rule

For the final rule analysis, EPA updated the projected growth in value of shipments for each industry using the most recent data available. On the basis of comments, three changes were made to the percentage of projected capacity growth that is attributed to new facilities. First, the American Chemistry Council stated that EPA overestimated the number of new in-scope chemical facilities in the proposal analysis because the percentage of growth that comes from new facilities (50 percent) was overstated. The comment did not provide a more accurate estimate. EPA therefore revised this estimate for the chemical industry to 25 percent, which reduced the number of new chemical facilities by half. (The *Economic Analysis* documents the effect of using an alternative assumption of 37.5 percent, the midpoint between the proposal analysis estimate and the final rule analysis estimate, in analyzing the economic impacts of this rule.) Second, the petroleum industry commented that the assumption of no new petroleum refineries over the next 20 years is invalid. Even though the AEO2001 projects no new refineries in the United States, to be conservative EPA nevertheless revised this estimate and included two new in-scope petroleum refineries in the final rule analysis. Third, the American Forest & Paper Association stated that one or two new greenfield paper mills will be built over the next decade. EPA added two new in scope paper mills over the 20-year analysis period in response to this comment. In addition, EPA updated the water use characteristics of the projected new facilities by using data from the *Detailed Industry Questionnaire: Phase II Cooling Water Intake Structures instead of the Screener Questionnaire*. In the proposal analysis, EPA erroneously used the average daily intake flow rate, instead of the design intake flow rate, to determine whether a facility meets the two MGD flow threshold and is subject to the rule. Since the average intake flow is either lower than or equal to the design intake flow, this error likely underestimated the number of new in-scope manufacturing facilities. For the analysis of the final rule, EPA used the design intake flows reported in the section 316(b) industry survey.

Overall, because of the revisions described above, EPA's estimate of the number of new in-scope manufacturing facilities dropped from 58 at proposal to 38 in the cost analysis for this final rule.

2. Revisions to the Costing Estimates

Chapter 2 of the *Technical Development Document* provides a detailed description of the data and methodology used to develop compliance cost estimates for the final regulation. This section provides a summary of the main revisions in the costing inputs since the proposal.

At the time of the proposal, EPA included cost estimates for plume abatement at 50 percent of the electric generating facilities anticipated to install recirculating wet cooling towers to comply with the rule. This was an error. As described in the NODA (66 FR 28866 and 28867), EPA has since refined its estimates of cooling tower costs on a national basis to reflect plume abatement costs at a significantly lower proportion of facilities. EPA determined, on the basis of further research and information received from vendor manufacturers, that plume abatement measures were installed at only 3 to 4 percent of recent wet cooling tower projects. Therefore, the costing estimates for the final rule reflect this change.

At the time of the proposal, EPA included cost estimates for pumping of recirculating cooling water in the towers based on a flow rate equal to 15 percent of a comparable once-through cooling flow (based on the flow of make-up water). As explained in the NODA (66 FR 28866), this was an error. EPA has since refined its costing estimates to include the entire cooling flow. EPA's cost estimates for both capital and O&M costs for the final rule reflect appropriately sized pumps to recirculate the full design cooling water flow. The in-tower cooling water flow is now based on the level of cooling necessary for the condenser and the plants' cooling needs.

Since proposal, EPA has included costs from additional projects in the calculation of its costing estimates for recirculating wet cooling towers. EPA obtained further "turn-key" vendor project costs that have been incorporated into the specific costing equations used to calculate the capital and operation and maintenance (O&M) costs of the final rule. Turn-key project costs represents all costing elements necessary to estimate engineering costs, such as vendor overhead, equipment, wiring, foundations and contingencies. EPA included these project costs in the calculation of the costing equations in order to increase the number of real-world projects upon which the final cost estimates are based.

EPA has refined its estimates of O&M costs for recirculating wet cooling towers since proposal. At the time of proposal, EPA estimated economy of scale for O&M costs for recirculating, wet cooling towers as their size increases. EPA based this estimate primarily on the economy of scale savings for wastewater treatment systems as wastewater flow increases. The overall effect of this approach showed that for very large cooling towers, a savings of nearly two-thirds was achieved compared with smaller cooling towers. On the basis of comments received and further research, EPA has refined its estimates of O&M costs and economies of scale. The cost estimates presented for the final rule reflect this revision to the analysis.

In the final rule, EPA has included cost estimates for energy penalties due to operating power losses from recirculating cooling tower systems. Further information on this subject can be found in Section IV.A.3 of this preamble, below.

3. Energy Penalty Estimates for Recirculating Wet Cooling and Dry Cooling Towers

Since proposal, as discussed in the NODA (66 FR 28866), EPA has included in its estimates of O&M costs the performance penalties that may result in reductions of energy or capacity produced because of adoption of recirculating cooling tower systems. The cost estimates for the final rule include consideration of these penalties. The final rule cost estimates account for the energy penalty at facilities that are projected to install recirculating wet cooling tower systems in lieu of once-through cooling systems. EPA's cost estimates for dry cooling regulatory alternatives account for the appropriate energy penalty of this technology at each facility projected to install such a system.

For the final rule, EPA's costing methodology for performance penalties is based on the concept of lost operating revenue due to a mean annual performance penalty. EPA estimated the mean annual performance penalty for each tower technology as compared with once-through or recirculating wet cooling systems (where applicable for the dry cooling analysis). EPA then applied this mean annual penalty to the annual revenue estimates for each facility projected to install a recirculating cooling tower technology as a result of the rule or a regulatory option. EPA considers these revenue losses as representative of the cost to the facility for either replacing the power lost via the market or expanding the capacity of the new power plant.

Chapter 3 of the *Technical Development Document* discusses performance penalties in more detail.

4. Significant Changes to the Economic Analysis a. Revisions to Costing Analysis

EPA has made a methodological change for estimating the cost for today's rule. For the proposal, EPA directly estimated the incremental cost of the rule without estimating the baseline cost. This made it difficult to identify the magnitude of changes in relevant components of a system of a facility and their individual costs. For the final rule, EPA separately estimated the baseline costs and the cost after meeting the requirements of the rule.

Thus, the incremental cost attributed to the rule is derived from the difference between the baseline cost and the cost after compliance with the requirements of the rule.

For the proposal, EPA estimated the cost of the rule to be $12 million. This estimate was in part based on the assumption that 90 percent of the coal facilities would be within the scope of the rule. Since the publication of the proposal, EPA has analyzed additional information regarding coal facilities. This information shows that 40.5 percent of the coal facilities would be within the scope of the rule. EPA also revised the baseline characteristics for these facilities. For the final rule, EPA estimates that 71 percent of new in-scope coal facilities would have recirculating cooling towers independent of the rule. For combined-cycle facilities, EPA used the January 2000 version of the NEWGen database at proposal to estimate the proportion of the facilities that would be within the scope of the proposal. In view of the changes in the energy market, EPA is using a more current version (February 2001) of the NEWGen database for the final analysis. Consequently, EPA is revising the in-scope percentage for combined-cycle facilities to 28.6 percent for the final analysis, instead of 12.5 percent used for the proposal.

For the proposal, EPA used the average flow from the section 316(b) industry survey, screener questionnaire for existing manufacturing facilities to estimate the technology and O&M costs for new manufacturing facilities. EPA believes that the average flow would underestimate the costs because costs mostly depend on design of a facility. Therefore, EPA is using the design flow for estimating the cost for manufacturing facilities for the final rule. For the proposal, EPA assumed that 50 percent of the growth in product demand in the chemical industry would be met from new facilities. Commenters pointed out that this assumption leads to an overestimation of the number of new facilities and EPA agrees. Therefore, EPA has revised this assumption to 25 percent for the analysis supporting today's rule.

EPA has also examined the cost of the rule as a percentage of (annual) revenue for purposes of determining whether the options are economically practicable. The worst-case, or upper-limit, cost estimate for the rule is between 3.3 to 5.2 percent of estimated revenues (for three coal facilities), between 1 and 3 percent for an additional six facilities, and less than 1 percent for the rest of the facilities. EPA concludes that those costs are economically practicable and will not pose a barrier to entry for new facilities. The initial compliance cost of the rule (i.e., capital costs and permitting costs) as a percentage of construction cost of an electric generation facility is 3.4 percent for one coal facility, between 1.0 and 3.0 percent for an additional seven facilities, and less than 1.0 percent for the rest of the electric generation facilities. EPA finds that these are relatively low compliance costs. EPA does not consider that the cost of the rule would be a barrier to entry for new facilities and also finds that cost to be economically practicable.

5. Air Emissions Increases as a Result of Certain Regulatory Options

For the final rule, and as discussed in the NODA, EPA includes estimates of annual air emissions increases for certain pollutants from new power plants as a result of certain regulatory options considered. EPA developed estimates for air emissions increases for SO_2, NO_X, CO_2, and Hg for the regulatory options based on near-zero intake (dry cooling) and for those based on uniform national requirements of flow reduction commensurate with closed-cycle recirculating wet cooling systems (wet cooling towers) or with wet-cooling systems in Track I of a two-track rule. EPA anticipates, because of measurable performance penalties associated with cooling tower systems (see Section IV.A.3 of this preamble), that, depending on the regulatory option, air emissions nationally could increase from all or a small subset of new power plants as a result of the installation of cooling tower systems. EPA estimates the marginal air emissions increases by assuming that the energy lost by the facility cannot be replaced through additional fuel consumption at that facility, but rather, the energy will be replaced by the entire grid as a whole. Thus, the replacement energy necessary to compensate for the performance penalty is generated by the mix of fuels present in the entire grid. This is because, in EPA's view and on the basis of comments received, power plants are not always capable of compensating for an energy shortfall due to a performance penalty of a recirculating cooling tower by increasing their fuel consumption. Even though the estimated mean annual performance penalty for recirculating wet cooling towers is small, EPA estimates that facilities designed for once-through cooling would not always be designed with sufficient excess capacity to compensate for the performance penalties caused by recirculating wet cooling tower installations as a result of this rule. Therefore, EPA determines that marginal increases in air emissions due to performance penalties are best represented by estimating that the entire grid will replace the energy loss. EPA's estimates of marginal increases of air emissions are presented in Exhibit 3.

EXHIBIT 3.—ESTIMATES OF MARGINAL INCREASES OF AIR EMISSIONS FOR RECIRCULATING WET COOLING TOWERS[a]

	Capacity (MW)	Annual CO_2 (tons)	Annual SO_2 (tons)	Annual NO_X (tons)	Annual Hg (lbs)
National Emissions from Electricity Generation	828,631	2,575,814,488	13,581,673	6,437,710	86,722
Air Emission Increases if Plants Compensate With Increased Fuel Consumption					
National Electricity Generation Air Emissions Increases for Wet Cooling.		712,886 (.0028%)	1,543 (.0011%)	1,518 (.0024%)	23 (.0026%)
Air Emission Increases if Plants Purchase Replacement Power From Market					
National Electricity Generation Air Emissions Increases for Wet Cooling.		485,860 (.0019%)	2,561 (.0019%)	1,214 (.0019%)	16 (.0019%)

[a] This analysis assumes that annual emissions from energy generation are constant from 1998 to 2020, even though generation is projected to increase steadily over the next twenty years. Therefore, these estimates are slightly overstated.

B. Regulatory Approach

1. Proposed Rule

EPA proposed flow, velocity, and other design and construction technologies requirements based on the type of waterbody in which the intake structure is located and, for certain types of waters, the location of the intake in the water body. EPA proposed to group surface water into four categories: freshwater rivers and streams, lakes and reservoirs, estuaries and tidal rivers, and oceans. For each of these waterbody types, EPA divided the waterbody into sections based on the defined "littoral zone." At proposal, littoral zone was defined as any nearshore area in a freshwater river or stream, lake or reservoir, or estuary or tidal river extending from the level of highest seasonal water to the deepest point at which submerged aquatic vegetation can be sustained (i.e., the photic zone extending from shore to the substrate receiving one (1) percent of incident light); where there is a significant change in slope that results in changes to habitat or community structure; and where there is a significant change in the composition of the substrate (e.g., cobble to sand, sand to mud). In oceans, the littoral zone encompassed the photic zone of the neritic region. The photic zone is that part of the water that receives sufficient sunlight for plants to be able to photosynthesize. The neritic region is the shallow water or nearshore zone over the continental shelf.

In general, the closer the intake structure was to the littoral zone, the more stringent the proposed best-technology-available requirements for minimizing adverse environmental impact became. For example, an intake structure located within the littoral zone would have required the most stringent capacity and velocity controls as well as the use of other design and construction technologies. EPA also proposed the most stringent requirements for best technology available for minimizing adverse environmental impact in all parts of tidal rivers and estuaries because of the potential for high biological productivity in these waters.

2. Notice of Data Availability

In the NODA, EPA sought comment on various versions of a two-track approach resulting from comments received on the proposal. Under this approach, a facility would choose to pursue one of two tracks. In general (based on size), Track I would establish national technology-based performance requirements, whereas Track II would allow the facility to conduct site-specific studies to demonstrate to the permit director that alternative technologies or approaches could reduce impingement and entrainment to the same or a greater degree than the Track I technology-based performance standards. See 66 *FR* 28868 to 28872.

3. Final Rule

In this rule, EPA is establishing a two-track technology-based approach that does not distinguish between waterbody types or the location of the intake structure within the waterbody type. Track I establishes capacity (for facilities with a design intake flow equal to or greater than 10 MGD), velocity, and capacity- and location-based proportional flow requirements to reduce impingement and entrainment of fish, shellfish, eggs, and larvae and requires the applicant to select and implement design and control technologies to minimize impingement and entrainment in certain areas. Track I applicants with intake flow between 2 and 10 MGD do not have to comply with a capacity limitation but then must use technologies to reduce entrainment at all locations. Track II allows a facility to conduct a comprehensive demonstration study to show that alternative controls will achieve comparable performance. The two-track approach balances the goal of providing regulatory certainty and fast permitting for new facilities with the goal of allowing flexibility by including a performance-based alternative. Track I streamlines the permitting process, providing a high degree of certainty that a facility will obtain a National Pollutant Discharge Elimination System (NPDES) permit without delays. In EPA's view, Track II provides an incentive for the development of innovative technologies that will represent best technology available for minimizing impingement and entrainment from cooling water intake structures.

V. Basis for the Final Regulation

A. Major Options Considered for the Final Rule

EPA considered and analyzed several technology-based regulatory options to determine the best technology available for minimizing adverse environmental impact for new facilities. All of these options were analyzed and compared with the current requirements applied to NPDES permits for existing facilities with cooling water intake structures. Although the Agency considered numerous regulatory options during rule development, the primary options considered in development of today's final rule include: (1) Technology-based performance requirements for different types of waters, with intake capacity limits based on closed-cycle recirculating wet cooling systems required only in estuaries, tidal rivers, the Great Lakes, and oceans; (2) national technology-based performance requirements for all waterbodies, with flow reduction commensurate with the level achieved with closed-cycle recirculating wet cooling; (3) national technology-based performance requirements for all waterbodies with a near-zero intake level (based on dry cooling);[29] and (4) a case-by-case, site-specific approached based on the 1977 draft guidance document.[30] In addition to these options, EPA also considered variations on each of the technology-based options using on a two-track permitting approach. The two-track options include one presented by industry for consideration. The two-track approach establishes a specific set of technology-based performance requirements that a permittee can implement that reflect best technology available for minimizing adverse environmental impact; this approach also provides permittees with flexibility to demonstrate that an alternative set of requirements achieves a comparable level of performance.

For all the options except for those based on dry cooling, EPA also considered requiring a design through-screen velocity of 0.5 ft/s, location- and capacity-based flow restrictions proportional to the size of the waterbody (such as a requirement for streams and rivers allowing no more than 5 percent withdrawal of the mean annual flow), and design and construction technologies to minimize impingement mortality and entrainment. In addition, EPA considered requiring post-operational monitoring of impinged and entrained organisms, monitoring of the through-screen velocity, and periodic visual inspections of the intake structures.

1. Technology-Based Performance Requirements for Different Types of Waterbodies

Under this option, EPA would establish requirements for minimizing adverse environmental impact from cooling water intake structures based on

[29] EPA also examined subcategorization strategies for the dry cooling based option, on the basis of regional distribution of facilities, size of facilities, and type of facility (i.e., steam electric power plants versus manufacturing facilities).

[30] U.S. Environmental Protection Agency. 1977. *Draft guidance for evaluating the adverse impact of cooling water intake structures on the aquatic environment: section 316(b) P.L. 92–500.*

the type of waterbody in which the intake structure is located, the location of the intake in the waterbody, the volume of water withdrawn, and the design intake velocity. EPA would also establish additional requirements or measures for location, design, construction, or capacity that might be necessary for minimizing adverse environmental impact. Under this option, the best technology available for minimizing adverse environmental impact would constitute a technology suite that would vary depending on the type of waterbody in which a cooling water intake structure is located and the location of the cooling water intake structure within the waterbody. EPA would set technology-based performance requirements; the Agency would not mandate the use of any specific technology.

Under this option, EPA considered only requiring intake flow reduction commensurate with the level that can be achieved using a closed-cycle recirculating wet cooling system for intakes located in estuaries, tidal rivers, oceans, and the Great Lakes. For all other waterbody types, the only capacity requirements would be proportional flow reduction requirements. In all waterbodies, velocity limits and a requirement to study, select, and install design and construction technologies would apply. EPA determined that the annual compliance cost to industry for this option would be $36.3 million. EPA found that the regulatory implementation burden would be of an acceptable level but that the delay in permitting of new facilities could be up to 6 months if all new facilities were required to complete a baseline biological characterization study prior to submitting an application for a permit. This study would detail the potential design and construction technologies that would apply to all new facilities and would be required beyond the flow reduction requirements for facilities located in estuaries, tidal rivers, oceans, and the Great Lakes. This option was, in part, rejected due to the potential of delays in permitting. More significantly, this option was rejected because closed-cycle recirculating cooling water systems are available and economically practicable across all waterbody types.

2. National Technology-Based Performance Requirements for All Waterbodies

a. Flow Reduction Commensurate With the Level Achieved by Closed-Cycle Recirculating Wet Cooling Systems

EPA also considered a regulatory option for new facilities based primarily on intake-flow reduction from all cooling water intake structures commensurate with the level that can be achieved using a closed-cycle recirculating cooling water system. This option does not distinguish between facilities on the basis of the waterbody from which they withdraw cooling water. In addition to reducing design intake velocity and complying with capacity- and location-based proportional flow requirements, all facilities need to complete a baseline biological characterization study prior to submitting the application for a permit. This study would detail the design and construction technologies necessary to maximize the survival of impinged adult and juvenile fish and to minimize the entrainment of eggs and larvae. The applicant would also need to comply with any additional requirements established by the Director as reasonably necessary to minimize impingement and entrainment as a result of the effects of multiple cooling water intake structures in the same waterbody, seasonal variations in the aquatic environment affected by the cooling water intake structures controlled by the permit, or the presence of regionally important species. EPA did not determine the annual compliance cost to industry for this option. EPA found that the permit writer's regulatory implementation burden would be of an acceptable level. EPA adopted this option, in part, as Track I of the two-track approach.

b. Intake Capacity Reduction Commensurate with the Level Achieved by Use of a Dry Cooling System

EPA considered a regulatory option for new facilities based primarily on intake flow reduction from all cooling water intake structures commensurate with zero or very low-level intake (dry cooling). This option does not distinguish between facilities on the basis of the waterbody from which they withdraw cooling water. Dry cooling systems use either a natural or a mechanical air draft to transfer heat from condenser tubes to air. EPA determined that the annual compliance cost to industry for this option would be at least $490 million. EPA also found that the permit writer's regulatory implementation burden would be of an acceptable level and there would be no delay in the permitting of new facilities. The option would require no baseline biological characterization study prior to submission of the application for a permit, due to the requirement of near-zero intake.

In addition, EPA analyzed three subcategorization strategies for the final rule based on the dry cooling technology. EPA considered establishing zero or very low-level intake requirements only for steam electric power plants locating in cold northern climates. See Section V.C.1. EPA also separately analyzed a zero or very low-level intake requirement for steam electric power plants of small capacity (those with total capacity less than 500 MW). See Section V.C.1. For both of these subcategorization strategies, all facilities not complying with dry cooling technology-based performance requirements would comply with the national requirement of capacity reduction based on closed-cycle recirculating wet cooling. The dry cooling subcategories would require no baseline biological characterization study prior to submission of the application for permit, because of the requirement of near-zero intake. EPA found that the permit writer's regulatory implementation burden would be of an acceptable level and there could be a delay of up to 6 months in the permitting of new facilities under the dry cooling based subcategories. EPA discusses why it is not adopting the dry cooling approach for subcategories based on size and/or climate in Section V.C. below.

3. Two-Track Options

For each of the regulatory options outlined above that requires reduction of flow commensurate with the level achieved with closed-cycle recirculating cooling systems, EPA also considered a number of two-track options. The two-track options provide flexibility to the permittee in that the facility may choose to comply by meeting the specific technology-based performance requirements defined in the "fast track" (Track I), or by demonstrating that a level of performance would be achieved comparable to the level that would be achieved under the Track I requirements under the "demonstration track" (Track II).

Under one of the two-track options (referred to as the "preferred two-track" option), EPA considered a fast-track based on a commitment by the facility to employ a suite of technologies that would represent best technology available for minimizing adverse environmental impact. The technologies considered include reduction in capacity commensurate with that achievable by use of a closed-cycle recirculating cooling water system; a velocity limitation of less than or equal to 0.5 ft/s; and location where intake capacity would be no more than five (5) percent of the mean annual flow of a freshwater stream or river, no more than one (1) percent of the tidal excursion volume of a tidal river or estuary or where the intake capacity would not disrupt the natural stratification and turnover patterns of a lake or reservoir. Applicants also would be required to conduct baseline biological characterization monitoring; these data would be used to determine which design and construction technologies are needed on a case-by-case basis. EPA also considered allowing the permit applicant to specify design and construction technologies and to require monitoring so that the performance of these technologies could be evaluated in a subsequent NPDES permit. In order to speed up the issuance of the first permit at the new facility, EPA considered waiving any mandatory baseline biological characterization monitoring under Track I. In this case, the applicant would have the opportunity to rely on and present historical or literature information to support its selection of design and construction technologies. Under this approach, applicants would propose what design and construction requirements are most appropriate to reduce impingement and entrainment or to maximize impingement survival resulting from water withdrawn as make-up water at these facilities. The biological characterization information would support the design and construction technologies that the permittee chose to implement. The Director could revisit these design and construction technologies at the time of permit renewal. (Most design and construction technologies can be implemented without stopping operation at the facility.) As an alternative to the case-by-case designation of design and construction technologies, EPA also considered designating the following two design and construction technologies as part of a fast-track, best technology available suite of technologies: a fine mesh traveling screen with a fish return system, variable speed pumps, and a low pressure spray; or a submerged wedgewire fine mesh screen.

Under Track II, a facility would need to conduct a comprehensive demonstration study that documents that an alternative suite of technologies can be used by the facility to reduce impingement mortality and entrainment for all life stages of fish and shellfish to achieve a level of reduction comparable to the level that would be achieved under Track I. The estimated annual compliance cost to facilities for the preferred two-track option is $47.7 million.

EPA also considered a less stringent variation of the two-track option above, in which Track I would not require cooling water intake structures located in fresh rivers or streams and lakes or reservoirs to reduce capacity to a level commensurate with that achievable by use of a closed-cycle cooling system. EPA did not select this option because other available technologies that are economically practicable achieve greater reduction in impingement and entrainment.

EPA also considered a third two-track option as suggested by industry. Under this option, an applicant choosing Track I would install "highly protective" technologies in return for expedited permitting without the need for pre-operational or operational studies in the source waterbody. According to the commenters, these technologies would "exceed the section 316(b) standards" because they would "avoid adverse environmental impact," defined as proven population or ecosystem impacts. Such fast-track technologies might include technologies that reduce intake flow to a level commensurate with a wet closed-cycle cooling at that site and that achieve an average approach velocity (measured in front of the cooling screens or the opening to the cooling water intake structure) of no more than 0.5 ft/s, or any technologies that achieve a level of protection from impingement and entrainment within the expected range for a closed-cycle cooling (with 0.5 ft/s approach velocity) given the waterbody type where the facility is to be located. This option was intended to allow facilities to use standard or new technologies that have been demonstrated to be effective for the species, type of waterbody, and flow volume of the cooling water intake structure proposed for their use. Examples of candidate technologies include (a) wedgewire screens, where there is constant flow, as in rivers; (b) traveling fine mesh screens with a fish return system designed to minimize impingement and entrainment; and (c) aquatic filter barrier systems, at sites where they would not be rendered ineffective by high flows or fouling. The operator of a proposed new facility would elect which set of technologies to install and validate its performance as necessary. In return, the permitting agency would not require additional section 316(b) protective measures for the life of the facility.

Under the industry approach, Track II would provide an applicant who does not want to commit to any of the above technology options with an opportunity to demonstrate that site-specific characteristics, including the local biology, would justify another cooling water intake structure technology, such as once-through cooling. For these situations, the applicant could demonstrate to the permitting agency, on the basis of site-specific studies, either that the proposed intake would not create an appreciable risk of adverse environmental impact or, if it would create an appreciable risk of adverse environmental impact, that the applicant would install technology to "minimize" adverse environmental impact. Such demonstrations would recognize that some entrainment and impingement mortality can occur without creating "adverse environmental impact," but, where there is an appreciable risk of adverse environmental impact (e.g., population effects), the technology that would "minimize" it would be the technology that maximized net benefits. EPA determined that the annual compliance cost to industry for this option would be $24.9 million. EPA discusses why it is not accepting the industry's two-track approach in full in Section V.D below.

EPA also considered a waterbody-based two track option. Under this option, Track I would require, depending on the waterbody type, screens, fish return systems, or reduction in capacity to a level commensurate with that achievable by use of a closed-cycle cooling system. The delineation of waterbody types would correlate with greater or lesser potential for impingement and entrainment. Under Track II, a permit applicant would be able to demonstrate how alternative technology performance measures would reduce impingement mortality and entrainment for all life stages of fish and shellfish to a level of reduction comparable to the level that would be achieved under Track I.

EPA did consider a two-track option based on dry cooling. EPA did not promulgate this option for reasons discussed at Section V.C. of this preamble for not adopting dry cooling as best technology available for minimizing adverse environmental impact. In addition, there are very limited alternatives for achieving a dry cooling-level reduction in impingement and entrainment in a second track. EPA did not select this option because other available technologies that are economically practicable achieve significant reduction in impingement and entrainment at far lower cost.

B. Why EPA Is Establishing EPA's Preferred Two-Track Option as the Best Technology Available for Minimizing Adverse Environmental Impact?

For new facilities subject to this rule, EPA finds that the preferred two-track option represents the best technology available for minimizing adverse environmental impact. With respect to new facilities, the technologies used as the basis for this option are commercially available and economically practicable for the industries affected as a whole, and have acceptable energy impacts. EPA estimates that only nine electric generators who were planning to install a once-through cooling system will have to install recirculating wet cooling towers as a result of this rule. The energy impacts associated with these nine facilities is estimated to comprise only 0.026 percent of total new electric generating capacity. Similarly, the technologies used as the basis for this option also have acceptable non-aquatic environmental impacts. The non-aquatic environmental impacts associated with increased air emissions (SO_2, NO_2, CO_2, and Hg) is very small. The increased SO_2, NO_X, CO_2, and Hg attributed to the nine facilities that would be required to install recirculating wet cooling towers in lieu of once-through cooling systems is negligible in comparison to the total annual air emissions from new power plants. EPA finds that the requirements contained in the preferred two-track approach meet the requirement of section 316(b) of the CWA that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. The components of the two-track approach are illustrated in Appendix 1 to this preamble.

1. What Are the Performance Requirements for the Location, Design, Construction, and Capacity for Cooling Water Intake Structures?

Under the final rule, EPA has adopted a two-track approach. Under Track I, for facilities with a design intake flow equal to or greater than 10 MGD, the capacity of the cooling water intake structure is restricted, at a minimum, to a level commensurate with that which could be attained by use of a closed-cycle recirculating system. Then for facilities with a design intake flow equal to or greater than 2 MGD, the design through-screen intake velocity is restricted to 0.5 ft/s and the total quantity of intake is restricted to a proportion of the mean annual flow of a freshwater river or stream, or to maintain the natural thermal stratification or turnover patterns (where present) of a lake or reservoir except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies), or to a percentage of the tidal excursions of a tidal river or estuary. In addition, an applicant with intake capacity greater than 10 MGD must select and implement an appropriate design and construction technology for minimizing impingement mortality and entrainment if certain conditions exist. (Applicants with 2–10 MGD flows are not required to reduce capacity but must install technologies for reducing entrainment at all locations.) Under Track II, the applicant has the opportunity to demonstrate that impacts to fish and shellfish, including important forage and predator species, within the watershed will be comparable to these which you would achieve were you to implement the Track I requirements for capacity and design velocity. See § 125.84(b)(1) and (2). Proportional flow requirements also apply under Track II.

a. Capacity

In Track I, all new facilities with cooling water intake structures having a design intake flow equal to or greater than 10 MGD must:

Reduce the total design intake flow to a level, at a minimum, commensurate with that which can be attained by a closed-cycle recirculating cooling water system using minimized make-up and blowdown flows.

Reducing the cooling water intake structure's capacity is one of the most effective means of reducing entrainment (and impingement). Capacity includes the volume of water that can be withdrawn through a cooling water intake structure over a period of time. Limiting the volume of the water withdrawn from a waterbody typically reduces the number of aquatic organisms in that waterbody that otherwise would be entrained. Under Track I, EPA requires that all new facilities, with intake flows equal to or greater than 10 MGD, limit their flow to a level commensurate with that which could be attained by use of a closed-cycle recirculating cooling water system using minimized make-up and blowdown flows. *See* § 125.84 (b)(1).

Closed-cycle, recirculating cooling water systems are known to reduce the amount of cooling water needed and in turn to directly reduce the number of aquatic organisms entrained in the cooling water intake structure. For the traditional steam electric utility industry, facilities located in freshwater areas that have closed-cycle recirculating cooling water systems can, depending on the quality of the make-up water, reduce water use by 96 to 98 percent from the amount they would use if they had once-through cooling water systems. Steam electric generating facilities that have closed-cycle recirculating cooling water systems using salt water can reduce water usage by 70 to 96 percent when make-up and blowdown flows are minimized. [31]

Manufacturing facilities that reuse and recycle water withdrawn from a water of the U.S. in a manner that reduces intake flow to a level commensurate with that which can be attained by a closed-cycle, recirculating cooling water system that has minimized make-up and blow down flows will be in accordance with the rule. *See* § 125.86(b)(1). For purposes of this regulation, EPA considers reuse and recycling at manufacturing facilities to be equivalent to closed-cycle, recirculating cooling water systems at steam-electric power plants.

Although EPA has not projected that any once-through electric generating facilities with an intake capacity of less than 10 MGD will be built in the next 20 years, EPA acknowledges that projecting the numbers and characteristics of facilities over long timeframes may lead to uncertainties in EPA's analysis. (*See* Sections 5.1.4 and 5.2.4 of the Economic Analysis for a discussion of uncertainties and limitations in EPA's baseline projections of new facilities.) In the event that such facilities might be built in the future (for example, as a stand-alone, combined-cycle, cogeneration facility associated with a manufacturer), EPA has concluded that the application of the intake capacity requirements in the selected option is not economically practicable for facilities with the smallest cooling water intake structures, those that withdraw less than 10 MGD. Based on EPA's estimate, the compliance cost-to-revenue ratio for combined-cycle facilities with these flows is 4.9 to 8.8 percent or higher. Even if these facilities installed a closed-cycle recirculating cooling system to reduce dynamic flow below the regulatory threshold for this rule and avoided all other costs of the rule, their cost-to-revenue ratio still would be from 2 to 3.2 percent or more (and they

[31] The lower range would be appropriate where State water quality standards limit chloride to a maximum increase of 10 percent over background and therefore require a 1.1 cycle of concentration. The higher range may be attained where cycles of concentration up to 2.0 are used for the design.

still might have to bear additional cost to comply with requirements the Director establishes on a case-by-case basis). EPA's analysis shows that the costs for all such facilities generally would be far above the range of impacts for facilities above 10 MGD, which have, compliance cost to-revenue ratios at or below 0.5 percent for more than 70 facilities, between 2 and 3 percent for only six facilities, and above 3 percent for only 3 facilities. EPA believes that the economic impact of complying with the rule would be disproportionate for electric generating facilities with flows below 10 MGD. Thus, the Agency is exercising its discretion under section 316(b) of the CWA to determine what is economically practicable and is creating specific requirements in Track I available to facilities with flows between 2 and 10 MGD. *See* § 125.84(c). These facilities are required to meet the same velocity, proportional flow, and the design and construction technology requirements for impingement that apply in § 125.84(b). *See* § 125.84(c)(1), (2) and (3). However, they are not required to reduce intake flow commensurate with use of a closed-cycle recirculating cooling system. Instead, they are required use design and construction technologies for minimizing entrainment at all locations. *See* 125.84(c)(4). EPA believes that the requirements of § 125.84(c) are an economically practicable way for these facilities to reduce impingement mortality and entrainment. EPA has made similar decisions in establishing technology-based effluent limitations guidelines and standards under 301 and 306, see e.g., Texas Oil & Gas Ass'n v. U.S. EPA, 161 F.3d 923, 940 (5th Cir. 1998) (Court upheld EPA's subcategorization for Cook Inlet based upon disproportionate economic impact).

b. Design and Construction Technologies

i. Velocity

Intake velocity is one of the key factors that can affect the impingement of fish and other aquatic biota. In the immediate area of the intake structure, the velocity of water entering a cooling water intake structure exerts a direct physical force against which fish and other organisms must act to avoid impingement or entrainment. EPA considers velocity to be an important factor that can be controlled for minimizing adverse environmental impact at cooling water intake structures. Because velocity can be minimized through appropriate design of the intake structure relative to intake flow, it is most easily addressed during the design and construction phase of a cooling water intake structure. Alternatively, the facility can install certain hard technologies (e.g., wedgewire screens and velocity caps) to change the configuration of the structure so that the effects of velocity on aquatic organisms are minimized.

Under Track I, for a facility with a design intake flows equal to or greater than 2 MGD, the final regulation requires that the maximum design through-screen velocity at each cooling water intake structure, be no more than 0.5 ft/s. See § 125.84(b)(2). 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.

To develop an appropriate minimum velocity requirement at cooling water intake structures that will be effective in contributing to the overall reduction in impingement, EPA reviewed available literature, State and Federal guidance, and regulatory requirement. EPA found that an approach velocity of 0.5 ft/s has been used as guidance in at least three Federal documents.[32 33 34] The 0.5 ft/s approach velocity threshold recommended in the Federal documents is based on a study of fish swimming speeds and endurance performed by Sonnichsen et al. (1973).[35] This study was based on an unknown number of individuals from about 30 different species of fish and eels, with many of the data for adult fish. The three Federal documents recommending a 0.5 ft/s intake velocity often referred to one another or had no references. The lack of abundant and diverse data led EPA to adopt a safety factor to ensure an appropriate level of protection for aquatic organisms. This study concluded that appropriate velocity thresholds should be based on the fishes' swimming speeds (which are related to the length of the fish) and endurance (which varies seasonally and is related to water quality). The data presented showed that the species and life stages evaluated could endure a velocity of 1.0 ft/s. To develop a threshold that could be applied nationally and is effective at preventing impingement of most species of fish at their different life stages, EPA applied a safety factor of two to the 1.0 ft/s threshold to derive a threshold of 0.5 ft/s. This safety factor, in part, is meant to ensure protection when screens become partly occluded by debris during operation and velocity increases through portions of the screen that remain open. EPA compiled the data from three studies on fish swim speeds (University of Washington study, Turnpenny, and EPRI) into a graph. The data suggest that a 0.5 ft/s velocity would protect 96 percent of the tested fish. EPA recognizes that there may be specific circumstances and species for which the 0.5 ft/s requirement might not be sufficiently effective. When issuing NPDES permits, the permit directors will need to comply with any applicable requirements under the Endangered Species Act (ESA). Both the National Marine Fisheries Service and the California Department of Fish and Game have developed fish screen velocity criteria.[36 37 38] Under section 510 of the Clean Water Act (CWA) States may impose additional requirements pursuant to State law. When EPA issues an NPDES permit, States may condition the permit pursuant to their certification authority under section 401 of the CWA.

Two velocities are of importance in the assessment and design of cooling water intake structures: the approach velocity and the through-screen or through-technology velocity. The approach velocity is the velocity measured just in front of the screen face or at the opening of the cooling water intake structure in the surface water source, and is biologically the most important velocity. The design through-screen or through-technology velocity is the velocity measured through the screen face or just as the organisms are

[32] Boreman, J. 1977. Impacts of power plant intake velocities on fish. Power Plant Team, U.S. Fish and Wildlife Service.

[33] Christianson, A. G., F. H. Rainwater, M.A. Shirazi, and B.A. Tichenor. 1973. 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.

[34] King, W. 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." In: U.S. Fish and Wildlife Service Navigable Waters Handbook.

[35] Sonnichsen, J.C., Bentley, G.F. Bailey, and R.E. Nakatani. 1973. A review of thermal power plant intake structure designs and related environmental considerations. Hanford Engineering Development Laboratory, Richland, Washington, HEDL-TME 73-24, UC-12.

[36] National Marine Fisheries Service Northwest Region. 1995. Juvenile Fish Screen Criteria.

[37] National Marine Fisheries Service, Southwest Region. 1997. Fish Screening Criteria for Anadromous Salmonids. Published on the Internet at *http://swr.ucsd.edu/hcd/fishscrn.htm* (access date).

[38] California Department of Fish and Game. 1997. Fish screening criteria.

passing through the opening into another device (e.g., entering the opening of a velocity cap). The through-screen velocity is always greater than the approach velocity because the net open area is smaller.

For this final rule, EPA uses the design through-screen velocity as a component of best technology for minimizing adverse environmental impact. EPA anticipates that design through-screen velocity will be simpler to calculate, and monitor (via measurement of head loss) and be more accurate than measuring approach velocity. The approach velocity is a point function. When the cross-section of an intake structure is large, the approach velocity will not be the same at all points across all points in a single cross-section. The approach velocity varies depending on where it is measured: how far from the surface, how far in front of the screen, or the location across the screen. Approach velocity also varies with the number of measurements taken; is 1 taken, or 10? Furthermore, it is much easier to design the intake structure to achieve a specific through-screen velocity. EPA notes that design through-screen velocity will be easier to implement because a number of technologies use it as the standard measure for intake design. In conjunction with the design intake velocity requirement, EPA requires new facilities to monitor the head loss across the screens or other technology on a quarterly basis. See § 125.87(b). EPA requires that head loss across the screens (or other appropriate measurements for technologies other than intake screens) be monitored and correlated with intake velocity once the facility is operating.

ii. Other Design and Construction Technologies

The final rule requires facilities withdrawing more than 10 MGD that choose Track I to select and install design and construction technologies for minimizing impingement mortality and/or entrainment if they locate in certain areas where fish or shellfish resources need additional protection. *See* § 125.84(b)(4) and (5). Facilities withdrawing between 2 and 10 MGD may meet a different set of Track I requirements. *See* § 125.84(c). If they choose to do so, the rule specifies that they must meet the same design and construction requirements to reduce impingement as applies to facilities withdrawing greater than 10 MGD. However, to reduce entrainment, instead of requiring a reduction in intake flow commensurate with use of a closed-cycle recirculating cooling water system, the rule requires these facilities to select and install design and construction technologies at all locations. *See* § 125.84(c)(3) and (4).

EPA is requiring these technologies in Track I because they are technically available, economically practicable and they effectively further reduce impingement mortality and entrainment at new facilities that choose to locate in areas where fish and shellfish resources need additional protection. EPA notes that facilities with closed-cycle recirculating cooling systems can still withdraw large volumes of cooling water, particularly if they operate in brackish or other waters where high rates of recirculation cannot be achieved, and may still impinge or entrain large numbers of aquatic organisms. Thus, EPA believes that facilities that choose to locate in areas where fish and shellfish need additional protection should install these technologies to further reduce impingement mortality and entrainment.

In the Track I requirements at § 125.84(c), *which apply to facilities* with cooling water intakes between 2 and 10 MGD that choose not to meet the capacity reduction requirements in § 125.84(b), the rule requires these facilities to meet the same design and construction requirements for minimizing impingement mortality as are required for facilities withdrawing greater than 10 MGD, *See* § 125.84(c)(3). These impingement requirements apply if the facility locates where fish and shellfish resources need additional protection. Facilities between 2 and 10 MGD that choose not to meet the capacity reduction requirements in § 125.84(b), however, must install design and construction technologies for reducing entrainment at all locations. *See* § 125.84(c)(4). EPA makes this distinction because, for economic practicality reasons, today's rule does not require smaller new facilities to reduce intake flow commensurate with a closed-cycle recirculating cooling system. In this case, EPA believes that use of design and construction technologies is an alternative, economically practicable and technically available means for reducing entrainment.

Today's rule does not require facilities choosing Track II to install design and construction technologies as specified under 125.84(b)(4) and (5) or 125.84(c)(3) and (4). EPA believes that such facilities will use these technologies, at least in part, to meet the Track II comparability requirements at 125.84(c)(1) and thus achieve comparable performance.

As used in these provisions, "minimize" means to reduce to the smallest amount, extent, or degree reasonably possible. *See* § 125.83. Technologies that minimize impingement mortality and entrainment of all life stages of fish and shellfish at a location might include, but are not limited to, intake screens, such as fine mesh screens and aquatic filter barrier systems, that exclude smaller organisms from entering the cooling water intake structure; passive intake systems such as wedgewire screens, perforated pipes, porous dikes, and artificial filter beds; and diversion and/or avoidance systems that guide fish away from the intake before they are impinged or entrained. In some cases, technologies that might be used to achieve the 0.5 ft/s velocity standard at § 125.85(b)(2) and § 125.85(c)(1), such as passive intake systems, might also minimize impingement mortality and entrainment.

Some technologies minimize impingement mortality by maximizing the survival of impinged organisms. These technologies include, but are not limited to, fish-handling systems such as bypass systems, fish buckets, fish baskets, fish troughs, fish elevators, fish pumps, spray wash systems, and fish sills. These technologies either divert organisms away from impingement at the intake structure, or collect impinged organisms and protect them from further damage so that they can be transferred back to the source water at a point removed from the facility intake and discharge points.

Some additional design and construction technologies have feasibility issues limiting their use to certain types of locations. Some have not been used on a widespread basis above certain intake flow rates. The effectiveness of these technologies also may vary depending on factors such as the speed and variability in direction of currents in a waterbody, the degree of debris loading at a location, etc. Because of these issues, EPA has not established a national performance standard for these technologies more specific than to require the applicant to study literature and available physical and biological data on their proposed location, and then to select and install technology(ies) that minimize impingement mortality and entrainment. (As stated above, "minimize" is defined as a reduction "to the smallest amount, extent or degree reasonably possible.")

In Track I of the final rule, EPA does not require an applicant that installs design and construction technology(ies) to seek the approval of the Director regarding which design and construction technology(ies) it selects, nor does EPA require the applicant to conduct biological monitoring prior to submitting its application. Rather, to avoid permitting delays Track I only requires the applicant to gather and present historical information and/or literature to support its decision on which design and construction technology(ies) to implement at the new facility. *See* § 125.86(b)(4).

Because an applicant does not need the Director's approval of its design and construction technology(ies) prior to the first permit, EPA has included a provision that requires the Director to determine, at each permit reissuance, whether design and construction technologies at the facility are minimizing impingement mortality and/ or entrainment, *See* § 125.89(a)(2). This provision is intended to ensure that the applicant selects and installs appropriate technology(ies).

The framework of these provisions balances a number of factors. One is EPA's interest in ensuring that applicants seeking their first permit under Track I can quickly obtain one without delay and, if they wish, without engaging in a dialogue with the Director about whether additional design and construction technologies are needed at their site, or which technologies will reasonably reduce impingement mortality and entrainment at the location. In this case, an applicant may wish to install some of the more highly protective additional design and construction technologies, to minimize any opportunity for disagreement with the Director at permit reissuance about whether the applicant chose technologies that "minimize" impingement mortality and entrainment at their location.

Alternatively, an applicant under § 125.84(b) who is willing to take the time to engage in a dialogue with the Director prior to the first permit under Track I may be able to obtain the Director's concurrence on a finding that the proposed intake will not be located in an area where fish or shellfish resources need additional protection. *See* § 125.84(b)(4) and (5) for a list of such areas. In this case, the applicant may not need to install any additional design and construction technologies. In the event that the location of the intake structure is such that additional technologies are required, an applicant who is willing to take the time to consult with the Director prior to the first permit under Track I may be able to obtain the Director's concurrence that technologies that are less costly than the most highly-protective ones available are sufficient for its location. (EPA again notes that "minimize" is defined as a reduction "to the smallest amount, extent or degree reasonably possible.")

EPA believes the above framework reasonably balances its interest in minimizing permit delays with its interest in ensuring that applicants willing to take more time and engage in a dialogue with the Director may have an opportunity to reduce their costs. As a general matter, EPA strongly encourages permit applicants to consult with the Director prior to selecting and installing design and construction technology(ies). Today's rule, however, requires no such consultation, and, as discussed elsewhere in this preamble, EPA's costing analysis conservatively assumes that permittees will install additional design and construction technologies at all locations.

EPA recognizes that the condition of biological resources at a location may change over time. The requirement for the Director to review the applicant's design and construction technologies at permit reissuance provides an opportunity for any appropriate changes in the design and construction technologies used at the location. *See* § 125.89(a)(2).

c. Location

Although EPA recognizes that the location of a cooling water intake structure can be a factor that affects the environmental impact caused by the intake structure, today's final rule, apart from the proportional flow requirements, does not include specific national requirements for new facilities based on location of the cooling water intake structure. In EPA's view, the optimal design requirement for location is to place the inlet of the cooling water intake structure in an area of the source waterbody where impingement and entrainment of organisms are minimized by locating intakes away from areas with the potential for high productivity (taking into account the location of the shoreline, the depth of the waterbody, and the presence and quantity of aquatic organisms or sensitive habitat). EPA received significant and convincing comments arguing against the specific proposed requirements and feasibility for locations based on waterbody type and location within the waterbody. Among other things, commenters argued that EPA's proposed requirements would be difficult to implement and relied on generalizations about types of waterbodies that were too simplistic. See section VI.C for further discussion of comments and EPA's responses regarding location. This topic is discussed further in Chapter 5 of the *Technical Development Document*.

Although today's rule does not specifically establish location requirements, several components of the two-track approach inherently consider location as a factor. Under Track I, location is a consideration when the applicant selects and implements the design and construction technologies for minimizing impingement and entrainment and maximizing impingement survival. In addition, EPA estimated that in order to meet the proportional flow requirements in Track I and Track II, facilities may need to site in locations that can support their water withdrawals or find other alternatives, such as, obtaining water from ground water, grey water, or a public water supply system. Under Track II, the new facility may choose location as a key component for minimizing impingement and entrainment. Under Track II, an applicant has the opportunity to conduct site-specific studies to demonstrate that alternative technologies or configurations, including the relocation of an intake to areas of less sensitivity, will reduce impingement mortality and entrainment for all life stages of fish and shellfish to a level of reduction comparable to the level that would be achieved were the applicant to implement the technology-based performance requirements in Track I.

In addition, this new facility rule also regulates location as a performance characteristic of new facilities to minimize entrainment and other adverse environmental impacts that are likely to occur as a result of the withdrawal of makeup water even where a facility uses recirculating systems. Historically, some previous CWA section 316(b) studies conducted for permits proceedings have considered potential impacts from facilities whose cooling water intake flow is large in proportion to the source water flow or tidal volume.[39 40 41] Under this rule, §§ 125.84(b)(3), 125.84(c)(2), and 125.84(d)(2), EPA establishes proportional flow requirements for new facility cooling water intake structures located in freshwater rivers and streams, lakes and reservoirs, and estuaries and

[39] Lewis, Randall B. and Greg Seegert. Entrainment and Impingement Studies at two Power Plants on the Wabash River in Indiana. *Power Plants & Aquatic Resources: Issues and Assessment. Environmental Science & Policy.* Volume 3, Supplement 1. September 2000.

[40] Public Service Indiana. 316(b) Demonstration for the Cayuga and Wabash River Generating Stations. Prepared by Dames and Moore, Cincinnati, Ohio. August 30, 1997.

[41] Public Service Company of Indiana. A 316(b) Study and Impact Assessment for the Cayuga Generating Station. Prepared by EA Science and Technology, Northbrook, IL. April 1988.

tidal rivers, requiring that the total design intake flow from all cooling water intake structures at a facility withdrawing:

- From a freshwater river or stream must be no greater than five (5) percent of the source waterbody mean annual flow;
- From a lake or reservoir must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);
- From estuaries or tidal rivers must be no greater than one (1) percent of the volume of the water column in the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level.

EPA finds these proportional flow limitations to represent limitations on capacity and location that are technically available and economically practicable for the industry as a whole. EPA examined the performance of existing facilities based on section 308 questionnaire data in terms of proportional flow in order to determine what additional value could be used as a safeguard to protect source waters against entrainment, especially in smaller waterbodies or in waterbodies where the intake is disproportionately large as compared to the source water body. (In practice, EPA expects that these requirements would require a facility to relocate or obtain water from another source, e.g., a public water supply or groundwater, only in smaller waterbodies, because no new facilities in larger waterbodies that use wet recirculating cooling systems would ever run afoul of these requirements.) In order to assess the performance of new facilities in meeting these requirements, EPA examined the performance of existing facilities and determined that 90 percent of existing facilities in freshwater rivers and streams and 92 percent of existing facilities in estuaries or tidal rivers meet these requirements. Based on documents included in the record, EPA also believes that most existing facilities meet the proportional flow requirement for lakes and reservoirs. EPA expects that new facilities would have even more potential to plan ahead to select locations and design intake capacity that meet these requirements. EPA recognizes that these requirements are conservative in order to account for the cumulative impact of multiple facilities' intakes. The 1 percent value for estuaries reflects that the area under influence of the intake will move back and forth near the intake and that withdrawing 1 percent of the volume of water surrounding the intake twice a day over time would diminish the aquatic life surrounding the intake. The 5 percent value for rivers and streams reflects an estimate that this would entrain approximately 5 percent of the river or stream's entrainable organisms and a policy judgment that a greater degree of entrainment reflects an inappropriately located facility. Because they are overwhelmingly achievable for new facilities, EPA believes they are appropriate to this new facility rule.

Proportional flow limitations are one way to provide protection for aquatic life and enhancement of commercial and recreational uses of source waters. Larger proportionate withdrawals of water may result in commensurately greater levels of entrainment. Entrainment impacts of cooling water intake structures are closely linked to the amount of water passing through the intake structure, because the eggs and larvae of some aquatic species are free-floating and may be drawn with the flow of cooling water into an intake structure. Sizable proportional withdrawals from a stream or river might also change the physical character of the affected reach of the river and availability of suitable habitat, potentially affecting the environmental or ecological value to the aquatic organisms. In lakes or reservoirs, the proportional flow requirement limits the total design intake flow to a threshold below which it will not disrupt the natural thermal (and dissolved oxygen) stratification and turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies). See § 125.84(b)(3)(ii). The proportional flow requirement for lakes and reservoirs would primarily protect aquatic organisms in small to medium-sized lakes and reservoirs by limiting the intake flow to a capacity appropriate for the size of the waterbody. In estuaries and tidal rivers, EPA's proportional flow requirement uses a volume that relates specifically to the cooling water intake structure and the area it influences (see § 125.83). Organisms in this area of influence travel back and forth with the tides and so may be exposed to the intake multiple times. The proportional flow requirement for estuaries and tidal rivers will limit the withdrawal of a sizable proportion of the organisms within the area of influence, commensurately reducing the entrainment of aquatic organisms.

d. Additional and Alternative Best Technology Available Requirements

At § 125.84(e), the final rule recognizes that a State may, under sections 401 or 510 of the CWA, ensure the inclusion of any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure at a new facility that are necessary to ensure attainment of water quality standards, including designated uses, criteria, and antidegradation requirements.

EPA interprets the CWA to authorize State and Tribal permit authorities to require more stringent limitations on intake where necessary to protect any provision of State law, including State water quality standards. Commenters have asserted that EPA does not have such authority under CWA section 301(b)(1)(C), arguing that authority is limited to controls on discharges of pollutants. Leaving that question open, there is ample authority under CWA sections 510 and 401, as is consistent with the goals of the CWA articulated in section 101 of the CWA, to provide EPA ample authority for such a provision. Section 510 of the CWA provides, in relevant part:

> Except as provided in this Chapter, nothing in this chapter shall (1) preclude or deny the right of any State or political subdivision therefore * * * to adopt or enforce * * * (B) any requirement respecting control or abatement of pollution * * * except that if an * * * other limitation * * * or standard of performance is in effect under this chapter, such State * * * may not adopt or enforce any * * * other limitation * * * or standard of performance which is less stringent than the * * * other limitation * * * or standard of performance under this chapter.

EPA interprets this to reserve for the States the authority to implement requirements that are more stringent than the Federal requirements under state law. PUD No. I of Jefferson *County v. Washington Dep't of Ecology*, 511 U.S. 700, 705 (1994). (As recognized by section 510 of the Clean Water Act, 33 U.S.C. 1370, States may develop water quality standards more stringent than required by this regulation.). Further, section 401(d) of the CWA provides, in relevant part,

> Any certification provided under this section shall set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a Federal license or permit will comply with any applicable effluent limitations and other limitations, under section 1311 or 1312 of this title, standard of performance under 1316 of this title, or prohibition, effluent standard, or

pretreatment standard under section 1317 of this title, and with any other appropriate requirement of state law set forth in such certification, and shall become a condition on any Federal license or permit subject to the provisions of this section."

In *PUD No. I of Jefferson County* v. *Dep't of Ecology*, 511 U.S. 700, 711 (1994), the Supreme Court held that this provision is not "specifically tied to a 'discharge'." ("The text refers to the compliance of the applicant, not the discharge. Section 401(d) thus allows the State to impose 'other limitations' on the project in general to assure compliance with various provisions of the Clean Water Act and with "any other appropriate requirement of State law.") Thus, section 401(d) provides states with ample authority in their 401 certifications to require EPA to include any more stringent limitations in order to meet the requirements of state law. These two sections of the CWA further the objectives of the act to "restore and maintain the chemical, physical, and biological integrity of the nation's waters," the interim goal to protect water quality and are consistent with the CWA policy to "recognize, preserve, and protect the primary responsibility and rights of States to prevent, reduce, and eliminate pollution" and "to plan the development and use * * * of water resources." CWA sections 101(a) and (b).

2. What Technologies Are Available To Meet the Regulatory Requirements

a. Track I: Capacity

The technical availability of the two-track option is demonstrated by information in EPA's record showing that each component of Track I, the "fast-track" option, can be achieved through the use of demonstrated technologies. Intake capacity reduction commensurate with use of a wet closed-cycle recirculating cooling system as required by § 125.84(b)(1) can be achieved using a recirculating wet cooling tower or cooling pond. Such a closed-cycle recirculating cooling system is a commonly practiced technology among the new facilities controlled by this rule. The Technical Development Document shows that 67 percent of new in-scope facilities (10 new coal-fired power plants, 64 new combined-cycle power plants, and 7 manufacturing facilities) would install a closed-cycle recirculating cooling system independently of this rule.

While manufacturers use closed-cycle recirculating cooling systems to a lesser extent than do electric power generators, manufacturers also have opportunities to recycle or reuse their cooling water to reduce their water intake capacity. To examine the extent to which new manufacturing facilities are likely to reuse and recycle cooling water, the Agency reviewed the engineering databases that support the effluent limitations guidelines for several categories of industrial point sources. In general, this review identified extensive use of recycling or reuse of cooling water in documents summarizing industrial practices in the late 1970s and early 1980s, as well as increased recycling and reuse of cooling water in the 1990s. For example, the reuse of cooling water in the manufacturing processes was identified in the pulp and paper and chemicals industries, in some cases as part of the basis for an overall zero discharge requirement (inorganic chemicals). Other facilities reported reuse of a portion of the cooling water that was eventually discharged as process wastewater, with some noncontact cooling water discharged through a separate outfall or after mixing with treated process water.

For manufacturing facilities, flow reduction techniques differ between facilities and industry sectors. Facilities use unheated noncontact cooling water for condensing of excess steam produced via cogeneration; they use unheated contact and noncontact cooling water for in-process needs; and they frequently reuse process waters and wastewaters for contact and noncontact cooling.

The chemical and allied products sector and the petroleum refining sector demonstrate similar cooling water practices. Both sectors utilize cooling water for condensing of excess steam from cogeneration and for critical process needs. Most process cooling water is noncontact cooling water and generally is not reused as process water (though it may be recirculated). Paper and allied products facilities generally reuse cooling water and cogenerated steam throughout their processes (though the level to which this occurs differs among facilities). Primary metals industries utilize cooling water for contact and noncontact cooling and for condensation of steam from onsite electric power generation. Contrary to the other sectors, the primary metals industries have no general purpose for cogenerated steam in their processes.

In general, the cooling requirement for cogeneration in these manufacturing sectors is less than for the same power generated by utility and nonutility power plants. Regardless of this fact, this rule requires that the intake of water used for this purpose (and not reused as process water) must be minimized according to the same technology-based performance requirements as for other steam electric generating facilities. The condensing of excess steam from cogeneration is the same process at manufacturers as at utility and nonutility power plants. Therefore, EPA does not distinguish between requirements for this activity.

For the purposes of this regulation, EPA considers the withdrawal of water for use and reuse as both process and cooling water analogous to the reduction of cooling water intake flows achieved through the use of a recirculating cooling water system. For example, some facilities transfer excess process heat to a water stream and subsequently reuse the heated stream for other process purposes. In this case there is considerable conservation of water and energy by the reuse of cooling water. Alternatively, some facilities often withdraw water first for a process application and subsequently reuse it as cooling water. EPA encourages such practices and, in turn, considers these techniques analogous to flow reduction for the purposes of meeting the capacity reduction requirements of this rule. To meet the intake capacity requirements at § 125.84(b)(1) a new manufacturing facility must, to the maximum extent practicable, reuse and recycle cooling water withdrawn for purposes other than steam electric condensing. Cooling water intake used for the purposes of condensing of exhaust steam from electricity generation must be reduced to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system using minimized make-up and blowdown flows. EPA concludes that for manufacturers the capacity requirement meets the criterion of best technology available commercially at an economically practicable cost.

b. Track I: Velocity

EPA examined the technical feasibility of the required through-screen velocity of 0.5 ft/s. This requirement relies on the appropriate design of the intake structure relative to intake flow to reduce velocity or installation of certain hard technologies (e.g., wedgewire screens and velocity caps) to change the configuration of the structure so that the effects of velocity on aquatic organisms are minimized. EPA's record demonstrates that these designs and technologies are widely used in the industries subject to this rule. Since there are a number of intake technologies currently in use that are designed to meet a 0.5 ft/s through-screen velocity, the technologies that can achieve the Track I velocity technology-based performance requirement meet the criterion of best technology available commercially at an economically practicable cost.

The Agency also reviewed the data from the section 316(b) industry survey with respect to the velocity requirement § 125.84(b)(2). The preliminary results suggest that more than two-thirds of combined cycle and coal-fired electric generating facilities built within the past 15 years would meet the velocity requirement. These currently operating facilities demonstrate that a design intake velocity of 0.5 ft/s is achievable and provides for sufficient cooling water withdrawal.

c. Track I: Other Design and Construction Technologies

EPA also examined the technology availability of the design and construction requirements at § 125.84(b)(4) and (5) in the final rule. While EPA costed this requirement based on the assumption that a facility would install cylindrical wedgewire screen, or fish return systems on traveling screens, EPA's record demonstrates that there are a number of potentially effective design and construction intake technologies available for installation at cooling water intake structures for minimizing adverse environmental impact. The intake technologies that new facilities may consider are in one of four categories that include, but are not limited to,

- Intake screen systems: single-entry, single-exit vertical traveling screens; modified traveling screens (Ristroph screens); single-entry, single-exit inclined traveling screens; single-entry, double-exit vertical traveling screens; double-entry, single-exit vertical traveling screens (dual-flow screens); horizontal traveling screens; fine mesh screens mounted on traveling screens; horizontal drum screens; vertical drum screens; rotating disk screens; and fixed screens.
- Passive intake systems: wedgewire screens, perforated pipes, perforated plates, porous dikes, artificial filter beds, and leaky dams.
- Diversion or avoidance systems: louvers, velocity caps, barrier nets, air bubble barriers, electrical barriers, light barriers, sound barriers, cable and chain barriers, aquatic filter barrier systems, and water jet curtains.
- Fish handling systems: fish pumps, lift baskets, fish bypasses, fish baskets, fish returns, fish troughs, and screen washes.

d. Track II: Alternative Technologies

EPA also notes that certain facilities following Track II may be able to demonstrate reduction of impingement mortality and entrainment for all life stages of fish and shellfish to a level of reduction comparable to the level that would be achieved under Track I using lower-cost alternative technologies. Under 125.84(d), new facilities that choose to comply under Track II must reduce impacts to fish and shellfish, including important forage and predator species, within the watershed to a level comparable to that which would be achieved were they to implement the requirements of § 125.84(b)(1), and (2) under Track I.[42] EPA does not consider this requirement to mandate exactly the same level of reduction in impingement and entrainment as would be achieved under Track I. Rather, given the numerous factors that must be considered to determine the required level of reduction in impingement and entrainment for Track II and the complexity inherent in assessing the level of performance of different control technologies, EPA believes it is appropriate for a new facility following Track II to achieve reductions in impingement and entrainment that are 90 percent or greater of the levels achieved under Track I. EPA believes this approach is reasonable for the several reasons.

New facility determinations regarding flow or impingement and entrainment under Track I or Track II are, by necessity, estimates based on available data as well as certain assumptions. Such estimates have substantial value but cannot reasonably be expected to achieve a high level of precision. This is particularly true where, as here, impingement and entrainment rates must be correlated with reductions in flow (which are themselves estimated), reductions in intake velocity, and other design and construction requirements. It also is important to recognize that the efficacies of different design and construction technologies also are based on estimates that are inexact due to data limitations, variations in ambient conditions, and the presence or absence of different species, among other factors.

Available data suggests that alternative design and construction technologies for cooling water intake structures can achieve the level of reduction in impingement and entrainment required under Track II. For example, technologies such as fine and wide-mesh wedgewire screens, as well as aquatic filter barrier systems, have been shown to reduce mortality from impingement by up to 99 percent or greater compared with conventional once-through systems. In addition, other types of barrier nets may achieve reductions in impingement of 80 to 90 percent, and modified screens and fish return systems, fish diversion systems, and fine mesh traveling screens and fish return systems have achieved reductions in impingement mortality ranging from 60 to 90 percent greater than conventional once-through systems. Similarly, although there is less available full scale performance data regarding entrainment, aquatic filter barrier systems, fine mesh wedgewire screens, and fine mesh traveling screens with fish return systems have in certain places been shown to achieve 80 to 90 percent greater reduction in mortality from entrainment compared with conventional once-through systems. Examples of effective use of technologies that reduce impingement and/or entrainment include:

- Studies from 1996 to 2001 at Lovett Station (New York) show no obvious impingement/contact mortality using aquatic filter barrier systems;
- Fine mesh (0.5 mm) screen performance to reduce entrainment has consistently improved at Big Bend Units 3 and 4 (Florida) with better surveillance and maintenance, including biweekly cleaning of screens to prevent biofouling. The operator's 1988 monitoring data show an efficiency in screening fish eggs (primarily drum and bay anchovy) exceeding 95 percent. For fish larvae (primarily drum, bay anchovies, blennies, and gobies), it was about 86 percent. Latent survival of fish eggs has improved to 65 to 80 percent for drum, and 66 to 93 percent for bay anchovy;
- At the Brunswick Station (North Carolina), 1 mm fine mesh screens have been used on two of four traveling screens (only when temperatures are less than 18 degrees C). Total reduction of fish entrained by the fine mesh versus conventional screens has been found to be 84 percent;
- Wedgewire screens with slot sizes of one, two, and three millimeter were studied by the State of Maryland at the Chalk Point Station. One millimeter screens led to 80 percent exclusion of all species, including larvae. For fish

[42] These Track I provisions require that the new facility reduce its intake flow, at a minimum, to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system; desgin and construct each cooling water intake structure to a maximum through-screen design intake velocity of 0.5 ft/s; and select and implement design and construction technologies (e.g., wedgewire screens, fine mesh screens, fish handling and return systems, barriers nets, acquatic filter barrier systems) to minimize impingement and entrainment of all life stages of fish and shellfish and to maximize survival of impinged life stages of fish and shellfish.

with greater than 10 mm length, entrainment was eliminated.[43]

Several additional factors suggest that these performance levels can be improved upon. First, some of the cooling water intake structure technology performance data reviewed is from the 1970's and 1980's and does not reflect recent developments and innovation (e.g., aquatic filter barrier systems, sound barriers). Second, the conventional barrier and return system technologies characterized above have not been optimized on a widespread level to date, as would be encouraged by this rule. Such optimization can be best achieved by new facilities, which can match site conditions to available technologies. Third, EPA believes that many facilities could achieve further reductions (estimated 15–30 percent) in impingement and entrainment by providing for seasonal flow restrictions, variable speed pumps, and other innovative flow reduction alternatives.

e. Track II: Location

New facilities seeking to comply under Track II can use the location of their cooling water intake structures to achieve further reductions in impingement and entrainment. Location of the cooling water intake structure can be addressed during the planning and design phases of new facility construction. At that time, it may be possible to choose a particular waterbody type and a specific location on that waterbody where (considering the proposed capacity of the cooling water intake structure) the potential for impingement and entrainment is relatively low. The optimal design requirement for cooling water intake structure location is to place the inlet in an area of the source waterbody where impingement and entrainment of organisms are minimized, i.e., taking into account: the physical and chemical characteristics of the waterbody; the presence and location of sensitive habitats; and the composition, abundance, and spatial/temporal presence of aquatic organisms. It is well known that there are certain areas within every waterbody with increased biological productivity, and therefore where the potential for impingement and entrainment of organisms is greater (e.g., littoral zone in lakes, shore zone in rivers, nearshore coastal waters in oceans). Examples include the following.

- Near the Fort Calhoun Station on the Missouri River, transect studies in 1974 to 1977 indicated higher densities of fish larvae along the cutting bank of the river adjacent to the Station's intake structure and lower densities at the mid-channel location. While densities of fish larvae changed throughout the three month data collection period, the densities collected from the mid channel remained substantially less than those in the cutting bank location.[44]
- Catches of young striped bass from Suisun Bay near the Pittsburg Power Plant (May to July 1976) ranged from $0.062/m^3$ to $0.496/m^3$ in the center channel, and from $0.082/m^3$ to $0.648/m^3$ along the north shore. Weekly mean densities for striped bass were $0.215/m^3$ in the center channel, and $0.320/m^3$ along the north shore.[45]
- A study of densities in the Connecticut River in 1972 showed that fish tended to be more abundant in the more shallow areas near the east shore. Distributions of fish also changed depending upon the time of day and the depth in the water column.[46]

Biologically productive and/or sensitive areas that should be avoided during the intake siting process are those that serve to promote: the congregation and growth of aquatic organisms; the propagation of the early life stages of aquatic organisms (e.g., planktonic stages); and any life stage of a threatened or endangered species. Examples of these sensitive areas would include (but are not limited to) critical nursery areas, spawning grounds, important migratory pathways, refuge areas, and essential fish habitats. Other factors to consider in the intake siting process include the proximity to: aquatic sanctuaries/refuges; national parks, seashores and monuments; wilderness areas; areas of environmental concern or outstanding natural resource waters; and coral reefs. Conversely, potential examples of less-sensitive areas may include: areas outside of the limnetic zone (i.e., no light penetration); areas of significant oxygen depletion; and areas proven to have low densities of organisms.

f. Track II: Restoration

The purpose of section 316(b) is to minimize adverse environmental impact from cooling water intake structures. Restoration measures that result in the performance comparable to that achieved in Track I further this objective while offering a significant degree of flexibility to both permitting authorities and facilities.

EPA recognizes that restoration measures have been used at existing facilities implementing section 316(b) on a case-by-case, best professional judgment basis as an innovative tool or as a tool to conserve fish or aquatic organisms, compensate for the fish or aquatic organisms killed, or enhance the aquatic habitat harmed or destroyed by the operation of cooling water intake structures. Under Track II, this flexibility will be available to new facilities to the extent that they can demonstrate performance comparable to that achieved in Track I. For example, if a new facility that chooses Track II is on an impaired waterbody, that facility may choose to demonstrate that velocity controls in concert with measures to improve the productivity of the waterbody will result in performance comparable to that achieved in Track I. The additional measures may include such things as reclamation of abandoned mine lands to eliminate or reduce acid mine drainage along a stretch of the waterbody, establishment of riparian buffers or other barriers to reduce runoff of solids and nutrients from agricultural or silvicultural lands, removal of barriers to fish migration, or creation of new habitats to serve as spawning or nursery areas. Another example might be a facility that chooses to demonstrate that flow reductions and

[43] EPA acknowledge that there are a limited number of large facilities where alternative technologies have been used. However, the use of fine mesh screens at Brunswick and big Bend have shown performance levels exceeding 70–80 percent. Similarly, fine mesh wedgewire screens at Logan have used to reduce entrainment by 90 percent. While these sites draw water from tidally influenced rivers, they should be equally transferable to large, fresh water rivers in the midwest. In fact, reliability and likely performance should be better than a site such as Big Bend where the bifouling would be a greats issue. The "actual" examples are supported by laboratory testing showing the viability of fine mesh screens that was performed at Delmara Research, TVA, and the proposed Seminole Plant in Florida. These tests found entrainment reductions using fine mesh screens of greater than 90 percent. the use of an aquatic filter barrier system (i.e. gunderboom) at the Lovett Station in New York is entirely transferable to a large, Midwestern river system. This system is now providing consistently greater than 80 percent reductions in entrainment and has the potential to exceed 90 percent. The areas where aquatic filter barrier systems might not be effective/feasible include ocean locations with high waves, limited access areas, and places where navigation could be effected. Note that feasibility should be similar to other barrier net systems, which have been installed at a number of Great Lake sites, e.g., Ludington.

[44] King, R.G. 1977. Entrainment of Missouri River fish larvae Fort Calhoun Station. In: Jensen, L.D. (Ed.), *Fourth National Workshop on Entrainment and Impringement* EA Communications, Melville, NY, pp.45–56.

[45] Stevens, D.E. and B.J. Finlayson. 1977. Mortality of young striped bass entrained at two power plants in the Sacramento-San Joaquin Delta, California, In: Jensen, L.D. (Ed.), *Fourth National Workshop on Entrainment and Impingement*. EA Communications, Melville, NY, pp. 57–69.

[46] Marcy, B.C. 1974. Vulnerability and survival of young Connecticut River entrained at a nuclear power plant. In: Jensen, L.D. (Ed.). *Entrainment and Intake Screening: Proceedings of the Second Entrainment and Intake Screening Workshop.* Electric Power Research Institute Publication No. 74–049–00–5, Palo Alto, CA, pp. 281–288.

less protective velocity controls, in concert with a fish hatchery to restock fish being impinged and entrained with fish that perform a similar function in the community structure, will result in performance comparable to that achieved in Track I.

EPA recognizes that it may not always be possible to establish quantitatively that the reduction in impact on fish and shellfish is comparable using the types of measures discussed above as would be achieved in Track I, due to data and modeling limitations. Despite such limitations, EPA believes that there are situations where a qualitative demonstration of comparable performance can reasonably assure substantially similar performance. EPA is thus providing, in § 125.86, that the Track II Comprehensive Demonstration Study should show that either: (1) The Track II technologies would result in reduction in both impingement mortality and entrainment of all life stages of fish and shellfish of 90 percent or greater of the reduction that would be achieved through Track I (quantitative demonstration) or, (2) if consideration of impacts other than impingement mortality and entrainment is included, the Track II technologies will maintain fish and shellfish in the waterbody at a substantially similar level to that which would be achieved under Track I (quantitative or qualitative demonstration).

g. Track I and II: Proportional Flow

Finally, EPA examined the technical feasibility of the proportional flow reduction requirements at §§ 125.84(b)(3), 125.84(c)(2), and 125.84(d)(2) of the rule. EPA based this requirement, in addition to the closed-cycle recirculating cooling water technologies discussed above, on the use of groundwater, municipal sources of water, treated wastewater (grey water), and on locating facilities on waterbodies that can meet the proportional flow requirements.

EPA analyzed the potential siting implications of the proportional flow requirements and determined that within the United States approximately 131,147 river miles have sufficient flow to support the water usage needs of large manufacturing facilities withdrawing up to 18 MGD of water without exceeding the proportional flow limitations in this rule. Approximately 53,964 river miles could support a large non-utility power-producing facility withdrawing 85 MGD, and approximately 14,542 river miles could support a large utility plant requiring 700 MGD without exceeding of the proportional flow limitations in this rule. Under today's final rule, new facilities needing additional cooling water in other areas would need to supplement withdrawals from waters of the U.S. with other sources of cooling water or redesign their cooling systems to use less water.

As another gauge of the siting impacts of the flow requirement for new facilities, the Agency determined, from a 1997 database of the Energy Information Agency and a 1994 Edison Electric Institute database, that 89 percent of existing non-nuclear utility facilities could be sited at their current location under today's final requirements if they also operated in compliance with the capacity reduction requirements at § 125.84(b)(1). (Please note that the Agency does not intend to prejudge or signal in any way whether its final rule for existing facilities will or will not include capacity limitations commensurate with a level that could be attained by a recirculating cooling water system. EPA conducted this analysis to determine whether today's proportional flow requirements would unreasonably limit siting alternatives for new facilities only.)

Finally, to further examine the potential siting implications of today's rule for new facilities, the Agency reviewed data on water use by existing facilities in arid regions of the country. The Agency found that 80 percent of the existing facilities in Arizona, California, Nevada, New Mexico, Oklahoma, and Texas do not use waters of the U.S. in their operations, indicating that new facilities in these areas would similarly use waters other than waters of the U.S. in their operations. Therefore, today's final rule would not affect these facilities if they were being constructed as new facilities subject to the rule.

3. Why Is the Two-Track Option Economically Practicable?

EPA has determined that the two-track option is economically practicable for the industries affected by the rule. For the two-track option that does not distinguish between waterbody types, the cost of compliance to the industry is expected to be no more than $47.7 million annually. Because the Agency cannot predict precisely which track the projected facilities would choose and what the compliance response for Track II facilities would be, EPA estimated the costs based on the assumption that each new facility that does not plan to install a recirculating system in the baseline would choose to conduct the studies required of Track II but then implement the requirements of Track I. This is the most conservative cost estimate because it assumes the highest cost a facility could potentially incur. Presumably, the facilities will choose the most economically favorable track, which would imply that the lowest cost is most representative. For example, at Section VIII.B.3. below, EPA describes how a permit applicant locating a facility with a once-through cooling system in certain waters such as large rivers and reservoirs may be able to demonstrate reduction of impingement mortality and entrainment to a level of reduction comparable to the level that would be achieved if they complied with the Track I requirements. However, the expediency of permitting through Track I may result in reductions in financing costs and market advantages that may outweigh the potential technology cost savings of Track II. The cost estimates above do not incorporate any savings occurring from the increased certainty of Track I faster permitting and reduction in finance costs. As stated above, for new in-scope power plants, EPA's record shows that 64 new combined-cycle facilities and 10 new coal-fired facilities would install a closed-cycle recirculating cooling water system independently of the rule. As discussed in the *Economic Analysis*, for those that would not otherwise install a recirculating cooling system, EPA has determined that the capital costs of such an installation would be economically practicable and would not create a barrier to entry. By barrier to entry, EPA means the requirements would not present costs that would prevent a new facility from being built. For those facilities that would not otherwise install a recirculating cooling system, EPA estimates that the annualized cost of such an installation is $19.1 million for a large coal-fired plant (3,564 MW), $3.8 million for a medium coal-fired plant (515 MW), and $0.7 million for a small coal-fired plant (63 MW). For a large combined-cycle facility (1,031 MW), installation of a recirculating cooling water system would cost approximately $3.2 million annually.

EPA finds that the final rule is economically practicable and achievable nationally for the industries affected because a very small percentage of facilities within the industries are expected to be affected by the regulation and the impact on those that would be affected would be small. For today's final rule, EPA used the compliance cost/revenue test as a basis for determining that the requirements on a national level are economically practicable. EPA used the compliance cost/revenue test to assess economic achievability by comparing the magnitude of annualized compliance costs with the revenues the facility is expected to generate. Under this test, EPA has determined that on average, the rule will constitute 0.3, 1.2, and 0.14 percent of projected annual revenue for new combined-cycle power plants, coal-fired power plants, and manufacturing facilities, respectively. The cost to-revenue ratio is estimated to range from 0.7 percent to 5.2 percent of revenues for steam electric generating facilities and less than 0.1 percent to 0.5 percent of annual revenues for manufacturing facilities. None of the 38 projected new manufacturing facilities was estimated to incur annualized compliance costs greater than 1 percent of annual revenues. Based on EPA's analysis, the steam electric generating facilities projected to be in scope of this rule are able to afford these economic impacts. In general, the Agency concludes that economic impacts on the electric generating industry from this final rule would be economically practicable, because the facilities required to comply with the requirements would be able to afford the technologies necessary to meet the regulations.

Finally, since the analysis for new facilities entails some uncertainty because it reflects a projection into the future, EPA is maintaining in the final rule a provision in the regulation authorizing alternative requirements where data specific to the facility indicate that compliance with the requirement at issue would result in costs wholly out of proportion to the costs EPA considered in this analysis. See § 125.85 of this rule.

Considering the economic impacts on the electric generating industry as a whole, today's final rule only applies to those electric generating facilities that generate electricity with a steam prime mover and that meet certain requirements (e.g., have or need to have an NPDES permit, withdraw equal to or greater than 2 MGD from waters of the U.S.). As summarized in Exhibit 1 and Exhibit 2 above, an analysis of the NEWGen database shows that only 69 out of the 241 new combined-cycle facilities (28.6 percent) would be subject to this rule, and only 14 out of 35 new coal-fired facilities (40.5 percent).

For the manufacturer industry sectors with at least one new facility that is subject to this final rule, an analysis of the data collected using the Agency's section 316(b) Industry Detailed Questionnaire for existing facilities indicates that only 472 of the 1,976 nationally estimated existing facilities have an NPDES permit and directly withdraw cooling water from waters of the U.S. Of these 472 facilities, only 406 facilities are estimated to withdraw more than two (2) MGD. Of these 406 facilities, only 296 facilities are estimated to use more than 25 percent of their total intake water for cooling water purposes. Thus, this finding of economic practicability is further supported because only 15 percent of the manufacturing industry sectors will incur costs under this rule. According to EPA's analysis, economic impacts on the manufacturing facilities from this final rule would be economically practicable because the facilities projected to be in scope of this rule would be able to afford the technologies necessary to meet the regulations.

C. Why EPA Is Not Adopting Dry Cooling as the Best Technology Available for Minimizing Adverse Environmental Impact?

In establishing best technology available for minimizing adverse environmental impact the final rule, EPA considered an alternative based on a zero-intake flow (or nearly zero, extremely low flow) requirement commensurate with levels achievable through the use of dry cooling systems. Dry cooling systems (towers) use either a natural or a mechanical air draft to transfer heat from condenser tubes to air. In conventional closed-cycle recirculating wet cooling towers, cooling water that has been used to cool the condensers is pumped to the top of a recirculating cooling tower; as the heated water falls, it cools through an evaporative process and warm, moist air rises out of the tower, often creating a vapor plume. Hybrid wet-dry cooling towers employ both a wet section and dry section and reduce or eliminate the visible plumes associated with wet cooling towers.

In evaluating dry cooling-based regulatory alternatives, EPA analyzed a zero or nearly zero intake flow requirement based on the use of dry cooling systems as the primary regulatory requirement in either (1) all waters of the U.S. or (2) tidal rivers, estuaries, the Great Lakes, and oceans. The Agency also considered subcategorization strategies for the new facility regulation based on size and types of new facilities and location within regions of the country, since these factors may affect the viability of dry cooling technologies.

EPA rejects dry cooling as best technology available for a national requirement and under the subcategorization strategies described above, because the technology of dry cooling carries costs that are sufficient to pose a barrier to entry to the marketplace for some projected new facilities. Dry cooling technology also has some detrimental effect on electricity production by reducing energy efficiency of steam turbines and is not technically feasible for all manufacturing applications. Finally, dry cooling technology may pose unfair competitive disadvantages by region and climate. Further, the two-track option selected is extremely effective at reducing impingement and entrainment, and while the dry cooling option is slightly more effective at reducing impingement and entrainment, it does so at a cost that is more than three times the cost of wet cooling. Therefore, EPA does not find it to represent the "best technology available" for minimizing adverse environmental impact. EPA recognizes that dry cooling technology uses extremely low-level or no cooling water intake, thereby reducing impingement and entrainment of organisms to dramatically low levels. However, EPA interprets the use of the word "minimize" in CWA section 316(b) to give EPA discretion to consider technologies that very effectively reduce, but do not completely eliminate, impingement and entrainment as meeting the requirements of section 316(b) the CWA.

Although EPA has rejected dry cooling technology as a national minimum requirement, EPA does not intend to restrict the use of dry cooling or to dispute that dry cooling may be the appropriate cooling technology for some facilities. This could be the case in areas with limited water available for cooling or waterbodies with extremely sensitive biological resources (e.g., endangered species, specially protected areas). An application of dry cooling will virtually eliminate use of cooling water and impingement and entrainment, in almost all foreseeable circumstances, would reduce a facility's use of cooling water below the levels that make a facility subject to these national minimum requirements.

1. Barrier to Entry

EPA has determined that higher capital and operating costs associated with dry cooling may pose barrier to entry for some new sources in certain circumstances. (In general, barrier to entry means that it is too costly for a new facility to enter into the marketplace). A minimum national requirement based on dry cooling systems would result in annualized compliance cost of greater than 4 percent of revenues for all of 83 projected electric generators within the scope of the rule. For 12 generators, costs would exceed 10% of revenues. EPA's economic analysis demonstrates that a regulatory alternative based on a national minimum dry cooling-based requirement would result in annualized compliance costs to facilities of over $490 million, exceeding the annual costs of a regulation based on recirculating wet cooling towers by more than 900 percent ($443 million annually).

Because the technology can cause inefficiencies in operation under certain high ambient temperature conditions and because of the greater capital and operating costs of the dry cooling system compared with the industry standard of using recirculating closed-cycle wet cooling systems, requiring dry cooling as a minimum national requirement could, in some cases, also result in unfair competitive advantages for some facilities. Thus, while at least one state has required dry cooling, EPA does not believe it is appropriate to mandate this requirement on a national basis. In EPA's view the disparity in costs and operating efficiency of the dry cooling systems compared with wet cooling systems is considerable when viewed on a nationwide or regional basis. For example, under a uniform national requirement based on dry cooling, facilities in the southern regions of the U.S. would be at an unfair competitive disadvantage to those in cooler northern climates, far more than if the rule were not based on such a requirement. Even under the regional subcategorization strategy for facilities in cool climatic regions of the U.S., adoption of a minimum requirement based on dry cooling could impose unfair competitive restrictions for new facilities. This relates primarily to the elevated capital and operating costs associated with dry cooling. Adoption of requirements based on dry cooling for a subcategory of facilities under a particular capacity would pose similar competitive disadvantages for those facilities. Furthermore, EPA is concerned that requiring dry cooling for a subcategory of new facilities would create a disincentive to building a new combined-cycle facility (with associated lower flows) in lieu of modifying existing facilities, which may have greater environmental impacts. Dry cooling systems can cost as much as three times more to install than a comparable wet cooling system. For example, the Astoria Energy LLC Queens application filed with the State of New York indicated that a dry cooling system would cost $32 million more to install than a hybrid wet-dry cooling system for a proposed 1,000-MW plant. Operating costs would be $30 million more for the dry cooling system than the hybrid wet-dry system.[47] The State of New York estimates that use of a dry cooling system at the 1,080-MW Athens Generating Company facility would cost approximately $1.9 million more per year, over 20 years, than a hybrid wet-dry cooling system. The total dry cooled projected cost would be approximately $500 million. Because dry cooling systems are so much larger than wet cooling systems, these systems' operation and maintenance require more parts, labor, etc. Costs of this magnitude, when imposed upon one subcategory of facilities but not another, provide a disparate competitive environment, especially for deregulated energy markets. New facilities are competing against the many combined-cycle and coal-fired facilities already in the marketplace or slated for substantial expansion that use wet, closed-cycle cooling systems or even once-through cooling systems. The potential economic impact should EPA not similarly require dry cooling for some or all existing facilities might cause some firms to, at the least, delay their entry into the marketplace until they better understand the regulatory environmental costs faced by their competitors.

2. Energy Penalty and Other Non-Aquatic Impacts

Given the performance penalty of dry cooling versus wet cooling, the incremental air emissions of dry cooling as compared with wet cooling, provide additional support for why EPA is rejecting dry cooling. Dry cooling technology results in a performance penalty for electricity generation that is likely to be significant under certain climatic conditions. By "performance penalty" EPA means that dry cooling technology requires the power producer to utilize more energy than would be required with recirculating wet cooling to produce the same amount of power. EPA concludes that performance penalties associated with dry cooling tower systems pose a significant feasibility problem in some climates. As discussed in Chapter 3 of the *Technical Development Document*, EPA estimates the mean annual performance penalty of a dry cooling system relative to recirculating wet cooling towers at 1.7 and 6.9 percent for combined-cycle and coal-fired facilities, respectively. Peak-summer energy shortfalls for dry cooling towers as compared to wet towers can exceed 2.7 and 9.3 percent for combined cycle and coal-fired facilities, respectively. These performance penalties could have significant technical feasibility implications. For example, dry cooling facilities have as a design feature turbine back pressure limits that often trigger a plant shut down if the back pressure reaches a certain level. Peak summer effects of inefficiency of dry cooling can and do cause turbine back pressure limits to be exceeded at some demonstrated plants which in turn experience shutdown conditions when the back pressure limits are reached. In addition, these performance penalties could pose potential power supply and reliability issues if dry cooling were required on a nationwide or regional basis. For example, EPA estimates that in hot climates dry cooling equipped power plants experience peak summer energy penalties of 3.4 to 4.3 percent for combined cycle plants and 14.8 to 19.4 percent for coal fired plants, as compared to once-through cooling systems. These peak summer penalties represent significant reductions in production at power plants in periods when demand is greatest. Compared to the selected option which a large majority of new facilities were planning to install independent of this rule, all 83 electric generators would be required to install dry cooling technology. The energy impacts (power losses) associated with these 83 facilities is estimated to comprise 0.51 percent of total new electric generating capacity (i.e., a reduction in new design generating capacity of 1,904 MW). These energy impacts raise the concern that on a large scale, dry cooling technology may affect electricity supply reliability. This significant reduction in electricity production is another reason EPA has not selected dry cooling as the best technology available for minimizing adverse environmental impacts on a nationwide or regional basis.

Because of the performance penalty, power producers using dry cooling produce more air emissions per kilowatt-hour of energy produced. Nationally, EPA estimates that a minimum requirement based on dry cooling would cause significant air emissions increases over wet cooling systems. EPA projects for the dry cooling alternative that CO_2, NO_X, SO_2, and Hg emissions would increase by 8.9 million, 22,300, 47,000, and 300 pounds per year, respectively. See Chapter 3 of the *Technical Development Document* for more information on EPA's air emissions analysis, including a discussion of the coincidence between maximum air emissions and the periods of the most severe air pollution problems. These additional non-aquatic

[47] Astoria Energy LLC Queens Facility Application.

environmental impacts (in the form of air emissions) further support EPA's determination that dry cooling does not represent best technology available for minimizing adverse environmental impact on a national or region-specific basis.

3. Cost-Effectiveness

EPA also considered the incremental costs and impingement and entrainment reduction between the selected option and dry cooling. Dry cooling, while very effective in reducing impingement and entrainment, is very expensive to implement. EPA understands that dry cooling can virtually eliminate the need for cooling water and therefore dramatically reduces impingement and entrainment. However, EPA has determined that the costs associated with implementing dry cooling are ten times as expensive as wet cooling. EPA has shown that the selected option, requiring facilities to reduce their intake flows to a level commensurate with that which can be attained by a closed-cycle, recirculating cooling water system, would reduce the amount of water withdrawn for cooling purposes by 70 to 98 percent. In addition, EPA has shown that this would result in corresponding reductions in impingement and entrainment. Further, the record shows that other requirements in the rule, such as velocity and proportional flow limits and the requirement to implement design and construction technologies, would result in additional reductions in impingement and entrainment. Based on the information available in the record, EPA estimates that the selected option may result in reduction of impingement to levels that could possibly exceed 99 percent. Estimated reductions in entrainment could also be substantial on a case-by-case basis (70 to 95 percent). Because EPA's selected option is very effective in reducing impingement and entrainment and is one-tenth the cost, EPA believes that it is reasonable to reject dry cooling as a nationally applicable minimum in all cases.

4. Technical Feasibility of Dry Cooling for Manufacturers

EPA considers that dry cooling technologies for manufacturing cooling water intake structures, as a whole, pose significant engineering feasibility problems. The primary feasibility issue is that dry cooling requires nearly zero water intake and many manufacturers reuse cooling water in their process. This dual use for process and cooling water prevents the application of dry cooling. In addition, many manufacturers require cooling water at an available temperature that is not reliably met by utilizing dry cooling. However, in some specific circumstances, EPA is aware of several demonstrated cases of dry cooling for cogeneration plants that are associated with manufacturers.

D. Why EPA Is Not Accepting the Industry Two-Track Approach in Full

While EPA is adopting the general two-track framework suggested by a trade association representing the electric generating industry, EPA is not accepting all aspects of this approach. The primary differences between the approach that EPA is promulgating and the approach industry suggested are: (1) The final two-track approach defines a different level of environmental performance as "best available technology for minimizing adverse environmental impact" for the "fast track" and (2) the final two-track approach contains a different way of measuring equivalence with the environmental performance of the "fast track" in the second track. In short, EPA prefers a more concrete and objective measure of best technology available for minimizing adverse environmental impact for the new facility rule than does the measure suggested by the industry proposal.

Under EPA's approach, best technology available for minimizing adverse environmental impact for new facilities would be the level of impingement and entrainment reduction achievable by (1) technology that reduces intake capacity in a manner comparable to that of a recirculating wet cooling tower; (2) technologies that reduce design through-screen velocity to reduce impingement, as explained in Section V.B.1.c of this preamble; (3) the applicant's selected design and construction technologies for minimizing impingement and entrainment and maximizing impingement survival; and (4) capacity and location-based technology requirements for limiting flow withdrawal to a certain proportion of a waterbody. By contrast, the industry proposal asserts that "closed cycle cooling and low intake velocity reduces entrainment and impingement to such low levels that adverse environmental impact is avoided, thereby not just meeting, but exceeding, the section 316(b) standard of protection."

Further, the industry proposal states that wedgewire screens, traveling fine mesh screens, and aquatic filter barrier systems, either alone or in combination, are sufficient, at least in certain types of waterbodies, in that they "may provide a level of protection within the same range" and thus should be determined to "in almost every case avoid adverse environmental impact, thereby exceeding the requirements of section 316(b)." While EPA's approach does not preclude the use of these alternative technologies if they demonstrate impingement and entrainment reductions equivalent to those of the suite of technologies it has described as "best technology available for minimizing adverse environmental impact," in EPA's view the record does not show that using just one of the technologies listed above in order to qualify for expedited fast-track permitting is equivalent in reducing impingement and entrainment in a manner that reflects best technology available for minimizing adverse environmental impact. While barrier methods are effective at reducing impingement, EPA's record shows that they are currently not as effective at reducing entrainment as EPA's preferred option. This is because larvae and very small organisms can still pass through the barrier and may be entrained. While industry asserts that entrainment does not lead to mortality, there is conflicting evidence in the record on this topic, some of which indicates that in fact a large percentage of organisms can perish or be severely harmed when entrained. For these reasons, EPA does not find that the record supports the notion that the technologies listed by industry in its two-track proposal as "exceeding the requirements of section 316(b)" are as effective at reducing impingement and entrainment as the suite of technologies EPA has found to be technically available and economically practicable to the industries affected as a whole. For further discussion of entrainment and the performance of a variety of cooling water intake structure technologies, see Section III of this preamble and Chapter 5 of the *Technical Development Document*.

The industry two-track approach is based on industry's argument that the CWA compels EPA to determine section 316(b) limits on a case-by-case basis examining first whether the cooling water intake structure causes population or ecosystem effects before requiring any technology, because, industry asserts, this is the only plausible interpretation of the phrase "adverse environmental impact." EPA does not believe that the language of the statute compels this interpretation. Instead, EPA believes it is reasonable to interpret section 316(b)'s requirement to establish "best technology available for minimizing adverse environmental impact" to authorize EPA to promulgate technology-based performance requirements analogous to those derived for point sources under sections 301 (existing sources) and 306 (new sources) for minimizing a suite of adverse environmental impacts, including impingement and entrainment, diminishment of compensatory reserve, and stresses to populations, communities of organisms, and ecosystems. The controls required today appropriately reflect technologies that for new facilities are available and economically practicable, that do not have unacceptable non-aquatic environmental impacts (including impacts on the energy supply across the United States), and that reduce impingement and entrainment of aquatic organisms in a manner that will help support, maintain, and protect aquatic ecosystems. EPA wants to be very clear that this decision relates only to new facilities. In making the upcoming decisions regarding existing facilities in Phases II and III, EPA will carefully weigh all of the relevant factors, many of which are different for existing facilities than for new facilities.

In addition, while EPA agrees that a two-track approach is an effective way to implement CWA section 316(b) for new facilities, EPA does not believe that a population-based approach for defining both the fast track and equivalent performance in the second track is a workable solution for new facilities.

With respect to the "fast track" suggested by industry, EPA does not have a record indicating that the technologies cited by industry (such as a fish return system alone) are the best technologies available for reducing impingement and entrainment. Moreover, even if population were the only endpoint, the record does not support the assertion that the technology cited by industry would qualify for the fast track because it can be uniformly predicted across the nation not to have population impacts (assuming one can agree upon what are the relevant species of concern) for all new facilities nationally in any location. At the same time, EPA has identified technologies that for new facilities (which, unlike existing facilities, do not have retrofitting costs) that are technically available and economically practicable. Therefore for new facilities, EPA believes it is reasonable to require such technologies on a national basis to reduce impingement and entrainment.

With respect to the second track, EPA does not prefer the population approach for new facilities, because the time and complexity of conducting population studies properly is generally inconsistent with making fast and reliable permitting decisions, an issue of particular importance for permitting new facilities. EPA's record shows that in order to study and demonstrate proper population studies, the permitting approval process would be adversely delayed for some new facilities. Specifically, because of the complexity of biological studies, it is very difficult to assess the cause and effect of cooling water intake structures on ecosystems or on important species within an ecosystem. An overwhelming majority of scientists have stated that biological studies can take multiple years because of the complex nature of biological systems. Moreover, unlike in the laboratory, where conditions are controlled, a multitude of confounding factors make biological studies very difficult to perform and make causation, in particular, difficult to determine. All of these issues take time to assess. EPA estimates that a credible job of studying these issues could take up to 3 years to complete. While some of this study can be conducted prior to start-up of the plant, this could cause delays in many situations. For these reasons, EPA does not believe that a population approach makes sense for new facilities.

VI. Summary of Major Comments on the Proposed Rule and Notice of Data Availability (NODA)

A. Scope/Applicability

Comments on the scope and applicability of the new facility rule address several issues, including the definition of a new facility, the definition of a cooling water intake structure (including the twenty-five (25) percent cooling water use threshold), the proposed threshold for cooling water withdrawals (i.e., 2 MGD), and the requirement for a facility to hold a NPDES permit.

1. New Facility Definition

EPA proposed to define a "new facility" as any building, structure, facility, or installation that meets the definition of a "new source" or "new discharger" in 40 CFR 122.2 and 122.29(b)(1), (2), and (4); commences construction after the effective date of the final rule; and has a new or modified cooling water intake structure. See proposed 40 CFR 125.83; 65 *FR* 49116.

Numerous commenters supported EPA's determination that the new facility rule should apply only to greenfield and stand-alone facilities but questioned whether EPA had clearly and effectively limited applicability of the proposed rule to such facilities. Some commenters indicated that the proposed regulatory definition of new facility, which references the existing NPDES new source and new discharger definitions, is confusing. For example, some commenters asserted that defining the total replacement of an existing process as a new facility is not consistent with application of the rule only to greenfield or stand-alone facilities. Commenters indicated that the regulation should make it very clear that the new facility rule applies only to greenfield and stand-alone facilities. To clarify the definition of new facility, some commenters encouraged EPA to include language or examples from the proposed preamble in the final regulatory language. Several commenters requested that EPA more explicitly clarify that a new cogeneration plant installed to serve an existing facility would not be considered a new facility under this rule.

The Agency believes that most new facilities subject to this rule will be considered new sources as defined in 40 CFR 122.2 and 122.29(b)(1), (2), and (4) and subject to new source performance standards for effluent discharges.[48] Under 122.29(b), a source is a new source if it meets the definition of new source in 122.2 (effectively, it discharges or may discharge pollutants, and its construction commenced after promulgation—or proposal in specified circumstances—of a new source performance standard) and it meets any of three conditions. The first is that the source is constructed at a site at which no other source is located (40 CFR 122.29(b)(1)(i)). The second is that the source totally replaces the process or production equipment that causes a discharge at an existing facility (40 CFR 122.29(b)(1)(ii)). The third is that the new source's processes are substantially independent of any existing source at the same site (40 CFR 122.29(b)(1)(iii)). EPA stated in the proposed rule that the new facility rule applies to greenfield facilities, described as facilities that meet the first and second conditions above, and stand-alone facilities, which are those that meet the third condition, provided these facilities meet other applicable conditions (*i.e.*, commencement of construction after the effective date of the final rule, new or

[48] Although the Agency believes that most new facilities subject to this rule will be considered new sources, EPA has included the reference to the definition of new discharger at 122.2 to address any new facility that may commence construction prior to the promulgation of a new source performance standard. The Agency notes that the definition of new discharger in 122.2 only applies to facilities not defined as a new source.

modified CWIS). Thus, the Agency believes the language of the regulation does make it clear that the rule applies to greenfield and stand-alone facilities or those whose processes are substantially independent of an existing facility at the same site. As commenters requested, EPA has added some examples to the regulatory section of the rule to serve as guidance regarding the definition of new facility under this final rule.

Several commenters also questioned whether repowering an existing facility would trigger applicability of the new facility requirements. These commenters pointed out that repowering is a common practice that often results in a gain in efficiency (*i.e.*, both increased power output and a reduced need for cooling water withdrawals). Commenters expressed concern that, although repowering an existing facility is distinct from building a greenfield or stand-alone facility, repowering could be interpreted as subject to the new source definition and thereby subject to the new facility rule. Some also asserted that the proposed rule included an arbitrary distinction between completely replacing an existing facility and repowering that facility. By defining the complete replacement of a facility as a new facility but allowing repowering to be defined as an existing facility, these commenters argued, the proposed rule creates an incentive to use less efficient technology for the redevelopment of older sites. Commenters also noted that the proposed rule would regulate a new, greenfield facility and the complete replacement of an existing facility (*i.e.*, a brownfield site) in a similar manner, which creates a disincentive to redevelop or modernize brownfield sites.

The definition of a new facility in the final rule applies to a facility that is repowered only if the existing facility has been demolished and another facility is constructed in its place, and modifies the existing cooling water intake structure to increase the design intake capacity. To the extent commenters assert some inequity of treatment between new facilities and certain existing facilities, EPA will address this comment when it addresses what substantive requirements apply to existing facilities. Further, changes to an existing facility that do not totally replace the process or production equipment that causes a discharge at an existing facility (*e.g.*, partial repowering), and those that do not result in a new separate facility whose processes are substantially independent of any existing source at the same site, do not result in the facility being defined as a new facility, regardless of whether these changes result in the use of a new or modified cooling water intake structure that increases existing design capacity. EPA does not agree that by not addressing most repowering under this rule the Agency is creating an incentive to use less efficient technology. Both the power-generating and manufacturing industries routinely seek greater efficiency when repowering. This is illustrated by the increased use over the past 10 years of combined-cycle technology, which requires significantly less cooling water for a given level of power generation and is a more efficient process than older technologies.

Several commenters supported EPA's definition of new facility as proposed. In contrast to concerns discussed above, some commenters expressed apprehension that the new facility definition would not capture all appropriate facilities. These commenters observed that an existing facility could rebuild its whole facility behind the cooling water intake structure and not be subject to the requirements applicable to a new facility. These commenters asserted that if an operator completely rebuilds an existing facility that facility should be subject to the new facility requirements.

EPA can foresee one instance in which the concern raised by this commenter may be well founded. In this rule EPA has defined a new facility in a manner consistent with existing NPDES regulations, with a limited exception. EPA generally deferred regulation of new sources constructed on a site at which an existing source is located (see 40 CFR 122.29(b)(3)) until the Agency completes analysis of its survey data on existing facilities. However, in addition to meeting the definition of a new source, today's rule requires that a new facility have a new cooling water intake structure or use an existing intake structure that has been modified to increase the design capacity. Thus, it might be possible to completely demolish an existing source, replace it with a smaller-capacity new source, and not be regulated under today's rule as a new facility. This facility would then be an existing facility an as such the requirements applicable to such a facility will be addressed in Phase II and III.

Several commenters requested that EPA define facilities deemed to be substantially independent for purposes of applying the new source criteria under 40 CFR 122.29 as those that could be practicably located at a separate site. Commenters maintained that such an approach is justified because EPA has based the proposed new facility requirements on the assumption that each owner or operator has the option to choose the location of his or her new facility and that such location would be selected to allow the owner or operator to best comply with the intake structure location and operation requirements.

With regard to defining when a facility is substantially independent under 40 CFR 122.29, EPA does not believe it is feasible to project under what circumstances owners and operators are free to select any location they desire for a new facility. For this reason, EPA takes the facility as it is planned for purposes of determining whether it is a new facility. In today's rule EPA does not believe it is appropriate to define the phrase "substantially independent" as used in 122.29(b)(1)(iii) as facilities that could be practicably located at a separate site. Section 122.29(b)(1)(iii) in the existing NPDES regulations already provides that "[i]n determining whether . . . processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source." EPA does not think it is feasible for the permit authority to judge whether the facility could have been elsewhere for the purpose of determining whether the facility is subject to the new facility rules. Commenters also requested that EPA define what actions constitute routine maintenance to an existing cooling water intake, so that the distinction between changes that constitute maintenance and those that constitute a modification to an existing intake is made clearer.

EPA has not defined "routine maintenance" in the final rule because clarifying what constitutes routine maintenance is not vital to the definition of new facility. Under the new facility rule, to be considered a new facility a facility must be a new source or new discharger and use a newly constructed cooling water intake structure or a modified existing cooling water intake structure whose design intake has been increased. Thus, changes to a cooling water intake structure at an existing facility that is not a new source or new discharger are not subject to this rule. In addition, at facilities that are new sources or new dischargers but may use an existing cooling water intake structure, EPA has clarified in the final rule that the facility is subject to this rule only where changes to the intake result in an increase in design capacity. At facilities that are new sources or new dischargers, changes to an intake structure that do not result in an increase in design capacity do not result in that facility being subject to this rule.

Finally, some commenters expressed concern about the status of facilities that are under construction or have recently been constructed. These commenters suggested that such facilities should not be defined as new facilities. Others asserted that it is unfair to define a facility that has submitted a permit application but has not started construction as a new facility.

The Agency chose the commencement of construction date because it was generally consistent with the term "new source" in the existing NPDES permitting regulations and it should provide adequate notice and time for facilities to implement the technological changes required under the rule. The date a facility commences construction is clarified at 40 CFR 122.29(b)(4). This provision describes certain installation and site preparation activities that are part of a continuous onsite construction program; it includes entering into specified binding contractual obligations. Thus, under today's rule facilities that are constructed or commence construction within the meaning of 40 CFR 122.29(b)(4) prior to or on the effective date of the final rule are not new facilities. Those that commence construction after the effective date of this rule and meet the other regulatory thresholds defined in § 125.81 are subject to the requirements of this rule.

2. Definition of Cooling Water Intake Structure

EPA proposed that the term "cooling water intake structure" means the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S., provided that at least twenty-five (25) percent of the water withdrawn is used for cooling purposes. See, proposed 40 CFR 125.83; 65 *FR* 49116. In the NODA the Agency requested comments on two additional alternatives. See, 66 *FR* 28854.

Most of the comments addressing the definition of cooling water intake structure focused on the 25 percent threshold for cooling water use. These comments are summarized and addressed under Section VI.A.3, below. EPA has placed the 25 percent threshold in the applicability requirements of the final rule to clarify the definition of cooling water intake structure. Intakes below this threshold are not subject to today's national rule; however, permit writers should determine any appropriate section 316(b) requirements for structures withdrawing less than 25% of intake flow for cooling purposes on a case-by-case basis.

Some commenters suggested that cooling water intake structures should not be defined in a way that would include the pumps in the cooling water system. Commenters maintained that pumps are part of the cooling water system, not part of the intake, and they assert that the Agency has authority under section 316(b) only over cooling water intake structures. Commenters noted that changing pumps is part of the normal routine of maintenance and repair performed at facilities that use water for cooling and that such activity should not trigger applicability of the new facility rule.

In the final rule EPA has clarified the definition of cooling water intake structure to explicitly include the first intake pump or series of pumps. The explicit inclusion of the intake pumps in the cooling water intake structure definition reflects the key role pumps play in determining the capacity (i.e., dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed. Section 316(b) authorizes EPA to impose limitations on the volume of the flow of water withdrawn through a cooling water intake structure as a means of addressing "capacity." *In re Brunswick Steam Electric Plant*, Decision of the General Counsel No. 41 (June 1, 1976). Such limitations on the volume of flow are consistent with the dictionary definition of "capacity,"[49] the legislative history of the Clean Water Act,[50] and the 1976 regulations.[51] *Id.* Indeed, as Decision of the General Counsel No. 41 points out, the major environmental impacts of cooling water intake structures are those affecting aquatic organisms living in the volumes of water withdrawn through the intake structure. (Statement of Mr. Buckley, Senate consideration of the Report of the Conference Committee [discusses intake from once-through systems]. A Legislative History of the WPCA Amendments of 1972, 93rd Cong., 1st Sess., Committee Print at 196, 197). Therefore, regulation of the volume of the flow of water withdrawn also advances the objectives of section 316(b).

[49] "Cubic contents; volume; that which can be contained." *Random House Dictionary of the English Language*, cited in Decision of the General Counsel No. 41.

[50] Legislative History of the Water Pollution Control Act Amendments of 1972, 93d Cong., 1st Sess., at 196–7 (1973).

[51] 40 CFR 402.11(c)(definition of "capacity"), 41 *FR* 17390 (April 26, 1976).

3. Applicability Criteria: Requirement to Withdraw Water From a Water of the U.S., the Twenty-Five (25) Percent Cooling Water Use Threshold, and the Two (2) MGD Intake Flow Threshold

As was proposed, the final new facility rule applies to any new facility that (1) has or is required to have an NPDES permit; (2) proposes to use a cooling water intake structure to withdraw water from waters of the U.S.; (3) uses at least twenty-five (25) percent of the water withdrawn for cooling purposes; and (4) has a design intake flow of greater than two (2) million gallons per day (MGD). See proposed 40 CFR 125.81 and 125.83; 65 *FR* 49116.

Commenters raised several concerns regarding the proposed 25 percent threshold. A number of commenters asserted that EPA did not provide a rational basis in its record for proposing that use of 25 percent of intake flow for cooling purposes should determine whether an intake structure is a cooling water intake structure. Commenters asserted that it is inappropriate to base the 25 percent cooling water use threshold on the number of cooling water intake structures or amount of cooling water flow this threshold would make subject to this rule. Several commenters observed that no single threshold can be applied to all intakes to accurately distinguish cooling water intakes from other intakes. If EPA is determined to use a single threshold in this definition, numerous commenters favored a threshold of 50 percent cooling water use, which commenters stated is the de facto threshold used under the existing definition of a cooling water intake structure found in 1977 draft guidance. However, some commenters maintained that for an intake to be defined as a cooling water intake structure the vast majority (i.e., 75–100 percent) of water withdrawn must be used for cooling.

As discussed above, in the final rule EPA has placed the 25 percent threshold in the applicability section to clarify the applicability of the rule. Permit writers may determine that an intake structure that withdraws less than 25% of the intake flow for cooling purposes should be subject to section 316(b) requirements, and set appropriate requirements on a case-by-case basis, using Best Professional Judgment. Although cooling water intake structures that fall below the 25% threshold are not subject to today's national rule, today's rule does not inhibit permit writers, including those at the Federal, State, or Tribal level, from addressing such cooling water intake structures as deemed necessary.

EPA chose 25 percent as a reasonable threshold for the percent of flow used for cooling purposes in conjunction with the two MGD total flow threshold discussed below to ensure that almost all cooling water withdrawn from waters of the U.S. is addressed by the requirements in this rule for minimizing adverse environmental impact. EPA estimates that approximately 68 percent of manufacturing facilities that meet other thresholds for the rule and 93 percent of power-generating facilities that meet other thresholds for the rule use more than 25 percent of intake water for cooling. In contrast, approximately 49 percent of new manufacturing facilities use more than 50 percent of intake water for cooling. EPA does not believe it is reasonable to exclude from regulation nearly half of those manufacturing facilities that use large volumes of cooling water and, as a result, impinge and entrain aquatic organisms. EPA also considered it important to cover as many of the facilities as possible in order to create regulatory certainty for new facilities and for States and Tribes that must permit these new facilities. EPA predicts this will leave four (4) percent of the electric power generating facilities and thirty-two (32) percent of manufacturing facilities to the discretion of the permit writer. EPA believes that new facilities that use less than 25 percent of water withdrawn for cooling are most effectively addressed by States and Tribes on a best professional judgement (BPJ) basis, rather than under a national rule, since BPJ provides a certain degree of flexibility for a permit writer to consider available technologies and unique factors posed by new facilities that are below the threshold.

Several manufacturers commented that the rule as proposed may create a disincentive to manufacturing operations increasing efficiency through reducing process water use, since such reductions increase the percentage of cooling water used. These commenters observed that since process water is reused for cooling and cooling water may be heated and reused as process water, flexibility is needed in the rule so these practices are not discouraged or penalized. They also stated that process water cannot be reused in a manner consistent with closed-loop cooling. Some commenters also stated that the final rule should address situations in which the percentages of water used for cooling and as process water are not constant, or where the withdrawal of cooling water is intermittent.

In the final rule EPA has amended the definition of cooling water intake structure to ensure that the rule does not discourage the reuse of cooling water as process water. EPA has amended the proposed definition of cooling water intake structure to specify that cooling water that is used in a manufacturing process, either before or after it is used for cooling, is considered process water for purposes of calculating the percentage of a new facility's intake flow that is used for cooling and whether that percentage exceeds 25 percent. In addition, EPA also has added guidance to the regulation that clarifies how the 25 percent threshold should be applied to new facilities that do not maintain a constant ratio of cooling water to process water. See § 125.81(c) of this rule. This guidance provides that the threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes is to be measured, on the basis of facility design, on an average monthly basis over a period of 1 year (any 12-month period). It further clarifies that a new facility meets the 25 percent cooling water threshold if any monthly average, over a year, for the percentage of cooling water withdrawn equals or exceeds 25 percent of the total water withdrawn.

Numerous commenters asserted that the two MGD threshold is too low and is not supported by a credible justification. Some commenters stated that the two MGD cutoff is overly conservative given that many facilities determined to be causing no adverse impact have considerably greater flows. For example, these commenters note that the State of Maryland uses a 10 MGD threshold, which commenters state would capture 99.67 percent of all existing cooling water flows if applied on a national basis. Several commenters supported the use of Maryland's approach. Others stated that the proposed rule contained insufficient data to be science-based (i.e., based on the level of withdrawal above which adverse environmental impact occurs). Commenters also observed that many of the environmental impact data EPA presented in the proposed rule focused on major power plants with flows much greater than two MGD, which does not support the proposition that adverse impacts occur at small facilities with lower flows. Rather, the commenters suggest, the threshold appears to be designed merely to capture a certain percentage of flow. If so, commenters assert this threshold is arbitrary and not based on sound science. Some of these commenters asserted that cooling water intake structure impact data support thresholds exceeding 500 MGD. A few commenters maintained that it is not appropriate to apply a single threshold to all waterbody sizes. Several supported the two MGD threshold. Several commenters also supported higher thresholds, including 5, 10, 25, and 100 MGD. Some commenters maintained that section 316(b) requirements should apply to all cooling water intake structures and that therefore no flow threshold is necessary.

EPA chose the two MGD threshold because this threshold addresses the majority of new facilities and therefore provides the States and Tribes with a national rule that can be easily applied to a majority of permitting decisions they face in order to implement the legal requirements of CWA section 316(b). All cooling water intake flow results in the potential for impingement and entrainment. Thus, all facilities must address section 316(b) requirements in the same fashion. Therefore, where EPA's record demonstrates that the requirements are technically available, economically practicable, and not have unacceptable non-water quality environmental impacts, including energy impacts, the Agency believes that it is appropriate for the new facility rule to address the majority of cooling water intake structure facilities. In doing so, EPA resolves for permit writers what the requirements are for new facilities.

On the basis of data for facilities with cooling water intake structures built in the past 10 years, EPA estimates that 58 percent of the manufacturers, 70 percent of the nonutilities, and 100 percent of the utilities will be regulated under the two MGD threshold. At the two MGD threshold, 62 percent of all in-scope facilities using surface water and 99.7 percent of the total flow will be covered. Estimated total flow is approximately 9 billion gallons per day. EPA did not select a significantly higher threshold, such as 15 or 25 MGD, because these thresholds would exclude most utility, nonutility and manufacturing facilities from regulation. At a threshold of 15 MGD, 32 percent of the manufacturers, 29 percent of the nonutilities, and 50 percent of the utilities would be covered, as would 97.3 percent of the total flow. The total flow covered remains relatively high, because the large flows from a small number of utility facilities dominate the total flow. While at a threshold of 25 MGD, 94.9 percent of the total flow would still be covered, many more facilities would not be covered. Only 18 percent of manufacturers, 17 percent of nonutilities, and 50 percent of utilities would be covered. Thus, 72 percent of manufacturers, 83 percent of nonutilities, and 50 percent of utilities, withdrawing up to 25 MGD would need to be addressed on a Best Professional Judgement basis. The Agency is concerned about the regulatory uncertainty for regulated new facilities and the burden on State and tribal permit writers to ensure appropriate requirements for these facilities. EPA also believes that the two MGD threshold reduces the burden on States and Tribes responsible for implementing section 316(b) requirements because, as a national threshold, it reduces the burden associated with site-specific determination of appropriate 316(b) limits. The lower threshold may also reduce delays for permit applicants by providing certain national standards.

EPA did not select a 5 or 10 MGD threshold because of the percentage of projected new nonutility and manufacturing facilities that would be excluded from regulation under these thresholds and concern that future trends in intake flow levels would, under these regulatory options, leave most new facilities using cooling water exempt from national regulation and subject to case-by-case determinations by permit agencies. At a threshold of 5 MGD, only 40 percent of nonutility facilities would be covered under this rule. Under a threshold of 10 MGD, 38 percent of manufacturing and 28 percent of nonutility facilities would be covered. EPA did examine the State of Maryland's 10 MGD standard but did not find information that would support the use of this standard on a national basis. In addition, the trend in power generation is toward, on a per facility/per unit of output basis, a general reduction in cooling water intake flow levels over time. Combined-cycle gas turbines require less water per unit of electricity generated than coal-fired or nuclear facilities. For example, a 750 MW combined-cycle facility with evaporative cooling towers is estimated to require approximately 7 to 8 MGD and under a 10 MGD threshold would not be subject to this national rule. The Agency believes that, given the objective of section 316(b), it is undesirable to exclude such a large plant from this rule. As reductions in cooling water intake flow levels occur, the two MGD threshold also ensures that this rule can serve the State, Tribes, and permit applicants by assuring that permits for new facilities comply with 316(b).

EPA does not agree that the intake flow threshold in the applicability portion of this rule must be based on prior determinations of the degree of environmental impact caused by a specific facility or specific cooling water intake structure. Section 316(b) applies to any facility that uses a cooling water intake structure and is a point source subject to standards imposed under CWA section 301 or 306. EPA has included a flow threshold to provide some reasonable limit on the scope of the national requirements imposed under today's rule. The Agency believes those new facilities with withdrawals that are at or below a two MGD threshold will generally be smaller operations that may face issues of economic affordability and are therefore more appropriately addressed on a case-by-case basis using BPJ. Moreover, as discussed in Section III, EPA does not agree that adverse environmental impact associated with cooling water intake structures is solely a population-based phenomenon. Rather, there can be numerous measures of such impacts, including assessments of fish and aquatic organism population impacts. Given the language of section 316(b) and the issues associated with determining adverse impacts, EPA does not view the examples of cooling water impacts discussed in the proposed rule and NODA as limiting the applicability of this rule to new facilities that have the opportunity to employ widely used, economically practicable measures that will, at a minimum, reduce injury to large numbers of fish and aquatic life and may result in benefits at higher levels of ecological structures.

Finally, commenters stated that large facilities that use closed cooling water systems may still require withdrawals of more than 2 MGD. These commenters asserted that it is unfair to subject these facilities to additional regulation after they have reduced their intake flow by 90 percent or more.

EPA agrees that very large facilities that use closed cooling water systems may still require withdrawals of more than two (2) MGD. As discussed elsewhere in this preamble, EPA determined that reducing intake capacity commensurate with use of a closed-cycle recirculating cooling system is not economically practicable for facilities withdrawing between 2 and 10 MGD. However, EPA does not agree that it is unfair to subject these facilities to further requirements necessary to reduce impingement and entrainment. Section 316(b) requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. While reductions in total intake flow may represent the single most significant improvement for new facilities with cooling water intake structures, large flows withdrawn for make-up (i.e., to replace evaporative loss and blow down) can still cause significant impingement and entrainment. Additional controls on intake velocity, flow relative to the source waterbody, and design and construction technologies proposed by the facility also represent important aspects of a cooling water intake structure that must, under section 316(b), be addressed. As discussed elsewhere in this preamble and in the *Technical Development Document and Economic Analysis*, these additional measures are both widely employed and affordable. EPA does not believe that a determination of "best technology available for minimizing adverse environmental impact" for new facilities can omit these low-cost, effective technologies. Also see Section VIII of this preamble for a discussion that explains the percentage of new facilities already meeting the final rule requirements and the low cost of these requirements.

4. NPDES Permit

The proposed rule would apply only to new facilities that are or will be subject to an NPDES permit. See, proposed 40 CFR 125.81; 65 *FR* 49116. Comments received on this proposed requirement generally focus on the new facilities that withdraw cooling water from waters of the U.S. but do not hold an NPDES permit.

Some commenters asserted that EPA should not use the 316(b) rulemaking to regulate cooling water intake structures that are not owned by the NPDES-permitted facility. Commenters indicated that such an approach was beyond the authority provided by 316(b) and would make the rule unnecessarily complex.

The final rule applies only to new facilities that hold an NPDES permit or are required to obtain a permit. The Agency continues to believe that most new facilities that will be subject to this rule will control the intake structure that supplies them with cooling water and will discharge some combination of their cooling water, wastewater, and stormwater to a water of the U.S. through a point source regulated by an NPDES permit. Under this scenario, the requirements for the cooling water intake structure will be applied in the facility's NPDES permit.

In the event that a new facility's only NPDES permit is a general permit for storm water, EPA anticipates that the Director will write an individual NPDES permit containing requirements for the facility's cooling water intake structure.

Such 316(b) requirements could also be included in the general permit.

B. Environmental Impact Associated With Cooling Water Intake Structures

The proposed rule requested comment on the scope and nature of environmental impacts associated with cooling water intakes. Many comments were directed generally toward entrainment and impingement impacts, with some discussion of impacts caused by intake construction activities. The majority of comments, however, concentrated on defining adverse environmental impact and the approaches that were most relevant for characterizing adverse environmental impact, including assessments of population modeling and bioassessment approaches.

1. Entrainment, Impingement, and Construction Impacts

In the proposed rule, EPA requested comment on the types of impacts attributable to cooling water intake structures (65 *FR* 49072). Most of the comments focused on discussion of entrainment and impingement impacts and the impacts associated with construction of new cooling water intake structures.

One commenter suggested that the EPA should have scientific analyses to support the statement that entrainment mortality is high. The commenter also stated that, on the basis of recently conducted entrainment studies, through-plant change in temperature was the controlling factor for entrainment mortality and that entrainment impacts could be minimized through use of a cooling water system designed for high volume, low-velocity flow, which would minimize temperature differential. The commenter also noted that high-volume, low-velocity-flow cooling water systems would be specifically eliminated by the proposed 316(b) regulation.

EPA notes that entrainment studies indicate that through-plant mortality rates of young fish are determined by numerous factors. Different species have different tolerance to passage through a cooling system, and mortality rates may differ among life stages of the same species. A summary of mortality data from five Hudson River power plants found that mortality rates could be substantial.[52] The report cited species-specific mortality rates that varied by life stage for bay anchovy (93 to 100 percent), Atlantic tomcod (0 to 64 percent), herrings (57 to 92 percent), white perch (41 to 55 percent), and striped bass (18 to 55 percent). The study emphasized that the reliability of these estimates was questionable and that various sources of potential bias may have caused the estimated rates to be lower than the actual mortality rates. The Electric Power Research Institute (EPRI) sponsored a recent review of 36 entrainment survival studies, the majority of which were conducted in the 1970s.[53] [54] The summarized mortality rates described by EPRI were in substantial agreement with patterns reported in the Hudson River summary, specifically that anchovies and herrings had the highest mortality rates (greater than 75 percent), and that temperature change seemed to be an important determining factor. Thus, EPA believes scientific studies document that entrainment mortality for some species can be quite high.

EPA recognizes that Track I of the final rule precludes the use of high-volume, flow cooling water systems. However, in today's rule, under Track II, an intake with the capacity needed to support a high-volume, once-through cooling system that is shown through studies to reduce impingement mortality and entrainment for all life stages of fish and shellfish to achieve a level of reduction comparable to the level that would be achieved by applying Track I technology-based performance requirements at a site would meet the requirements of the rule.

Another commenter suggested that many of the more significant impingement episodes occur in conjunction with environmental phenomena such as low dissolved oxygen and rapid temperature declines. According to the commenter, these phenomena cause the death of many fish that are then ultimately collected on intake screens. EPA acknowledges that episodes of low dissolved oxygen and rapid temperature declines can result in fish losses, but does not concur that this is consistently documented as a significant or sole cause of fish impingement mortalities.

Another commenter recommended that EPA require antifouling measures at the construction and operational stages to minimize intake attractiveness to local fish, diving birds, and marine mammals. As stated previously, EPA defers controls for minimizing adverse impacts due to construction of new cooling water intake structures to the authority of existing Federal, State, and Tribal programs established for this purpose. EPA believes it is incumbent upon the individual facilities to implement antifouling measures during operations that are appropriate for the specific characteristics of their waterbody. As an example, antifouling measures for freshwater systems will be different from measures used for ocean intakes. (See Section VI.E.3.a. below for more information on fouling controls).

Finally, one commenter suggested that cooling water intake structures affect many components of an ecosystem, not just individual species. Thus, the regulation should consider indirect effects on predators resulting from losses of prey species and overall ecosystem effects when evaluating environmental impacts. EPA has taken primarily a technology-based approach to this national rule. EPA believes that this rule will reduce impacts to predators by dramatically reducing entrainment and impingement of prey species and will therefore protect ecosystems as a whole. In addition, this rule recognizes that States and Tribes can be more stringent as is consistent with section 510 of the CWA.

EPA also received comments on the documented examples of impingement and entrainment impacts discussed in the proposed rule. Several commenters argued that it was inaccurate for EPA to equate the taking of aquatic organisms with environmental impact because there was little evidence that intakes, new or existing, would cause or were causing adverse impacts. In contrast, other commenters asserted that, given the tremendous quantity of water that utilities withdraw and the large number of organisms impinged and entrained by intakes, it was clear that the cooling process had an adverse impact on aquatic ecosystems. EPA believes that the examples of environmental impact provided in the proposed rule are illustrative of the types of effects associated with cooling water intakes.

Several commenters objected to the use of specific facilities as representative examples of environmental impact. They argued that EPA focused on a few high-profile, high-intake facilities and in some cases used outdated information or misinterpreted results. EPA believes it used the best

[52] Boreman, J., L.W. Barnthouse, D.S. Vaughan, C.P. Goodyear, S.W. Christensen, K.D. Kuman, B.L. Kirk, and W. Van Winkle. 1982. the Impact of Entrainment and Impingement on Fish Populations in the Hudson River Estuary: Volume I. Entrainment Impact Estimates for Six Fish Populations Inhabiting the Hudson River Estuary. Prepared for the U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research by the Oak Ridge National Laboratory. ORNL/NUREG/TM-385/V1.

[53] EPRI. 2000. Review of entrainment survival studies: 1970–2000. Report No. 1000757. Prepared by EA Engineering Science & Technology.

[54] Some of the studies summarized in EPRI (2000) are the same ones considered by Boreman et al. (1982). See EPRI (2000) for complete citations of 36 original studies.

information available for the proposed rule and the final rule. There are few, if any, recent data documenting entrainment or impingement rates at the majority of existing facilities. Many of the available reports are for larger facilities (for which environmental impact concerns were greatest) and contain analyses conducted 20 to 25 years ago. Several of the examples cited in the proposed rule were based on historical data and EPA acknowledges that the data may not reflect current impingement or entrainment rates at the facility, particularly if technologies and other operational measures for reducing entrainment and impingement have been implemented since the original study. However, in most cases updated information was not available. To the extent possible, EPA has supplemented the facility information in the record for this final rule to include smaller facilities and updated information.

Finally, several commenters suggested that there was no need to address construction impacts in the 316(b) rule because there were existing Federal, State, and local provisions designed to minimize the impacts caused by construction activities. Another commenter stated that it was likely that the majority of new generation, once-through cooling facilities will be using existing cooling water intake structures and that it was doubtful that a new once-through facility would be constructed in an area where significant habitat could be disrupted. In contrast, another commenter stated that the regulation should address impacts associated with new cooling water intake structure construction, even if impacts were not recurring.

Under today's rule, EPA will minimize construction impacts by requiring appropriate intake design and construction technologies. EPA recognizes that other Agencies have a prominent role in evaluating and minimizing impacts related to construction activities and acknowledges that existing Federal, State, and Tribal programs include requirements that address many of the environmental impact concerns associated with the construction of new intakes. EPA believes that implementation of appropriate design and construction technologies and existing program requirements will minimize the environmental impacts of construction.

2. Adverse Environmental Impact

The proposed rule discussed six potential definitions for adverse environmental impact: (1) A level of impingement and entrainment that is recurring and nontrivial, perhaps defined as the impingement or entrainment of 1 percent or more of the aquatic organisms in the near-field area as determined in a 1-year study; (2) entrainment or impingement damage as a result of the operation of a specific cooling water intake structure, including a determination of the magnitude of any short-term and long-term adverse impacts; (3) any impingement or entrainment of aquatic organisms; (4) a biocriteria approach based on a comparison of the abundance, diversity, and other important characteristics of the aquatic community at the proposed intake site with similar biological metrics at defined reference sites; (5) evaluation of impacts to protected species, socially, recreationally, or commercially important species, and community integrity (including community structure and function); and (6) impacts likely to interfere with the protection and propagation of a balanced indigenous population of fish, shellfish, and wildlife. The proposed rule also invited comment on whether adverse environmental impact should be defined more broadly to include non-aquatic environmental impacts (e.g., air emissions, noise, introductions of non-indigenous species) associated with technology-based requirements (see Section VI.B.2.e. below). In the NODA, EPA presented another population-based approach proposed by industry for defining adverse environmental impact—"Adverse environmental impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function, and (2) is attributable to the operation of the cooling water intake"—and invited comment on this definition as well as refinements to three of the definitions discussed in the proposed rule. See, 66 *FR* 28859–28863.

Numerous commenters stated that defining adverse environmental impact was critical to the 316(b) regulation because the program is fundamentally based on minimizing environmental impact. Further, commenters suggested that, without a solid definition of adverse environmental impact, the Agency's ability to interpret, implement, and enforce 316(b)-related actions would be seriously hampered.

EPA recognizes that since enactment of 316(b), scientists, environmentalists, lawmakers, and regulators have disagreed on an exact definition for adverse environmental impact. Further, the many studies conducted to date and arguments put forward on this issue have done little to resolve the current lack of consensus among the concerned parties. Given this background, EPA has determined to address adverse environmental impacts as discussed below.

a. What Constitutes Adverse Environmental Impact Under This Final Rule?

EPA acknowledges that there are multiple types of adverse environmental impact including impingement and entrainment; reductions of threatened, endangered, or other protected species; damage to ecologically critical aquatic organisms, including important elements of the food chain; diminishment of a population's potential compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function.

In the preamble to the proposed rule, EPA discussed several other options for interpreting adverse environmental impact. One option would be to look to section 316(a) of the Clean Water Act for guidance. Section 316(a) addresses requirements for thermal discharge and provides that effluent limitations associated with such discharge should generally not be more stringent than necessary to "assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on that body of water." The same language is repeated in section 303(d) with reference to total maximum daily load (TMDL) listing requirements for waters impaired by thermal discharge. These statutory provisions indicate that Congress intended this requirement to be used in evaluating the environmental impacts of thermal discharges. Some have suggested that, since thermal discharges are usually paired with cooling water intake, it may be reasonable to interpret the Clean Water Act to apply this requirement in evaluating adverse environmental impact from cooling water intake structures as well.

Commenters have argued that the CWA compels EPA to determine that the objective of section 316(b) must be linked to the 316(a) goal to ensure protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife. EPA does not agree that the CWA compels EPA to interpret adverse environmental impact as that term is used in section 316(b) in the Act by reference to the phrase "balanced indigenous population" under section 316(a). Because Congress used different terms in section 316(b) than in section 316(a), EPA does not believe the Agency is required to adopt such an interpretation. When Congress includes particular language in one section of a statute but omits it in another section of the same act, it is generally presumed that Congress acted intentionally and purposely in the disparate inclusion or exclusion. *Bates v. U.S.*, 522 U.S. 23 (1997). The usual canon of statutory interpretation is that when Congress uses different language in different sections of a statute, it does so intentionally. *Florida Public Telecommunications Ass'n, Inc.* v. *F.C.C.*, 54 F.3d 857 (D.C. Cir. 1995). Instead, EPA believes, consistent with EPA's ecological risk assessment guidelines, that it is reasonable to interpret adverse environmental impact as including impingement and entrainment, diminishment of compensatory reserve, stresses to the population or ecosystem, harm to threatened or endangered species, and impairment of State or authorized Tribal water quality standards. The Agency has long maintained that adverse environmental impact from cooling water intake structures must be minimized to the fullest extent practicable,[55] even in cases where it can be demonstrated that the requirement applicable under section 316(a) is being met.[56] [57] Thus, the objective of section 316(b) includes population effects but is not limited to those effects. EPA's interpretation of "adverse environmental impact" is discussed in more detail below.

b. Approach to Defining Adverse Environmental Impact

EPA received numerous comments on its proposed rule asserting that the proper endpoint for assessing adverse environmental impact is at the population level, that some of EPA's proposed alternative definitions of adverse environmental impact would essentially protect "one fish," and that EPA's alternative for defining adverse environmental impact as recurring and nontrivial impingement and entrainment was vague or would lead to excessive and costly efforts to protect a very few fish that would not result in ecologically relevant benefits. EPA's record at proposal demonstrated that cooling water intake structures do not kill, impinge, or entrain just "one fish," or even a few aquatic organisms. The NODA published by EPA provides further examples of cooling water intake structures that kill or injure large numbers of aquatic organisms. For example, EPA provided information on aquatic organism conditional mortality rates for the Hudson and Delaware rivers that demonstrated significant mortality due to cooling water intake structures. EPA considered this information, as well as information in Section III on impingement and entrainment survival and impact, as it deliberated options for the final rule and how adverse environmental impact should be defined. Further, EPA considered documents that discussed potential consequences associated with the loss of large numbers of aquatic organisms. These potential consequences included impacts on the stocks of various species, including any loss of compensatory reserve due to the deaths of these organisms, and the overall health of ecosystems. Given all of these considerations, EPA determined that there are multiple types of undesirable and unacceptable adverse environmental impacts, including entrainment and impingement; reductions of threatened, endangered, or other protected species; damage to critical aquatic organisms, including important elements of the food chain; diminishment of a population's compensatory reserve; losses to populations, including reductions of indigenous species populations, commercial fishery stocks, and recreational fisheries; and stresses to overall communities or ecosystems as evidenced by reductions in diversity or other changes in system structure or function.

EPA also invited commenters to submit for consideration additional studies that documented either significant impacts or lack of significant impacts from cooling water intake structures. Several commenters submitted reports on manufacturing and power plant facilities that purported to demonstrate minimal impact from cooling water intake. One commenter submitted three documents for EPA's review. Another commenter submitted information on the Neal Complex facility located on the Missouri River near Sioux City, Iowa. The commenter described a 10-year (1972–82) study that focused on evaluating the operational impacts of the Neal facility, sited on a heavily channelized segment of the Missouri River. The commenter asserted that study results indicated little if any detrimental impact to the Missouri River ecosystem caused by facility operations. EPA reviewed the information summarized by the commenter and finds fault with several of the statements and conclusions cited in the comment. This is discussed further in EPA's response to comments document.

c. Assessment of Population Modeling Approach

Some commenters asserted that impacts on individual organisms or subpopulations are not ecologically relevant and recommended that EPA define adverse environmental impact as follows: "Adverse environmental impact is a reduction in one or more representative indicator species that (1) creates an unacceptable risk to the population's ability to sustain itself, to support reasonably anticipated commercial or recreational harvests, or to perform its normal ecological function, and (2) is attributable to the operation of the cooling water intake structure." Under this approach, EPA would define unacceptable risk by using a variety of methods that fisheries scientists have developed for estimating (1) the level of mortality that can be imposed on a fish population without threatening its capacity to provide "maximum sustainable yield" (MSY) on a long-term basis, as developed under the Magnuson-Stevens Fishery Conservation and Management Act, and (2) the optimum population size for maintaining maximum sustainable yield.

In evaluating such comments, EPA considered the premises underlying MSY and the models used by National Marine Fisheries Service (NMFS) to derive MSY. Because the concept of MSY is based on harvesting adult fish, EPA generally questions whether this approach is directly relevant to egg, larvae, and juvenile losses associated with intakes. EPA also notes that the models used to estimate MSY do not directly incorporate any additional stressors (such as losses from entrainment and impingement) to managed stocks other than fishing pressure. Further, it is important to note that NMFS does not always manage stocks to their calculated MSY. In many cases, particularly if there is a concern over protecting habitat or critical ecosystems, NMFS regulates fisheries based on their "optimum yield," which is less than the MSY. According to the Magnuson-Stevens Fisheries Conservation and Management Act, "the

[55] *In re Brunswick Steam Electric Plant*, Decision of the General Counsel No. 41, June 1, 1976.

[56] *In re Public Service Co. of New Hampshire*, (Seabrook Station Units 1 and 2) (Decision of the Administrator) 10 ERC 1257, 1262 (June 17, 1977).

[57] *In re Central Hudson Gas and Elec. Corp.*, Decision of the General Counsel No. 63, July 29, 1977.

term 'optimum' with respect to the yield from a fishery, means the amount of fish which * * * is prescribed as such on the basis of the MSY from the fishery, as reduced by any relevant economic, social, or ecological function * * *"

EPA also considered the relative long-term success of ongoing fishery management practices implemented by the National Marine Fisheries Service and others. Despite the availability of state-of-the-art fish population models and considerable experience managing fisheries, NMFS recently classified 34 percent of their managed fishery stocks as over-utilized.[58] EPA agrees with fisheries experts and resource managers that there is unavoidable uncertainty associated with managing fish populations.[59 60 61 62] As a recent NMFS advisory panel expressed it, "Uncertainty and indeterminancy are fundamental characteristics of the dynamics of complex adaptive systems. Predicting the behaviors of these systems cannot be done with absolute certainty, regardless of the amount of scientific effort invested." [63] Consistent with its own Guidelines for Ecological Risk Assessment, EPA agrees with the conclusions of the NMFS panel that "Given the high variability associated with ecosystems, managers should be cognizant of the high likelihood for unanticipated outcomes. Management should acknowledge and account for this uncertainty by developing risk-averse management strategies that are flexible and adaptive." As the panel concluded, "The modus operandi for fisheries management should change from the traditional mode of restricting fishing activity only after it has demonstrated an unacceptable impact, to a future mode of only allowing fishing activity that can be reasonably expected to operate without unacceptable impacts." EPA and other fishery scientist support the concept of a precautionary approach,[64] particularly when dealing with complex systems, as described below.

EPA recognizes that the limitations of existing population models, including models used to manage fisheries, may be related to our overall limited understanding of the complexity of aquatic ecosystems and the long-term effects of anthropogenic activities [65 66]. As proposed in a recent journal article, many of the adverse impacts identified for coastal ecosystems, such as estuarine eutrophication, loss of kelp beds, coral reef die-offs, and introductions of invasive species, were initiated by historical overfishing.[67] Losses or extinctions of large vertebrate predators and filter-feeding bivalves such as oysters caused by overfishing have, over time, resulted in species replacements and significantly limited or ceased interactions between the overfished populations and other coastal community species. Historical overfishing and ecological extinctions precede both modern ecological investigations and the collapse of several marine ecosystems in recent times, "raising the possibility that many more marine ecosystems may be vulnerable to collapse in the near future." [68] Further, because modern ecological studies do not typically consider the long-term historical record, existing fishery resource baselines may be inaccurate, and "Even seemingly gloomy estimates of the global percentage of fish stocks that are overfished are almost certainly far too low." [69] Thus, EPA is concerned that historical overfishing increased the sensitivity of coastal ecosystems to subsequent disturbance, making them more vulnerable to human impact and potential collapse. Based on the long-term record of anthropogenic impacts to coastal ecosystems, their documented degradation, and their potential sensitivity to additional anthropogenic disturbance, as well as the admitted uncertainty associated with managing coastal fishery populations, EPA firmly believes that protective, risk-averse measures are warranted to prevent further declines or collapses of coastal and other aquatic ecosystems. EPA views impingement and entrainment losses to be one of many potential forms of disturbance that should be minimized to avoid further degradation.

Further, it remains unclear whether it is possible or sufficient to use single species population assessment models to assess impacts on multiple species, as is often necessary in evaluating impingement and entrainment by cooling water intake structures. NMFS now recognizes that improvement in fisheries management will require a comprehensive, ecosystem-based approach and recently convened an advisory panel to develop principles and approaches for ecosystem-based fishery management. In its report to Congress, the advisory panel noted that such an approach will "require managers to consider all interactions that a target fish stock has with predators, competitors and prey species; the effects of weather and climate on fisheries biology and ecology; the complex interactions between fishes and their habitat; and the effects of fishing on fish stocks and their habitat." [70] EPA supports the ecosystem-based approach to fisheries management advanced by NMFS and recognizes that this approach will require an in-depth understanding of species interactions. Because the ecosystem-based approach is currently evolving, EPA believes it is unlikely that most existing single species population models can accurately account for multiple-species interactions.

EPA also considered information addressing the issue of compensation—an increase that may potentially occur in survival, growth, or reproduction of a species triggered by reductions in population size [71 72]—and its application to the section 316(b) rulemaking. In particular, EPA sought comment on a memorandum discussing compensation and the quantity of data required to calculate compensation factors (DCN #2–020C). This document states that the use of compensation factors is typically

[58] National Marine Fisheries Service. 1999. Our living oceans. Report on the status of U.S. living marine resources. U.S. Department of Commerce, NOAA tech. memo. NMFS–F/SO–41.

[59] Hilborn, R., and C.J. Walters. 1992. *Quantitative fisheries stock assessment: choice, dynamics, and uncertainty*. Chapman and Hall.

[60] Hilborn, R., E.K. Pikitch, and R.C. Francis. 1993. Current trends in including risk and uncertainty in stock assessment and harvest decisions. *Canadian Journal of Fisheries and Aquatic Sciences* 50:874–880.

[61] Hutchings, J.A., and R.A. Meyers. 1994. What can be learned from the collapse of a renewable resource? Atlantic cod, Gadus morhus, of Newfoundland and Labrador. *Canadian Journal of Fisheries and Aquatic Sciences* 51:2126–2146

[62] National Research Council. 1998. *Improving fish stock assessments*. National Academy Press, Washington, D.C.

[63] National Marine Fisheries Service Ecosystem Principles Advisory Panel. 1998. *Ecosystem-based fishery management. A report to Congress*.

[64] Dayton, P.K. 1998. Reversal of the burden of proof in fisheries management. *Science* 279:821–822.

[65] Fogarty, M.J., A.A. Rosenberg, and M.P. Sissenwine. 1992. Fisheries risk assessment: sources of uncertainty. A case study of Georges Bank haddock. *Environ. Sci. Technol*. 26:440–446.

[66] Ludwig, D., R. Hilborn, and C. Walters. 1993. Uncertainty, resource exploitation, and conservation: lessons from history. *Science* 260:17 and 36.

[67] Jackson, J.B.C., M.X. Kirby, W.H. Berger, K.A. Bjorndal, L.W. Botsford, B.J. Bourque, R.H. Bradbury, R. Cooke, J. Erlandson, J.A. Estes, T.P. Hughes, S. Kidwell, C.B. Lange, H.S. Lenihan, J.M. Pandolfi, C.H. Peterson, R.S. Steneck, M.J. Tegner, and R.R. Warner. 2001. *Science* 293(5530):629–638.

[68] Ibid.

[69] Ibid.

[70] NMFS Ecosystem Principles Advisory Panel. 1998. *Ecosystem-based fishery management. A report to Congress*.

[71] Rose, K.A., J.H. Cowan, Jr., K.O. Winemiller, R.A. Myers, and R. Hilborn 2001. In press. Compensatory density-dependence in fish populations: importance, controversy, understanding, and prognosis. In press, *Fish and Fisheries*.

[72] Goodyear, C.P. 1980. Compensation in fish populations. In *Biological monitoring of fish*, ed. C.H. Hocutt and J.R. Stauffer, pp. 253–280. Lexington Books, Lexington, MA.

limited to cases in which fishery managers have extensive data on a fish population and that specific, numerical compensation values generally are not used in the absence of robust data sets (i.e., a minimum of 15–20 years of data suggested). Moreover, fish stocks for which these robust data sets exist are generally the highly exploited commercial and recreational stocks,[73] and few data exist for most nonharvested species. This memorandum also noted that in the absence of sufficient data various proxies are typically used to avoid quantitatively determining compensation.

In general, commenters asserted that compensation is a well-documented property of population regulation and that, despite 30 years of studies, there was no evidence that power plant impacts alone could reduce a population's compensatory reserve. Other comments specific to the memorandum concurred that, in the absence of sufficient data, compensation may be indirectly assessed using spawner-recruit models and that more than 100 marine and estuarine shellfish populations are currently managed by NMFS and other fisheries commissions using these proxies. One commenter provided information pertaining to new scientific studies of compensatory reserve and large databases containing fisheries information that are currently under development. The commenter asserted that use of meta-analysis—defined as the process of combining and assessing findings from several separate research studies that bear upon a common scientific problem—in conjunction with expanded fishery data sets will greatly increase the number of species for which scientists can estimate compensatory reserves. The commenter maintained that more and better estimates of compensatory reserve will be developed by the end of the decade, and requested that EPA take this trend into consideration. In contrast, another commenter asserted that industry abuses compensation theories and density-dependent models to support their contention that killing millions of fish is not ecologically relevant nor does it equate to an adverse environmental impact. The commenter further contended that there was a lack of scientific support for density-dependent models and provided references from peer-reviewed journals that critique and challenge the scientific underpinnings of these models.

EPA believes that a population's potential compensatory ability is affected by all stressors encountered within the population's natural range, including takes attributed to individual or multiple cooling water intake structures. Thus, even if there is little evidence that cooling water intakes *alone* reduce a population's compensatory reserve, EPA is concerned that the multitude of stressors experienced by a species can potentially adversely affect its ability to recover.[74] Moreover, EPA notes that the opposite effect may occur when populations are low, a phenomenon known as "depensation." Depensation refers to decreases in recruitment as stock size declines.[75] Because depensation can lead to further decreases in the abundance of populations that are already seriously depleted, recovery may not be possible even if stressors are removed. In fact, there is some evidence that depensation may be a factor in some recent fisheries collapses.[76 77 78]

Because EPA's mission includes ensuring the sustainability of communities and ecosystems, EPA must comprehensively evaluate all potential threats to resources, and work towards eliminating or reducing identified threats. EPA believes that cooling water intakes do pose a threat to some fishery stocks and through this rule is seeking to minimize that threat. EPA also acknowledges that spawner-recruit proxies are currently used by several agencies to manage fishery stocks. However, as indicated in the record, these proxies are used in the absence of robust data sets. EPA does not believe that simply because an approach is currently in place, it constitutes the best approach. Given the uncertainty associated with managing fish stocks and the degree of stock overutilization despite long-term management efforts (see earlier discussion in Section VI.B.2.c.), EPA is concerned about the relative accuracy of these proxies and their overall ability to protect fishery stocks. EPA does not discourage development of new data sets, population models, or other scientific investigations that will improve estimates of compensatory reserve or other parameters that are needed to understand fishery dynamics. In fact, it is EPA's belief that these developments are ongoing due to the acknowledgment—direct or otherwise—that existing data and models are inadequate. Under the consent decree schedule, EPA is required to promulgate today's rule based on its interpretation of current science and EPA agrees with all comments discussed above that there are some weaknesses and potential inaccuracies inherent to existing estimations of compensation. EPA strongly supports additional research efforts and the development of expanded fisheries data sets that can be used to fill information gaps and improve our understanding of the complex relationships associated with aquatic ecosystems, fishery populations, and anthropogenic activities and, ultimately, assist NMFS and other agencies in wisely managing fishery resources. Because fishery resources are so precious, EPA further contends that compensation studies and models currently under development—including the data on which they are based—should be subject to peer review and other measures that will ensure their scientific rigor.

EPA also evaluated information submitted by the Utility Water Act Group (UWAG) and the Electric Power Research Institute (EPRI), both in their comments and in studies provided to the Agency after the comment period. In summary, these comments and documents asserted that entrainment of very large numbers of eggs, larvae, and early juvenile-stage fish does not necessarily meaningfully affect populations of the entrained species and that substantial percentages of the organisms of many species may survive entrainment. Further, these comments and documents asserted or were intended to support the assertion that impingement survival was high for many species and that impingement often impacts low-value, forage species when they are naturally prone to seasonal die-off regardless of cooling water intake structures. One of these comments asserted that EPRI and some

[73] Myers, R.A., J. Bridson, and N.J. Barrowman. 1995. Summary of worldwide stock and recruitment data. *Canadian Technical Reports in Fisheries and Aquatic Science* 2024:1–327.

[74] Hutchings, J.A. and R.A. Myers. 1994. What can be learned from the collapse of a renewable resource? Atlantic cod, *Gadus morhus*, of New Foundland and Labrador. *Canadian Journal of Fisheries and Aquatic Sciences* 51:2126–2146.

[75] Goodyear, C.P. 1977. Assessing the impact of power plant mortality on the compensatory reserve of fish populations. Pages 186–195 in W. Van Winkle, ed., *Proceedings of the Conference on Assessing the Effects of Power-Plant Induced Mortality on Fish Populations*. Pergamon Press, New York, NY.

[76] Myers, R.A., N.J. Barrowman, J.A. Hutchings, and A.A. Rosenberg. 1995. Populations dynamics of exploited fish stocks at low population levels. *Science* 26:1106–1108.

[77] Hutchings, J.A. and R.A. Myers. 1994. What can be learned from the collapse of a renewable resource? Atlantic cod, *Gadus morhus*, of New Foundland and Labrador. *Canadian Journal of Fisheries and Aquatic Sciences* 51:2126–2146.

[78] Liermann, M. and R. Hilborn. 1997. Depensation in fish stocks: A hierarchic Bayesian meta-analysis. *Can J. Fish. Aquat. Sci.* 54:1976–1985.

of the best fishery scientists in the world have never identified a site where definitive or conclusive aquatic population or community level impacts have occurred from operation of cooling water intake structures as described by EPA in the proposed rule.

In response to comments that entrainment of very large numbers of eggs, larvae, and other life stages of fish do not meaningfully affect populations of entrained species, EPA believes that there is evidence that some fish stocks have been adversely affected by cooling water intakes. For example, Atlantic Coast States have expressed concern over declines in winter flounder populations and have requested that the Atlantic States Marine Fisheries Commission conduct a study of the cumulative effects of cooling water intakes on winter flounder abundance. In addition, NMFS documented in several fishery management plans that cooling water intake structures are one of the threats that may adversely affect fish stocks and their habitats (DCN# 2–024M, 2–024N, and 2–024O). EPA also is concerned that an extensive data set, encompassing 20 or more years of monitoring data, is usually required to adequately assess whether or not populations are being affected by intakes. These long-term data sets are not currently available for many species, and thus it is very difficult to confidently state that entrainment has a negligible impact on *any* fish population. EPA also notes that the potential compensatory reserve of some fishery stocks can be depleted beyond the point of recovery [79] and that the compensatory reserve of many species entrained or impinged by intakes is unknown. For all of these reasons, EPA believes that the potential for entrainment impacts exists, and that additional scientific data are needed to evaluate entrainment impacts on all affected fish and shellfish populations.

In response to assertions that many organisms survive entrainment, EPA maintains that studies show that through-plant mortality rates of young fishes vary depending on numerous factors. [80] Different species have different tolerance to passage through a cooling system, and mortality rates may differ among life stages of the same species. A summary of mortality data from five Hudson River power plants showed that mortality rates could be substantial.[81] The report cited species-specific mortality rates that varied by life stage for bay anchovy (93 to 100 percent), Atlantic tomcod (0 to 64 percent), herrings (57 to 92 percent), white perch (41 to 55 percent), and striped bass (18 to 55 percent). The study further emphasized that the reliability of these estimates was questionable and that various sources of potential bias may have caused the estimated rates to be *lower* than the actual mortality rates. EPRI sponsored a recent review of 36 entrainment survival studies, the majority of which were conducted in the 1970s. [82] [83] The summarized mortality rates described by EPRI were in substantial agreement with patterns reported in the Hudson river summary, namely that anchovies and herrings had the highest mortality rates (greater than 75 percent), and that thermal regimes seemed to be important determining factors.

Similar to entrainment survival, EPA notes that studies show impingement survival is dependent on species characteristics such as and life history stage, swimming ability, etc.[84] Impingement survival is also dependent on the type of technology in place and the operational aspects of the intake. EPA is aware that in some cases, with appropriate technologies in place, impingement survival may be substantial for some species.[85] EPA is also aware that impingement survival studies suggest that impingement survival is low for some species such as small bay anchovy and Atlantic menhaden during summers in Atlantic Coast estuaries.[86] EPA does not believe that loss of such forage species should be viewed as having limited importance simply because they have minimal or no commercial or recreational value. From a more holistic, ecological perspective, forage species can have great importance in their role as prey for higher trophic levels, including many commercially and recreationally important fish species. In today's rule, EPA seeks to minimize impingement losses for *all* affected species.

d. Biological Assessment Approach

Biological assessments and criteria are recognized as important methods for gathering relevant ecological data for addressing attainment of biological integrity and designated aquatic life uses.[87] EPA invited comment on the following discussion and documents that identified potential constraints on using these methods to determine adverse environmental impact from the operation of cooling water intake structures. First, biological assessment and criteria methods are still being developed for large rivers and the Great Lakes, two large waterbody types where many cooling water intake structures are located. Second, although biological assessment and criteria guidance has been published by EPA for small streams and wadeable rivers, lakes and reservoirs, and estuaries and coastal marine waters, many States and authorized Tribes have yet to apply these criteria in large waterbodies where cooling water intake structures will be located. Most work to date by the States to use these methods was applied to small streams and wadeable rivers where relatively few cooling water intake structures are located. In addition, although bioassessments and criteria are valuable for evaluating the biological condition of a waterbody, in complex situations where multiple stressors are present (e.g., point source discharges, non-point source discharges, harvesting, runoff, hydromodifications, habitat loss, cooling water intake structures, etc.), it is not well understood how to identify all the different stressors affecting the biology in a waterbody and how best to apportion the relative contribution to the biological impairment of the stressors from each source within a watershed. Thus, it is the opinion of EPA that the existing guidance for conducting biological assessments (particularly within large river systems and the Great Lakes) and the quantity of biocriteria data compiled at the State/Tribal level are insufficient at this time to apply a biocriteria approach to

[79] Hutchings, J.S. and R.A. Myers. 1994. What can be learned from the collapse of a renewable resource? Atlantic cod, *Gadus morhus*, of New Foundland and Labrador. *Canadian Journal of Fisheries and Aquatic Sciences* 51:2126–2146.

[80] EPRI. 2000. Review of entrainment survival studies: 1970–2000. Report No. 1000757. Prepared by EA Engineering Science & Technology.

[81] Boreman, J., L.W. Barnthouse, D.S. Vaughan, C.P. Goodyear, S.W. Christensen, K.D. Kumar, B.L. Kirk, and W. Van Winkle. 1982. The impact of entrainment and impingement on fish populations in the Hudson River Estuary: volume I, Entrainment impact estimates for six fish populations inhabiting the Hudson River Estuary. Prepared for the U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research by the Oak Ridge National Laboratory. ORNL/NUREG/TM–385/V1.

[82] Electric Power Research Institute. 2000. *Review of entrainment survival studies: 1970–2000*. No 1000757. Prepared by EA Engineering Science & Technology.

[83] Some of the studies summarized in EPRI (2000) are the same ones considered by Boreman *et al.* (1982). See EPRI (2000) for complete citations of 36 original studies.

[84] EPRI. 2000. Technical evaluation of the utility of intake approach velocity as an indicator of potential adverse environmental impact under Clean Water Act section 316(b). Report No. 100731, EPRI, Palo Alto, CA.

[85] Ibid.

[86] Ibid.

[87] Davis, W.S. and T.P. Simon, eds. 1995. *Biological assessment and criteria: tools for water resource planning & decision making*. Lewis Publishers, Boca Raton, FL.

evaluation of cooling water intakes nationally.

EPRI also questioned the applicability of bioassessments for 316(b) analyses. Specifically, EPRI developed a document that examined the suitability of multimetric bioassessment for regulating cooling water intake structures under section 316(b) of the CWA.[88] In its conclusion, EPRI stated that biocriteria are well suited for assessing community-level effects, but are not designed as indices for measuring population-level effects without additional analyses; that assumptions about the structure and function of ecosystems embedded in the biocriteria approach appear to conflict with current understanding of ecosystems as dynamic, nonequilibrium systems structured on multiple time and space scales; and that issues such as significant uncertainty related to identification of reference conditions remain unresolved, particularly for large, open systems such as estuaries and coastal marine waters.

e. Non-Aquatic Environmental Impacts

EPA invited comment in the proposal on whether adverse environmental impact should be defined broadly to consider non-aquatic adverse environmental impacts in addition to aquatic impacts (65 *FR* 49075). EPA also discussed the water quality and non-water quality impacts of cooling towers (both wet and dry) in the proposal (see 65 *FR* 49075 and 65 *FR* 49081). In the NODA, EPA outlined its methodology for estimating marginal increases in air emissions from electric generating facilities due to the adoption of wet or dry cooling towers (66 *FR* 28867).

Some commenters asserted that EPA failed to consider potential adverse environmental impacts associated with evaporative cooling towers. One commenter stated that evaporative cooling towers carry some potential for localized impact apart from their extraction of cooling water, because they may discharge bacterial slimes, fungi, and a variety of organisms which colonize the tower but are not otherwise native to the local ecosystem. The commenter added that such organisms can be suppressed by the use of biocides that may be discharged with the effluent. In addition, the commenter claimed that evaporative towers may concentrate nutrients such as phosphates and, when brackish or marine water is used, discharge salt spray drift. Additionally, one commenter stated that although there is no express statutory support in section 316(b) for limiting consideration to aquatic impacts (see 33 U.S.C. 1326(b)) they believe that the analysis of such impacts can be appropriate. Further, the commenter encouraged EPA to consider non-aquatic impacts which relate to cooling towers. Other commenters stated that Congress' mandate for environmental impact is broader than the entrainment and impingement impacts upon which EPA has focused in the proposed regulation. The commenters urged EPA to consider the following effects of the cooling tower technology: (1) Increased air emission due to the "energy penalty" exacted by closed-cycle cooling, or dry cooling; (2) noise; (3) visible plumes that (a) are unaesthetic, and (b) contribute to increased fogging and icing on nearby roadways; and (4) salt drift. The commenters added further that of all the technologies associated with cooling condenser water, once-through cooling is the only technology that is not associated with increased air emissions. According to the comments, the other cooling water technologies either directly emit contaminants into the air and/or indirectly result in an increase of fuel use and air emissions due to the loss of electrical generation capacity by the power used to operate these technologies. The comments stated that, in essence, the proposed regulations pre-determine that air and noise impacts are more acceptable than impacts to aquatic resources and water quality. The comments added that the locations least likely to be able to comply with the requirements, like those in urban areas, are also the most likely to have impaired air quality. One commenter maintained that for recirculated systems, cooling tower blowdown must be stored in evaporation ponds or treated prior to discharge, resulting in potential for groundwater impacts and disturbance of terrestrial habitats. Additional commenters stated that there could be unintended air pollution consequences for manufacturers from the 316(b) rule due to adoption of cooling towers. The forest products industry projects an increase in SO_2, NO_X, PM, and CO_2 emissions due to increased energy demand to run their mills. Other commenters stated that EPA must ensure that new cooling water technologies do not increase fossil fuel use by manufacturers.

Conversely, some commenters stated that the primary environmental concern with intake structures should be those focused on the aquatic environment. They added that while non-aquatic concerns are valid and should be considered secondarily, the main effect of these facilities is to the aquatic communities and the decision-making process should reflect this priority. Further, one commenter recommended that the regulation, (and probably more specifically the guidance), allow States, authorized Tribes, permitting authorities, and facility operators to have sufficient flexibility to consider non-aquatic impacts that may result from activities related to the design, construction, location, and operation of an intake structure and other alternative technologies identified as having a harmful effect on air, lands, and other natural resources when making section 316(b) decisions. One commenter claimed that a large array of environmental laws and regulations already exist to address non-water environmental impacts. Some commenters asserted that the potential for localized impact from wet cooling towers is relatively minor given the substantial improvements in entrainment and impingement and the elimination of thermal impacts associated with wet cooling as compared to once-through cooling.

For the final rule, EPA presented estimates of marginal annual increases in air emissions associated with installing recirculating wet cooling towers in lieu of once-through cooling systems. The Agency compared projected emissions under the rule to projected emissions absent the rule. Because EPA projects that, regardless of the outcome of the rule (that is, absent the regulations) a majority of power plants would have recirculating wet cooling towers and a minority would have once-through or dry cooling systems, the number of in-scope facilities contributing to increased air emissions is small. Regardless, EPA estimates that the following annual air emissions increases will occur as consequence of the rule: 2,560 tons of SO_2, 1,200 tons of NO_X, 485,900 tons of CO_2, and 16 pounds of Hg. These increases represent a change of less than 0.02 percent of annual emissions from power plants in the United States. Air emissions for manufacturing facilities projected within the scope of the rule are projected to not increase. This is due to the fact that EPA projects manufacturers to utilize reuse and recycling of cooling water to meet the flow reduction requirements in lieu of recirculating wet cooling towers. For the other regulatory options analyzed for the final rule, EPA presented annual air

[88] EPRI. 2000. Evaluation of biocriteria as a concept, approach, and tool for assessing impacts of impingement and entrainment under :§ 316(b) of the Clean Water Act. Report No. TR-114007, EPRI, Palo Alto, CA.

emissions estimates in Chapter 3 of the *Technical Development Document.*

To a large degree, issues brought forth by commenters regarding non-aquatic impacts of cooling towers were highly site-specific. For instance, in the cases where visible plumes from evaporative cooling towers was a significant issue for the public and other stakeholders on the local level, alternative or additional technologies have been adopted in response to stakeholder sentiment. The two-track regulatory framework adopted by EPA in the final rule allows for this local, site-specific decision-making process. In the case where facilities, or public stakeholders, determine that an alternative technology to a traditional flow reducing type (such as recirculating wet cooling towers or cooling ponds) is necessary, the two-track methodology provides the flexibility for an equivalent aquatic environmental impact minimization to occur without producing a non-aquatic impact.

In general, EPA has concluded that at a national level the primary impacts of this rule will be aquatic in nature, and focus on impingement and entrainment affects. Nevertheless, at a local level, it is possible that air quality impacts, non-impingement and entrainment aquatic effects, or energy impacts could be significant and potentially justify a different approach to regulating cooling water intake structures. Moreover, the cost impact of the rule, under certain local conditions, could be wholly disproportionate to costs anticipated by EPA on a national level. EPA believes that it is prudent to make an alternative regulatory mechanism available to the permitting authority to address such situations, and to be used at the permitting authority's discretion. EPA is sensitive to the large resource burden which such flexibility could place on the permitting authority, if this mechanism were abused by permit applicants. Therefore, EPA is placing the burden of demonstration of the need to pursue such alternative regulatory limits entirely on the permit applicant.

In this final rule for new facilities, where EPA is concerned about certainty and speed of permitting, EPA has selected impingement and entrainment as the metric for performance. EPA has considered the non-impingement and entrainment environmental impacts of the new facility rule and has found them to be acceptable on a national level. EPA is currently developing proposed regulations to establish the best technology available for minimizing adverse environmental impact from intake structures associated with existing facilities. The studies EPA has done of non-impingement and entrainment impacts in the case of new facilities would not govern in that context. Accordingly, the standard and procedures EPA develops for assessing adverse environmental impact from intake structures at existing facilities may well be quite different, and nothing in this rulemaking should preclude EPA from coming to the conclusion that a different approach for regulating cooling water intake structures at existing facilities is warranted.

3. Additional Information Indicating that Impingement and Entrainment May Be a Non-Trivial Stress on a Waterbody

In addition to reviewing the merits of a population approach to assessing adverse environmental impact, EPA considered information suggesting that impingement and entrainment, in combination with other factors, may be a nontrivial stress on a waterbody. EPA recognizes that cooling water intake structures are not the only source of human-induced stress on aquatic communities. These stresses include, but are not limited to, nutrient loadings, toxics loadings, low dissolved oxygen content of waters, sediment loadings, stormwater runoff, and habitat loss. While recognizing that a nexus between a particular stressor and adverse environmental impact may be difficult to establish with certainty, the Agency identified methods for evaluating more generally the stresses on aquatic communities from human-induced perturbations other than fishing. Of particular importance is the recognition that stressors that cause or contribute to the loss of aquatic organisms and habitat may incrementally impact the viability of aquatic resources. EPA examined whether waters meet their designated uses, whether fisheries are in stress, and whether waters would have higher water quality or better support their designated uses if EPA established additional requirements for new cooling water intake structures. EPA considered use of this type of information as one approach for evaluating adverse environmental impact.

EPA prepared a memorandum (Dabolt, T. EPA. April 18, 2001, revised July 2001. Memo to file Re: 316(b) analysis-relationship of location to cooling water intake structures to impaired waters) documenting that 99 percent of existing cooling water intake structures at facilities that completed EPA's section 316(b) industry survey are located within two miles of locations within waterbodies identified as impaired and listed by a State as needing development of a total maximum daily load (TMDL) to restore the waterbody to its designated use. All of the leading sources of waterbody impairment—nutrients, siltation, metals, and pathogens—can affect aquatic life. In the 1998 National Water Quality Inventory, inability to support aquatic life uses was one of the most frequently cited water quality concerns.

EPA recognizes, however, that these data do not establish that cooling water intake structures are the cause of adverse environmental impact in any particular case and that there may be other reasons for the presence of impaired waters near cooling water intake structures, such as the frequent location of facilities with cooling water intake structures near other potential sources of impairment (*e.g.*, industrial point sources, urban stormwater). Nonetheless, this analysis suggests that many cooling water intake structures are sited within or adjacent to impaired waters, and that intakes potentially contribute to existing stress on waterbodies and their resident biota.

EPA also summarized information from a number of sources indicating overutilization of about 34 percent of the fishery stocks whose known status is tracked by and under National Oceanic and Atmospheric Administration's (NOAA) purview (54 out of 160 stock groups) and which rely on tidal rivers, estuaries, and oceans for spawning, nursery, or adult habitat. An additional 45 stocks under NOAA purview are of unknown status (about 22 percent of the fisheries managed by NOAA) because of incomplete assessments. In addition, NOAA documents in a number of their fishery management plans that cooling water intake structures, particularly once-through cooling water systems that withdraw large volumes of water, cause adverse environmental impacts due to significant impingement of juveniles and entrainment of eggs and larvae. EPA believes that stress due to overutilization may be relevant to assessing cumulative impacts of multiple stressors, including cooling water intake structures.

C. Location

The proposed rule outlined a framework in which intakes located in certain sections of a waterbody would be subject to varying levels of restrictions. Specifically, intakes located within the broadly defined littoral zone or in especially sensitive waterbodies (estuaries and tidal rivers) would face additional restrictions on intake flows and intake velocity. Intakes located outside these higher priority waters would be subject to decreased levels of regulation. See the proposed rule for a detailed discussion of the framework set forth. (Section VIII.A.2., pages 49083 to 49085.)

Numerous comments were received on the proposed requirements for location, nearly all of which opposed the proposal. In the most general sense, many commenters agreed with the concept of protecting waters that are more productive. However, most commenters also argued that the proposed approach was scientifically and technically flawed and would be extremely difficult to implement. The comments can be divided into several generic categories: importance of location for an intake, general comments on the use of the littoral zone as a regulatory concept, and specific comments regarding the littoral zone definitions for each waterbody type.

In the NODA, EPA further explored the issue of intake location by soliciting comments on a revised definition of littoral zone and revised requirements for several waterbody types including the Great Lakes, and for waters not designated to support aquatic life use.

Comments on the NODA generally reiterated issues raised in the comments on the proposed rule. Commenters agreed that location is an important factor in assessing the impacts of cooling water intake structure, but that creating a regulatory framework to specifically address locational issues would be extremely difficult.

After reviewing the available data and comments regarding intake location, EPA has elected not to vary requirements for new facilities on the basis of whether a cooling water intake structure is located in one or another broad category of waterbody type or in a broadly defined zone of higher productivity or sensitivity within certain types of waterbody. Instead, EPA has promulgated technology-based performance requirements for new facilities that defines best technology available for minimizing adverse environmental impact in all waterbody types. This prescription for best technology available for minimizing adverse environmental impact recognizes the site-specific nature of biology and other locational factors by allowing the permit applicant in Track I to select and implement certain design and construction technologies after a review of available information on the site. Facilities that choose not to follow the specific technology-based performance requirements in Track I may opt for Track II and, after site-specific study, seek to demonstrate equivalent protection of the aquatic resources in a given waterbody from impingement and entrainment by using alternative technologies or approaches.

While EPA continues to believe that it could have established different requirements based on general information about the productivity of water bodies, EPA decided for the new facility rule that introducing separate requirements for different water bodies was unnecessary in light of the strong record support that the track I requirements are technically available and economically practicable for new facilities and in light of the flexibility provided by Track II where the applicant demonstrates that it can use different technologies to reduce impacts to fish and shellfish to a level comparable to the level that would be achieved if they implemented Track I requirements at their site.

EPA did not vary the performance requirements based on waterbody type because it found problems in defining and implementing a littoral zone approach (as discussed below) and found that reducing impingement mortality and entrainment on fresh water bodies to a comparable level as in estuaries and oceans to be technically feasible and economically practicable.

1. Importance of Intake Location

Several commenters agreed with EPA that location is an important factor in assessing the impact of a cooling water intake structure. One commenter added that location is also critical to the technical feasibility of the facility, because the site characteristics with respect to hydrology, land area available, and other factors can greatly influence the viability of a facility. Other commenters supported the waterbody-specific approach, but in the context that adverse environmental impact is a site-specific or even species-specific phenomenon. Another commenter disagreed with the proposed delineation of waterbody types, stating that adverse impacts can be found at all waterbody types and both in and outside the littoral zone. Therefore, equal protection should be afforded to all waters under the regulation. One commenter opposed the approach involving waterbody types, since defining distinct types is difficult, and noted that a site-specific approach would be more appropriate. Another commenter argued that the effectiveness of intake technologies varies by location, thereby supporting a site-specific approach.

EPA agrees that location is an important factor in addressing cooling water intake structure impacts, and, in Track I, permit applicants must select and implement certain design and construction technologies after considering site-specific conditions. In Track II, permit applicants have complete flexibility to address site-specific conditions, provided they can reduce impacts to fish and shellfish to a level comparable to the level that would be achieved if they implemented Track I requirements at their site.

2. General Comments on the Use of the Littoral Zone Concept

Many commenters made general statements of opposition to the use of the concept of littoral zone as part of the proposed rule, each for a variety of reasons. Most of the comments expressed concern over one or more of the following issues: The proposed definition and approach is too broad and untenable; the conditions used to define the littoral zone can vary greatly on an annual basis; the proposal is poorly supported by the scientific literature; and the proposal is a poor proxy for biological productivity and ignores ecological complexity and site-specific conditions. In general, commenters acknowledged that some areas of a waterbody are more sensitive to cooling water intake structure impacts but disagreed with EPA's approach for defining the concept. For example, the term "area of high impact," proposed in the NODA, represented an improvement over the term "littoral zone," but commenters noted that the proposed term still lacked a clear definition. One commenter further noted that a site-specific approach would allow for a more thorough analysis of a waterbody and account for these sensitive areas. Another commenter argued that the approach was inappropriate, because EPA does not have the authority to establish less restrictive requirements in some waterbodies.

EPA recognizes that most commenters, albeit for a variety of sometimes conflicting reasons, do not support use of a littoral zone or similarly broad concept to specify requirements for best technology available for minimizing adverse environmental impact. EPA instead has adopted a two-track framework in which permit applicants can fully address site-specific factors in proposing what technologies or alternatives they will use to reduce impingement and entrainment to levels readily achievable with use of low-cost, widely used technologies.

3. Specific Comments on the Definition or Applicability of the Littoral Zone

a. Littoral Zone—Oceans

Most commenters opposed the proposed definition and use for oceanic littoral zones. Generally, commenters saw it as too broad, vague, and unsupported by scientific literature, although one commenter did disagree with a reduced level of protection for oceanic waters. Some commenters noted that the entire continental shelf could be interpreted as the littoral zone under the proposed definition. Other commenters disagreed with the usage of salinity as a defining criterion, noting that many environmental factors (e.g., seasonality, tides, weather) can influence the salinity levels and therefore alter the geographic location of the littoral zone. One commenter added that some estuarine waters could possibly be classified as oceanic waters, thus reducing the level of protection required by the regulation. Commenters were also asked to comment on a proposed fixed distance from shore as a definition of the littoral zone. Some commenters did support a fixed distance (from 200 to 500 meters offshore) but most commenters opposed the proposed definition, because of the need to recognize site-specific characteristics, such as biological resources, areas of high productivity, and waterbody size and configuration, at each facility. Many of the same comments opposing the fixed-distance approach are echoed in the general comments about the inadequacy of the littoral zone approach noted above.

For the reasons discussed above, EPA has adopted an alternative regulatory structure and will not in this rule set nationally defined areas within oceans where different requirements apply for best technology available for minimizing adverse environmental impact.

b. Littoral Zone—Freshwater Rivers

Only a few of the comments received addressed freshwater rivers and streams, but those few comments raised concerns over the proposed definition of the littoral zone. One commenter noted that, generally, the flow, turbidity, and seasonality at a site can greatly affect the vegetation and light penetration, thereby affecting the extent of the littoral zone. This commenter also added that riverine intakes are often shoreline intakes and noted that the definition would be difficult to apply to intakes because of hydrologic factors such as meanders and shoreline construction techniques. Another commenter submitted additional data and analysis supporting the concept that freshwater lakes and rivers are less vulnerable to the effects of impingement and entrainment than other types of waterbodies.

Today's final rule adopts a different regulatory framework—a two-track approach—and does not set different requirements for best technology available for minimizing adverse environmental impact for different parts of freshwater rivers. Instead, under Track II, an applicant may conduct site-specific studies and possibly determine that a different cooling water intake structure location within the waterbody would reduce impingement mortality and entrainment to a level of reduction comparable to the level achieved under Track I requirements at a lower cost. If so, the applicant is free to propose an alternative location for its intake in its permit application.

c. Littoral Zone—Lakes and Reservoirs

One commenter noted that site-specific factors must be considered when locating a cooling water intake structure. The commenter argued that it was not necessarily true that intakes located in the littoral zone of lakes or reservoirs impact more species or species having higher economic value compared to intakes sited offshore. The commenter also stated that based on its experience, the dominant species entrained and impinged within lake systems were forage species (e.g., gizzard shad, alewife, smelt) regardless of intake location.

EPA agrees that it is important to consider site-specific factors when identifying the most appropriate location for a cooling water intake structure. As discussed above, under a Track II approach, an applicant may conduct site-specific studies to determine where best to site its intake (inshore or offshore) as long as it can be proven that the chosen location would reduce the level of impingement mortality and entrainment of all stages of fish and shellfish to a level of reduction comparable to the level the facility would achieve under the Track I requirements. However, EPA does not agree that the susceptible life history stages of lake forage species (such as those listed by the commenter) are as likely to be impinged or entrained at an offshore intake as an intake located inshore. Basic life history information for many forage species documents that spawning events and juvenile stages often occur in nearshore lake waters. As an example, young-of-the-year gizzard shad form schools and are usually found close inshore within shallow waters overlying mud bottom (Dames & Moore, 1977). Similarly, although adult alewifes typically inhabit deep, pelagic waters of landlocked lakes, they migrate to harbors and nearshore waters to spawn in spring and early summer.

d. Littoral Zone—Estuaries and Tidal Rivers

Commenters were more divided in their comments on estuaries and tidal rivers. Some commenters generally supported the proposed definition of an estuary and the increased level of protection for these waters. Others noted that the proposed definition greatly oversimplified its ecological function, since not all areas within an estuary are equally productive. Another commenter noted that the proposed rule applied the greatest level of restrictions to the waterbody type with the greatest heterogeneity. Several commenters expressed concern over the use of salinity as a delineation tool, noting the tendency for the 30 ppm gradient to move within the waterbody.

Based on facility size, EPA is setting the same performance-based technology requirements for tidal rivers and estuaries as for all other waterbodies under Track I of the final rule. To the extent that site-specific characteristics of a proposed facility location make the Track I requirements more or less effective at reducing impingement and entrainment, the facility choosing to pursue Track II will have a site-specific goal for evaluating the efficacy of alternative technologies and approaches.

4. Waters Not Designated To Support Aquatic Life Uses

In the NODA, EPA requested comment on the issue of less stringent requirements for facilities located on waterbodies that are not designated to support aquatic life. One commenter supported less stringent requirements than proposed, requesting that facilities located on waters not designated to support aquatic life be exempt from the 316(b) regulations. This commenter also noted that such an exemption would not necessarily be permanent, since States have the authority to reclassify waters to again support aquatic life. Another commenter did not support the proposed approach. A third commenter argued that the CWA does not allow for exemptions from technology-based requirements on the basis of the designated use of the receiving waters. Some commenters submitted specific examples of impaired waterbodies and listed nutrient enrichment as one of the causes of impairment.

Today's final rule does not establish less stringent requirements for waterbodies not designated to support aquatic life use. However, to the extent that the lack of an aquatic life use would result in Track I requirements achieving limited reductions in impingement and entrainment at a site, a permit applicant willing to conduct site-specific studies under Track II might be able to demonstrate that alternative technologies or approaches would reduce the level of impingement mortality and entrainment to a level of reduction comparable to the level the facility would achieve if it met the Track I requirements at that location. EPA addressed use impairment and the stress that cooling water intake structures may add to impaired waterbodies at VI. B. above.

D. Flow and Volume

Under the proposed rule, EPA proposed limitations on intake flow and volume for new facilities that varied depending on the type of waterbody upon which the facility is to be located. Specifically, intake flows at facilities whose cooling water intake structure withdraws from freshwater lakes and rivers would be limited to the lower of five (5) percent of the source water body mean annual flow or twenty-five (25) percent of the 7Q10. Facilities located on lakes and reservoirs would be limited to intake flows that do not disrupt, alter the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies). Intakes in tidal rivers and estuaries would be limited to no more than one (1) percent of the volume of the water column in the area centered about the opening of the intake, with a diameter defined by the distance of one tidal excursion at the mean low water level. The additional requirement of intake flow commensurate with that of a closed-cycle recirculating cooling water system was proposed for intakes located in either estuaries and tidal rivers or the littoral zone of any waterbody.

EPA requested comment on each proposed limitation by waterbody type, unique situations such as the Great Lakes, and the introduction of more stringent flow requirements for intakes in estuaries, tidal rivers, and littoral zones.

In general, commenters opposed the proposed flow and volume limitations. They argued that EPA did not present a link between intake flows and adverse impact, that the limits are based on questionable grounds, and that EPA lacked the authority to enact such limits, and against specific items in each proposed waterbody limitation.

On the basis of the supporting data presented in the proposed rule and the NODA, Track I and Track II of today's final rule maintain the proposed flow limitations with some changes. EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (See, #2–029, 2–013L–R15 and 2–013J). EPA also has determined that a capacity- and location-based limit on withdrawals in certain waterbody types is an achievable requirement that will have little or no impact on the location of cooling water intake structures projected to be built over the next 20 years.

1. Relation of Flow and Capacity to Impact

Several commenters disagreed with EPA's contention that a high intake flow volume necessarily corresponds to higher rates of adverse environmental impact. Commenters pointed to several facilities with relatively high intake volumes that reported no significant loss of aquatic life due to entrainment or impingement. The commenters asserted that, collectively, these cooling systems showed no significant impact on the recovery of impaired aquatic species or on the overall health of the aquatic population. By contrast, some commenters faulted EPA's proportional flow requirements for failing to account for cumulative impacts in waterbodies that have been previously designated as sensitive. In their view, such waters would suffer a disproportionate impact from high intake volumes than would less sensitive waters. Relying heavily on a flow-based requirement would ignore this potentially ecologically harmful effect.

Many commenters also disagreed with the notion that flow-induced entrainment automatically equates to adverse impact. Commenters argued that any intake flow would likely result in some entrainment loss but that this does not substantially harm the biological community of the source water. To support this, commenters provided examples that demonstrate healthy sport and commercial fishing populations in close proximity to large power plants. Citing these examples, commenters argued that EPA's proposed best technology available requirements based on entrainment and impingement are overly restrictive and cost prohibitive. Instead, commenters proposed basing the 316(b) requirements more on the overall health and viability of the surrounding aquatic environment than on rates of entrainment and impingement.

On the other hand, some commenters supported EPA's assertion that volume and impact are directly proportional. One commenter provided statistical evidence from several cooling system studies that demonstrated higher rates of entrainment and impingement when intake volumes were increased.

Several commenters questioned EPA's emphasis on reducing intake flow to minimize impact while ignoring other influential factors, such as life history strategy, distribution throughout the water column, and adaptations to external stresses, among others, that can result in high entrainment and impingement mortality rates. The commenters argued that such factors can often be mitigated by structural design or location modifications without incurring the expense associated with a reduction in the overall volume of water withdrawn. Similarly, other commenters noted that EPA failed to address technologies and design modifications that could achieve the desired effect—reduction in entrainment and impingement losses—while still maintaining a high rate of withdrawal.

EPA believes the record contains ample evidence to support the proposition that reducing flow and capacity reduces impingement and entrainment, one measure of adverse environmental impact, and may reduce stress on higher levels of ecological structure including population and communities. (*See* DCN #2–029 in the record for this rule (compilation of swim speed data), which demonstrates the potential vulnerability of many fish species to impingement. The documents DCN #2–013L–R15 and 2–013J support the proposition that flow is related to entrainment.) The widespread use of capacity-reduction technology at almost all proposed new electric generating facilities and by a substantial number of new manufacturers makes capacity reduction an appropriate component of best technology available for minimizing adverse environmental impact at new facilities. EPA disagrees with commenters that other factors influential to impingement and entrainment have been ignored. Both Track I and Track II of the final rule allow for site-specific evaluations in determining the appropriate technologies to be implemented. For example, the Design and Construction Technology Proposal Plan required in Track I and the Evaluation of Potential

Cooling Water Intake Structure Effects in Track II allow for site specific consideration of factors other than flow to minimize impacts from impingement and entrainment. Cumulative impacts are addressed on a case-by-case basis by each permitting authority.

2. Basis for Flow Proportional Limits

Numerous commenters rejected the justification for the flow requirement proposed by EPA as being too vague and untenable. Specifically, commenters questioned the proposed goal of a "99 percent level of protection" for aquatic communities and how it relates to levels of protectiveness in other water quality-based programs. Many commenters believed both "99 percent" and "level of protection" were vague and called on EPA to provide more explicit definitions in the final rule. Other commenters questioned the gain in overall aquatic health that can be achieved by setting the requirement at such a high level. Several commenters cited other federal programs and publications, such as the *Water Quality Standards Handbook*, in support of their claim that EPA has no precedent on which to base its proposed requirement. Other programs have demonstrated that a lower target protection level is still adequately protective of the viability of the total aquatic environment. Commenters noted that a high standard would increase compliance costs significantly while producing no measurable improvement in the overall health of the source waterbody and called on EPA to better justify its support of the proposed requirement.

While EPA believes this final rule will significantly increase protection for aquatic communities, the Agency has determined that the proportional flow requirements represent limitations on capacity and location that are technically available and economically practicable for the industry as a whole. EPA examined the performance of existing facilities based on data from the section 316(b) industry survey in terms of proportional flow to determine what additional value could be used as a safeguard to protect against impingement and entrainment, especially in smaller waterbodies, where multiple intakes are located on the same waterbody, or in waterbodies where the intake is disproportionately large as compared to the source water body. As discussed in Section V.B.1.c. above, EPA found most existing facilities meet these requirements. EPA expects that new facilities would have even more potential to plan ahead and select locations that meet these requirements. EPA recognizes that some measure of judgment was involved in establishing the specific numeric limits in these requirements and that these requirements are conservative in order to account for multiple intakes affecting a waterbody. In particular, the 1 percent value for estuaries reflects that the area under influence of the intake will move back and forth near the intake and withdrawing 1 percent of the volume of water surrounding the intake twice a day over time would diminish the aquatic life surrounding the intake. The 5 percent value mean annual flow reflects an estimate that this would entrain approximately 5 percent of the river or stream's organisms and a policy judgment that such a degree of entrainment reflects an inappropriately located facility. Nevertheless, because they address important operation situations and appear to be highly achievable for new facilities, EPA believes they are appropriate to this rule.

These requirements are expected to have little or no impact on the location of cooling water intake structures projected to be built over the next 20 years as new facilities have the opportunity to choose sites that meet their specific design and cooling water needs before construction begins.

E. Velocity

1. Design Through-Screen Velocity as a Standard Measure

Under the proposed rule, any intake located in a freshwater or tidal river, stream, estuary, or ocean or within or near the littoral zone of a lake or reservoir would have to meet a maximum intake velocity requirement: a design through-screen intake velocity of 0.5 feet per second (ft/s).

EPA requested comment on the appropriateness of design through-screen velocity as a standard measure with 0.5 ft/s as the intake velocity, and the utility and appropriateness of a nationally based velocity requirement for the 316(b) regulations. Comments addressed these topics, as well as a range of other issues: problems with biofouling, issues better addressed through a site-specific approach, applicability to offshore oil and gas facilities, and applicability to existing facilities.

Generally, industry commenters thought the 0.5 ft/s requirement to be overprotective and not supported by the scientific literature. On the other hand, states and public interest groups commenters agreed with this requirement. Commenters also gave examples of several situations in which the velocity requirement would be inappropriate. Comments on the NODA generally reiterated issues raised in the comments on the proposed rule.

Numerous commenters questioned the proposed intake velocity requirement on several grounds. Many of the comments suggested that the proposed requirement is based on limited scientific data and undocumented or unsupported government policies. Commenters generally cited the age of the data used to support the requirement, the small number of scientific studies upon which the requirement is based, and the unclear origins of existing government policies that advocate using the 0.5 ft/s requirement. Other commenters stated that the requirement is very conservative and still may not prevent adverse environmental impact. A number of commenters pointed to other factors that affect impingement and entrainment, such as light, turbidity, temperature, and fish behavior. Other commenters suggested alternative requirements, including 1.0 ft/s, an allowable range of velocity from 0.5 ft/s to 1.0 ft/s, a species-specific velocity requirement dependent on the species composition of nearby waters, and a case-by-case velocity limit. Several other commenters further noted that a number of existing facilities with intake velocities exceeding 0.5 ft/s have been determined to be in compliance with 316(b) or to have minimal impacts to fish populations. Other commenters questioned the record support for determining the safety factor used in deriving the proposed velocity requirement. Some commenters supported the velocity requirement, with one commenter noting that it is well-established as a protective requirement and is consistent with the levels of protection required under other existing regulations.

Several commenters expressed concern over the use of design through-screen velocity as the proposed requirement. Some pointed out that approach velocity has been the accepted standard for measuring velocity and questioned the lack of justification for proposing a different methodology. One commenter noted that a specific measure of velocity may be better suited for the design of a particular intake (e.g., through-screen velocity for a wedgewire screen and sweeping velocity for an angled screen). Another commenter opposed the use of design through-screen velocity, arguing that it is difficult to measure and does not represent the velocity that fish must detect in order to avoid impingement. Others noted that a through-screen velocity of 0.5 ft/s would, by definition, require an approach velocity of less than 0.5 ft/s. A commenter also questioned the appropriateness of using through-screen velocity, because intake screens can easily become clogged or fouled, having a dramatic effect on velocity and water flows at and through the screen. Other commenters supported the use of design through-screen velocity, noting that it has long been the industry and regulatory standard for measuring intake velocity. Several commenters suggested methods for measuring approach velocity.

Finally, several commenters drew comparisons with existing velocity requirements used by NMFS Northwest Region. Some of these comments requested that the proposed requirement be fully consistent with the existing NMFS requirements. Others noted that the proposed requirements are actually more stringent than the NMFS requirements when compared using a flow vector analysis, contrary to the Agency's statement that the proposed requirements were less stringent than NMFS requirements.

Given the compilation of supporting data presented in the proposed rule and the NODA, Track I of today's final rule maintains the proposed intake velocity requirement of 0.5 ft/s through-screen velocity. The 0.5 ft/s through-screen requirement is well supported by existing literature on fish swim speeds and will also serve as an appropriately protective measure. EPA believes a requirement that protects almost all fish and life stages is particularly appropriate to provide a margin of safety when, as is common, screens become occluded by debris during the operation of a facility and velocity increases through the portions of a screen that remain open. EPA notes that more than 70 percent of the manufacturing facilities and 60 percent of the electricity generating facilities built in the past 15 years have met this requirement and believes the requirement is an appropriate component of best technology available for minimizing adverse environmental impact at new facilities.

As documented by the data collected for the NODA, EPA believes the 0.5 ft/s requirement is scientifically based, technically sound, protective of aquatic resources, and technically available and economically practicable as demonstrated by the fact that it is frequently achieved at recently built facilities. As discussed below, the requirement is well supported by existing literature on fish swim speeds and will also serve as an appropriate protective measure, since the data suggest that a 0.5 ft/s intake velocity would protect 96 percent of the tested fish. EPA notes that if the permit applicant does not want to meet the specific Track I velocity requirement, the applicant can, under Track II, conduct site-specific studies and seek to demonstrate comparable reduction of impingement mortality and entrainment. This may allow facilities to install cooling water intake structures with greater that 0.5 ft/s velocities if they can demonstrate that they would have the same reduction of impingement and entrainment as Track I standards which include the 0.5 ft/s limitation on velocity. Additionally, past permitting decisions were made using the best judgment at the time of the decision. These permitting decisions should not be interpreted to signify best technology available in future decisions.

The NODA presented further data on fish swim speeds. The velocity of water entering a cooling water intake structure exerts a direct physical force against which fish and other organisms must act to avoid impingement and entrainment. An analysis of swim speed data demonstrates that many fish species are potentially unable to escape the intake flow and avoiding being impinged. EPA received or collected data from EPRI (see W–00–03 316(b) Comments 2.11), from a University of Washington study that supports the current National Marine Fisheries Service velocity requirement for intake structures, and from references included in comments from the Riverkeeper (see Turnpenny, 1988, referenced in W–00–03 316(b) Comments 2.06; document found in DCN #2–028B in the record for this rule). These data were compiled into a graph (Swim Speed Data, DCN #2–029 in the record of this rule). The data suggest that a 0.5 ft/s velocity would protect 96 percent of the tested fish.

In developing the intake velocity requirement, EPA assumed a flat screen with the intake flow directly perpendicular to the face of the screen, because this is a typical arrangement for a cooling water intake structure. However, angled screens, such as those described in the NMFS requirements, are used in some intake designs, and EPA does not wish to discourage any intake designs. Under § 125.84(e), the Director may require additional controls (such as the NMFS requirements) to complement the protection afforded by the velocity requirement. EPA also developed the velocity requirement with a highly protective intake velocity in mind, regardless of the intake configuration. As a result, EPA's requirements may be more stringent than existing requirements required by NMFS or other agencies.

EPA recognizes that approach velocity has been a measurement technique for intake velocity in the past. However, many recently constructed facilities have been designed to meet through-screen intake velocity limitations. Additionally, EPA notes that design through-screen velocity will be simpler to measure and therefore be easier to implement on a national level for both regulators and facilities than approach velocity. New facilities can be designed with consideration given to the through-screen velocity requirement, and designs can be altered accordingly. Intake velocity will also be simpler to measure, as facility engineers can simply calculate the intake velocity on the basis of intake flow and the intake screen area, as opposed to the more complex data gathering process involved in measuring approach velocities near an intake screen. EPA also recognizes that the approach velocity will be less than 0.5 ft/s. The intake velocity requirement is intended to be a highly protective requirement. Regardless of the intake structure design or the presence of sufficient detection or avoidance cues, the intake velocity is low enough to protect of a majority of fish species. For these reasons, the final rule maintains the requirement to measure intake velocity on a design through-screen basis.

2. *Appropriateness of a National Velocity Requirement*

Numerous comments were received regarding the appropriateness of a national-scale requirement for intake velocity. Many commenters expressed concern that a national requirement would be an unnecessary burden on facilities. Specifically, some commenters noted that a site-specific framework for the 316(b) rule and velocity requirement would be preferable, as it would best account for site-specific details, some of which may affect the rates of impingement and entrainment. Other commenters questioned using a national requirement; given the variability in environmental conditions and fish swim speeds, these commenters said making a national approach is inappropriate to suitably cover the range of organisms found in a given water body. Some commenters noted that the velocity requirement might preclude the future use or implementation of some highly effective technologies. One commenter noted that several studies have suggested little or no correlation between flow and impingement or entrainment; the commenter argued that, therefore, a relationship between impingement or entrainment and intake velocity does not exist.

As documented by the data collected for the NODA, the 0.5 ft/s requirement is scientifically based, is protective of aquatic resources with a reasonable margin of safety, and is met by many recently built facilities. EPA believes it is an appropriate component of best technology available for minimizing adverse environmental impact at new facilities. Permit applicants who wish to build a facility using higher intake velocities have the option, under Track II, to conduct site-specific studies and seek to demonstrate that their alternative will reduce impingement mortality and entrainment to a level of reduction comparable to the level the facility would achieved if it met the Track I requirements, including the velocity limit of 0.5 ft/s.

While EPA acknowledges that multiple factors may affect impingement and entrainment at a given intake, EPA believes that there is ample evidence contained in the record to support a correlation between velocity and/or flow and impingement and entrainment. As stated in the preamble to the rule, intake velocity is one of the key factors affecting the impingement of fish and other aquatic biota. The velocity of water entering a cooling water intake structure exerts a direct physical force against which fish and other organisms must act to avoid impingement and entrainment. The compilation of swim speed data (DCN #2–029 in the record of the rule) demonstrates that many fish species are potentially unable to escape the intake flow and avoid being impinged. The record also supports the proposition that flow is related to entrainment.[89]

Finally, EPA chose a national requirement in order to provide a consistent standard for facilitating implementation given the technical availability and economic practicability of the requirement.

3. Other Comments Concerning the Velocity Proposal

a. Biofouling at Intakes

Several commenters submitted that an intake velocity of 0.5 ft/s may lead to increased difficulties with biofouling at facility intakes, especially at offshore oil and gas extraction facilities. Another commenter noted that with an increase in biofouling facilities would need to increase treatment efforts. Frequently, these efforts involve adding chemical treatments to water flows and may have subsequent adverse impacts on water quality. Another management strategy noted by a commenter is to maintain sufficiently high intake velocities to preclude colonization by fouling organisms. One commenter also expressed concern over the implications of biofouling at fine mesh screens and the potential for these protective technologies to become quickly fouled. One commenter supported the velocity requirement, noting that commercially available alloys have been shown to be highly effective in repelling biofouling organisms.

EPA recognizes that maintaining sufficiently high intake velocities is one possible solution for minimizing settlement by biofouling organisms. However, further research by the Agency suggests that this is not the most effective technique. Often, intake velocities are designed to be as low as possible to reduce the impingement and entrainment of aquatic organisms. Additionally, the intake systems of many facilities are unprepared to support such high intake velocities and would possibly require modifications in order to maintain such velocities. An analysis of facility survey data at existing facilities suggested that only 33 (3.4 percent) of 978 surveyed facilities have intake velocities of sufficient magnitude (greater than 5 ft/s) to inhibit biofouling. Fortunately, a variety of viable alternative technologies and management strategies for dealing with biofouling are available. Examples of these options include the use of construction materials that inhibit attachment of organisms, mechancial cleaning, and chemical and/or heat treatments. While no one strategy has been shown to be universally applicable, there are certainly affordable and implementable options. Maintaining a high intake velocity has not been shown to be the most effective way to control biofouling, since other methods have been shown to be more effective at a lower cost, especially in the context of new facilities. A facility that has yet to be constructed can integrate biofouling control technologies into its design and minimize the impacts of biofouling on normal operations.

b. Concerns Better Addressed by a Site-Specific Approach

Several commenters raised other concerns about the proposed velocity requirement, pointing to a variety of issues that they argue could be more easily addressed on a site-specific level. Some commenters noted that intakes located on large or fast-moving waterbodies may have difficulty maintaining the proposed intake velocity. For example, an intake located in a river moving at 3.0 ft/s may be unable to maintain a constant 0.5 ft/s intake velocity because of the ambient flow. As for the biota near the intake, the commenters submitted that these organisms have adapted to a higher-velocity environment and do not necessarily require protection under a velocity requirement. Other commenters noted that the direction of flow near an intake can have a substantial effect on the intake velocity and detection by fish. For example, the intake velocity at an intake subject to tidal movements or a longshore current may be affected. Another commenter expressed concern that the intake velocity is meaningful only if measured where the screen is the first component of the cooling water intake structure encountered by an organism, such as with a wedgewire screen. Intake canals, trash racks, and other cooling water intake structure components pose a threat by potentially entrapping fish that are unable to locate an escape route. One commenter noted that experimental technologies, such as strobe lights, sound, or intake velocities greater than 0.5 ft/s (up to 10 ft/s for some technologies) may not be developed because of the restrictions on intakes. One commenter observed that a reduction in intake velocity may also reduce the amount of cooling water taken in by a facility. The commenter observed that reducing the cooling capacity of the cooling system may adversely affect facility safety and efficiency.

For faster-moving waterbodies and in other situations where a permit applicant may wish to use a higher intake velocity, facilities may opt to follow Track II and seek to demonstrate that reductions in impingement mortality and entrainment would be comparable to the level achieved with the Track I requirements. Given the data EPA has seen on the protective nature of the 0.5 ft/s requirement (see DCN #2–028 in the Docket for the rule), EPA does not foresee a significant issue regarding entrapping fish and will continue in Track I to specify design through-screen velocity as the measure for determining compliance with the velocity requirement. EPA also notes that facilities wishing to employ developmental technologies may follow Track II and demonstrate a comparable level of protection.

For new facilities, EPA does not anticipate that cooling system safety for nuclear-fueled facilities will be an issue

[89] The documents DCN# 2–013L–R15 (Goodyear. 1997. Mathematical Methods to Evaluate Entrainment of Aquatic Organisms by Power Plants) and DCN# 2–013J (EPRI. 1999. Catalog of Assessment Methods for Evaluating the Effects of Power Plant Operations on Aquatic Organisms.) in the record of the rule both support this premise.

because any requirements can be addressed through facility design. New facilities have the opportunity to address and mitigate safety and efficiency issues during the design of the facilities. The fact that 79 percent of power generating plants and 46 percent of manufacturing facilities built within the last five years meet the Track I velocity requirement demonstrates that facilities designed in accordance with this requirement can incorporate any necessary features to ensure proper functioning of the cooling system.

F. Dry Cooling

In the proposed rule EPA requested comment on regulatory alternatives based wholly or in part on a zero-intake flow (or nearly zero, extremely low-flow) requirement commensurate with levels achievable through the use of dry cooling systems. See, 65 *FR* 49080–49081. EPA rejected dry cooling as best technology for minimizing adverse environmental impact for the reasons discussed in Section V.C above.

Some commenters, citing several examples, responded that dry cooling systems must be the best technology available for minimizing adverse environmental impact because they reduce intake volume and the killing of aquatic organisms to extremely low levels. These comments claim that dry cooling is an available and demonstrated technology. They focus on several demonstrated cases of dry cooling and discuss its use for a range of fuel sources, ownership categories, climates, and electric generating capacity. The comments claim that dry cooling technology in the United States has been growing rapidly since the early 1980s and represents approximately 27 percent of new capacity since 1985. Additionally, commenters in favor of the dry cooling alternative state, on the basis of recent construction trends, that the best technology available for the New England region is dry cooling systems. The commenters provide examples of 15 steam electric stations currently operating, under construction, or recently approved for construction using dry cooling in New England. These projects range in capacity from 24 MW to 1500 MW, with an average capacity of 480 MW and a total capacity of 7200 MW. Commenters supporting the dry cooling alternative claim that the technology frees the industry user groups from unnecessarily restrictive requirements to site facilities adjacent to or short distances from waterbodies or other sources of cooling water and eliminates discharges (of both thermal pollution and water conditioning chemicals) to these waterbodies. This freedom from water dependency, the comments assert, allows new power plants to locate in close proximity to the end users of electricity, thereby decreasing energy loss due to transmission, and to use alternative sources of water such as treated wastewater effluents, municipal supplies, and groundwater. EPA rejected dry cooling for the reasons discussed at V.C above.

Some commenters asserted that dry cooling systems are not necessary for minimizing adverse environmental impact nor do they qualify as the best technology available. They assert that dry systems are not considered to be a viable, cost-effective design choice unless there are unique circumstances and conditions associated with either the site or the market climate for the project. The comments recommend that adoption of dry cooling systems be left to the permittee's judgment and not be a uniform requirement. The physical space requirements, the commenters assert, severely limit the siting options available to new facilities. They oppose the imposition of dry cooling in southern climates, where, they claim, there is an abundance of high volume surface water available for cooling. Additionally, the commenters claim that dry cooling has not been shown necessary for minimizing adverse environmental impact. They also contest claims made by other commenters on the proposal that dry cooling has been demonstrated for a variety of climates and generating capacities. These commenters counter claims made by other commenters on the proposal that dry cooling is a demonstrated technology for large-size power plants. EPA has rejected dry cooling as best technology available for the reasons discussed at V.C above.

Other commenters discuss dry cooling technologies at manufacturing facilities. The commenters challenge the viability of dry cooling systems in manufacturing facilities that cool process fluids to ambient levels (e.g., below 100 degrees F) or do not condense steam. They claim that the dual use of process and cooling water prevents the application of dry cooling. EPA agrees that dry cooling technologies for manufacturing cooling waters pose engineering feasibility problems. EPA rejects dry cooling as a basis for a national requirement for new manufacturing facilities (as discussed in Section V.C above) but points to several demonstrated cases of dry cooling for cogeneration plants at or adjacent to manufacturing facilities as encouragement for cogenerating plants to consider the technology on a site-specific basis.

The cost of dry cooling systems is discussed in a variety of comments. Generally, all commenters discuss elevated capital and operating and maintenance (O&M) costs in comparison with similar capacity recirculating wet cooling towers. An analysis of modeled new combined-cycle plants in five regions of the United States was submitted with one comment. This analysis estimated that capital and total O&M costs for dry cooling systems exceed those for wet cooling systems by greater than 75 percent, regionally and nationally. Other commenters generically assert that the capital and operating costs of the technology significantly exceed those of recirculating wet cooling towers of comparable capacity. Even commenters in favor of dry cooling as the best technology available acknowledge that the cost of a dry cooling system can be as much as three times that of a comparable wet cooling system. However, these commenters also contest that the cost of the technology is clearly not wholly disproportionate to the environmental benefit gained. These commenters in favor of dry cooling as the best technology available claim that the capital cost and O&M costs of air-cooled structures at combined-cycle electric generating plants represent a small fraction, only 2 to 3 percent (using EPA's proposal cost estimates), of the estimated annual revenues for those facilities. These commenters state that because newer combined-cycle plants need cooling only for the steam portion of their cycle (only about one-third of their total capacity), they can be cooled with a much smaller dry cooling system than a comparably sized, steam-only generating plant. Thus, these commenters claim, the increased cost for dry cooling is considerably smaller than it would have otherwise been for conventional all-steam plants. These commenters add that they believe the costs of installing dry cooling as the best technology available at a fraction of a cent per kilowatt hour, would not be felt or even noticed by consumers. EPA discusses the costs of dry cooling extensively in Chapter 4 of the *Technical Development Document*. EPA agrees with commenters that elevated costs of the technology as compared with other cooling technologies pose a significant implementation problem for new facilities. Specifically, as discussed in Section V.C above, the compliance costs of dry cooling based requirements would result in annualized compliance cost of greater than 4 percent of revenues for all 83 electricity generators, and of greater than 10% of revenue for 12 of the 83 generators.

The performance of dry cooling systems is addressed in many comments. Some comments point to lower performance than wet cooling systems and greater sensitivity to climatic conditions as being crucial for evaluating the efficacy of the technology. These comments claim that depending on climatic conditions, certain locations in the country will have a higher probability of incurring energy penalties. These commenters cite performance drawbacks to dry cooling systems due to operation at elevated turbine backpressures or reductions in energy production in locations with high daily or seasonal dry-bulb temperatures. One commenter provided results from a modeling exercise simulating energy inefficiency impacts at dry cooling facilities in a variety of climatic conditions. The results from the commenter's analysis showed summer peak performance shortfalls (*i.e.*, peak energy penalties) of greater than 30 percent for dry cooling facilities. Additionally, the commenters estimate that the energy penalty would vary considerably throughout the United States because of climactic conditions. Conversely, some commenters claim that the energy penalty from some dry cooling facilities in some areas is equivalent to that calculated by New York State officials for the Athens Generating Company facility, where they estimated a 1.4 to 1.9 percent reduction in overall plant electrical generating capacity as a consequence of using a dry cooling system versus a hybrid wet'dry system. [90] The commenters add that, in their view, energy conservation measures can more than offset any potential minor loss of efficiency from dry cooling. The commenters claim that the building of modern generating facilities provides significant efficiency gains that dwarf any potential loss due to the cooling system design. These commenters claim that transmission losses exceed the energy penalty associated with the dry cooling system; further, they assert that because dry cooling makes it possible to locate away from major bodies of water and closer to energy users, a facility can be more than compensated for the energy penalty. Finally, the commenters state that a 1 to 2 percent loss for the sake of greater protection of water resources is comparable to other efficiency penalties EPA requires of the electric industry for reductions in NO_X and SO_2 emissions. The performance penalties of dry cooling systems play a significant role in EPA's decision to reject dry cooling as the best technology available. See Section V.C above for further discussion.

Hybrid wet and dry cooling systems are addressed in several comments. One commenter contends that the viability of hybrid systems for large-scale cooling operations (e.g., at a power plant with capacity greater than 500 MW) is uncertain. The commenter identifies site-specific performance advantages of hybrid systems over dry cooling, noting that the most common type of hybrid system is designed to eliminate visible plumes from wet cooling towers. These comments additionally claim that hybrid plume abatement systems are not water-conserving systems and that their costs are greater than wet cooling tower systems. EPA considers hybrid cooling systems not to be adequately demonstrated for power plants of the size projected to be within the scope of the rule. As such, EPA has not adopted the technology as a component of the best technology available requirements of today's rule. However, EPA recognizes that there is distinct potential for the use of hybrid cooling systems, especially in cases where plume abatement is concerned.

Some commenters claim that air emissions from electricity generation would increase because of energy penalties from dry cooling systems. These commenters state that an energy penalty creates a need for replacement power, which must be met by even more new generating capacity resulting in an increased potential for environmental impacts (such as increased air emissions). The comments add further that estimating those emissions would project the costs of power production and the mix of generating capacities (e.g., coal-fired, nuclear) available at the time of anticipated demand. Other commenters take the view that increased air emissions due to dry cooling systems are not a concern. EPA is concerned about the degree to which dry cooling-based requirements would increase air emissions associated with electricity generation. In the cases where performance penalties are high (i.e., in hot climates or during hot climatic periods), the increases in air emissions due to the potential adoption of dry cooling-based requirements are of concern to the Agency. This issue is further discussed in Section V.C in the context of EPA's rejection of dry cooling.

For the final rule EPA concludes that dry cooling systems are not the best technology available for minimizing environmental impact. EPA recognizes that dry cooling systems can achieve significant reductions in the impingement and entrainment of aquatic organisms compared with other cooling systems, especially once-through systems. Additionally, EPA acknowledges that the technology has been demonstrated as a viable cooling alternative for certain power plant applications under certain circumstances. EPA notes, however, that few of the plants constructed with the technology have been built with cooling systems of a size comparable to what would be required at several of the planned coal-fired systems EPA projects within the scope of the rule. The dry cooling technology presents flexibility to power plants, especially those of small size, those locating in arid regions, and those with water scarcity issues, or those wishing to avoid NPDES permitting issues. However, the technology presents several clear disadvantages that prohibit its adoption as a minimum national requirement or as a minimum requirement for subcategories of facilities. Although EPA recognizes that the technology—by using extremely low-level or no cooling water intake—reduces impingement and entrainment of organisms to dramatically low levels, EPA interprets the use of the word "minimize" in CWA section 316(b) to give EPA discretion to consider technologies that reduce but do not completely eliminate impingement and entrainment as meeting the requirements of section 316(b) the CWA.

A minimum national requirement based on dry cooling systems would result in annualized compliance cost of greater than 4 percent of revenues for all 83 electricity generators, and of greater than 10% of revenue for 12 of the 83 generators. Because the technology can cause inefficiencies in operation during peak summer periods and in hot climates, adoption as a minimum national requirement would also impose unfair competitive disadvantage for facilities locating in hot climates, more so than a traditional recirculating wet cooling tower or once-through cooling system. For the subcategory of facilities in cool climatic regions of the United States, adoption of a requirement based on dry cooling for these facilities would also impose unfair competitive restrictions. The competitive disadvantages relate primarily to the capital and operating costs of the dry cooling system. Additionally, adoption of requirements based on dry cooling for

[90] State of New York, Department of Environmental conservation. 1999. Initial post hearing brief, Athens Generating Company, L.P. Case no. 97–F–1563.

a subcategory of facilities with a capacity under a particular level or by fuel type would pose similar competitive disadvantages for those facilities. EPA's record demonstrates that dry cooling systems generally cost as much as three times more to install and construct than a comparable wet cooling system. Dry cooling system O&M costs range from less than or comparable to those for wet systems to two or more times higher. In addition, dry systems generally impose an energy penalty as compared with wet cooling systems. EPA estimates the annual average energy penalty to be 3 percent over a recirculating wet cooling tower system.

Further, EPA considers the degree of energy inefficiency associated with dry cooling to be counter to the performance of the best technology available candidate technology. EPA's record shows an annual average energy penalty for dry cooling of approximately 3 percent relative to recirculating wet cooling towers. This energy penalty represents the typical performance of a dry cooling system in northern climates, extended to the rest of the national climates. However, the peak summer performance is expected to decrease significantly in certain hot climates. EPA estimates that, for a newly constructed and designed facility, the peak summer shortfall could exceed the annual penalty by an additional 3 percent. This value could increase significantly as the facility ages; it hinges on regular and thorough maintenance.

EPA concludes that the air emissions increases from power plants due to adoption of a requirement based on dry cooling would be counter to the performance of a best technology available candidate technology. Changes in energy consumption associated with dry cooling would result in changed fuel consumption and therefore could result in greater air emissions from power plants using dry cooling than would occur if the plants used wet cooling. EPA estimates that the average annual air emissions for the power plants in scope of the final rule with a dry cooling alternative for CO, NO_X, SO_2, and Hg emissions would be greater than if the plants used wet cooling. See Section VI.B.2.e. See Chapter 3 in the *Technical Development Document* for more information on EPA's air emissions analysis.

G. Implementation-Baseline Biological Characterization

In the proposed regulations, the Agency proposed that all facilities perform a source water baseline biological characterization to establish an initial baseline for evaluating potential impact from the cooling water intake structure before the start of operation. The study required that information be collected over a 1-year period. This information was needed to determine the kinds, numbers, life stages, and duration of aquatic organisms in the vicinity of the cooling water intake structure. The Director would use the findings of the study to evaluate the efficacy of the location, flow, and velocity requirements and to define the need for design and construction technologies. The regulations would have also required facilities to conduct impingement monitoring over a 24-hour period once per month and entrainment monitoring over a 24-hour period no less than biweekly during the period of peak reproduction and larval abundance. After two years, the permitting agency would be allowed to reduce the frequency of impingement and entrainment monitoring. EPA's July 2000 information collection request estimated costs for the Source Water Baseline Biological Characterization at an average of $32,000. Monitoring was estimated at approximately $38,000 annually for entrainment and $13,000 annually for impingement. The NODA provided updated costs for both the source water baseline characterization and post operational monitoring.

1. Need for the Source Water Baseline Biological Characterization

Numerous commenters from both the States and the industry agreed that the source water baseline biological characterization was reasonable to determine the condition of the aquatic system. Other commenters questioned the need for a 1-year study that would provide information of limited utility because of the variation that natural populations exhibit from year to year. Some commenters were concerned that the baseline year may not be representative of the average characteristics of the organisms and that comparing subsequent monitoring with the baseline may provide erroneous conclusions.

Some commenters expressed their concern that the requirement to perform the baseline biological characterization would delay issuance of an NPDES permit and that the time required to develop the study in cooperation with and with approval from the permitting authority would increase the development time by 3 to 6 months. They estimated that the time to perform the study would be approximately 18 to 21 months. In particular, the electric utility industry stated that the additional time may result in construction delays that would threaten the availability or price structure of electricity in certain areas.

In addition, some commenters stated that there may be no need for a study if highly protective technology such as closed-cycle cooling is proposed to be used by the permittee, especially if the facility is located on a large waterbody.

Some commenters suggested that the studies be required only if alternative requirements were requested and not if the strict technology-based requirements are adopted. One commenter questioned the need for reevaluating the baseline biological characterization for the next permit term.

In response to these comments, EPA has modified the baseline biological characterization requirements in the rule to allow for the use of existing data, both for the initial permit issuance and reissuance. In today's final rule, Track I specifies highly protective technology-based performance requirements and does not require a permit applicant to conduct monitoring prior to submitting an application. The applicant must gather existing information on the site and select design and construction technologies that will minimize impingement and entrainment and maximize impingement survival. Under Track II, the applicant must conduct a considerably more rigorous study if he or she seeks to demonstrate that alternatives to the Track I requirements will reduce the level of impingement mortality and entrainment to a level of reduction comparable to the level the facility would achieve if it met the Track I requirements at a site.

2. Cost of Source Water Baseline Biological Characterization

Numerous commenters stated not only that the proposed sample collection was time consuming but also that the analysis and identification of the samples of aquatic insects and ichthyoplankton were extremely labor intensive. Some commenters suggested that the studies be required only if alternative requirements were requested and not if the strict technology-based requirements were adopted.

Numerous commenters stated that existing qualitative information is already available on aquatic species at many sites located on major waterbodies. At these sites, little additional information would be provided by an additional year of sampling in the vicinity of a proposed cooling water intake structure. These commenters would like the Agency to prepare additional guidance as to when existing information would be appropriate. Another commenter questioned the acceptability of existing information that is more than 5 years old, because of changes in water quality, species composition, and other variables.

One commenter stated that the study should be tailored to the needs of the site. The commenter stated that some static or controlled environments might require a less rigorous study, while more complex and changing environments might require a more rigorous study to fully characterize the site. Other commenters stated that the requirements in the regulation were ambiguous.

Commenters were concerned that the costs estimated for the proposed rule, at an average of $32,000, were unrealistically low and that a more reasonable estimate might be $100,000. Some commenters stated that the estimate for a proper characterization study would be 10 times the original estimate. One commenter stated that the $32,000 may be low even for a paper study, stating that a simple study with the barest scope of work would cost in excess of $50,000 while impingement and entrainment monitoring would cost approximately $100,000–$150,000 per year.

Some commenters stated that the costs EPA estimated were too low in light of the accuracy that would be needed to determine whether significant adverse environmental impact exists and whether further mitigative measures or technologies must be used and that the characterization will also serve as the benchmark against which future performance is measured. One commenter stated that the accuracy needed would require stratified sampling.

Some commenters stated that the costs presented in the NODA for post-operational monitoring were still too low. They stated that at a minimum multi-species assessments for decisionmaking would cost approximately $50,000.

EPA believes that the post-operational monitoring cost is accurate. This cost was developed to reflect the extent of the monitoring required, which is noticeably less than previous 316(b) monitoring requirements. It is likely that the commenter is referring to these previous monitoring requirements when making comments as to the cost of these efforts. For example, previous studies may have required extensive impingement and entrainment monitoring and detailed taxonomic studies. The post operational monitoring required by this rule is expected to be less burdensome, requiring only monthly surveys for impingement and entrainment and possibly species identification. This level of effort is considerably less than the monitoring conducted under previous section 316(b) studies and is therefore less costly.

3. Impingement and Entrainment Monitoring

Some commenters requested that impingement and entrainment monitoring not be required if the strict technology-based requirements were adopted by a facility. They thought that installing the technology should be adequate to show compliance and to demonstrate that the objectives of section 316(b) had been met. Other commenters suggested that postoperational monitoring be implemented on a site-by-site basis *where there is evidence that* unanticipated potential impacts could occur or where habitat restoration has restored aquatic populations.

EPA disagrees with commenters who advocate no impingement and entrainment monitoring during the permit for permittees who opt to meet the Track I requirements. The Track I requirements for design through-screen velocity and for selecting and installing design and construction technologies that minimize impingement mortality and entrainment require the permittee to install and operate technologies that require periodic maintenance and operation in a prescribed manner. Periodic monitoring is appropriate. The permit director also must determine for each permit renewal whether additional design and construction technologies are necessary, and impingement and entrainment monitoring will provide information needed for this determination. See 125.89(a)(2).

H. Cost

1. Consideration of Facility Level Costs

EPA received comments on the proposal regarding its facility level cost estimates for the proposed requirements and a number of the regulatory alternatives. The issues addressed by commenters covered a range of topics, which EPA summarizes below.

Some commenters claim that EPA has not considered or addressed all environmental costs and impacts of the regulatory alternatives. The commenters state that EPA has not considered the operating efficiency losses of wet and dry cooling tower systems. They claim that both auxiliary power requirements and performance penalties may result in reductions in capacity and in the quantity of energy to end-users. The commenters state that replacing this power from other higher-cost sources will result in social costs for which EPA has not accounted. As a result of performance penalties, according to the commenters, the quantity of fuel required to generate the same quantity of energy increases. They add that recirculating cooling towers may result in the following additional environmental impacts, for which EPA has not accounted: visibility impacts from recirculating cooling towers, local climate change from wet cooling tower plumes, wildlife losses (e.g., birds colliding with towers), fish losses due to loss of heated aquatic plumes to over-wintering habitats, increased air emissions from sources replacing lost power, and increased impediments to waterway navigation due to icing in northern regions.

EPA initially responded by providing information in the NODA regarding this subject and outlined its intent to account for some additional costs in the final rule (66 *FR* 28866 and 28867). The cost estimates for the final rule include consideration of performance penalties and other environmental issues highlighted by the commenters. The final rule accounts for the "energy penalty" for facilities that are projected to install recirculating wet cooling tower systems in lieu of once-through cooling systems. EPA estimated marginal performance penalties, the costs to replace the lost power due to these penalties, and the increased air emissions of the penalties. Additionally, visibility impacts from cooling towers, local climate change from wet cooling tower plumes, wildlife losses (*e.g.*, birds colliding with towers), fish losses due to loss of heated aquatic plumes to support over-wintering habitats, and increased impediments to waterway navigation due to icing in northern regions are considered local impacts that can be addressed through the use of Track II or, in some cases, through design modifications of the recirculating wet cooling tower. EPA has provided costs for plume abatement (2 percent of the number of cooling towers) to address cooling tower emissions and considers the other impacts to be negligible and best addressed on a site-specific basis.

Some commenters criticize EPA's approach to estimating capital and operating costs of recirculating wet cooling towers. The commenters claim that EPA has significantly underestimated the costs of a recirculating wet cooling tower by considering only the cost of the cooling tower without the additional cost of other necessary cooling system equipment such as wiring, foundations, noise attenuation treatment, the cost of construction and other equipment. They claim also that EPA's estimates understate makeup water costs for wet cooling towers. The commenters add that EPA's cost multipliers for recirculating wet cooling towers are questionable and not consistent with a number of engineering texts. With respect to O&M costs, they question EPA's estimates for economies of scale. For dry cooling towers, the commenters object to EPA's methodology of making a direct cost comparison between dry cooling systems and wet cooling systems. They claim that EPA's approach for estimating capital and O&M costs for dry cooling towers is flawed because it relies on cooling water flow as the cost basis. In addition, they state that EPA does not provide cost equations or curves for dry cooling systems. One commenter claims that winterization costs of dry cooling systems were not considered by EPA and that EPA therefore has underestimated the system's costs.

EPA fully documented the bases for recirculating wet cooling tower cost estimates in the NODA (66 *FR* 22866 and 22867). EPA disagrees with many of the comments regarding flaws in estimating capital and operating costs for cooling towers. The *Technical Development Document* and comment response document discuss EPA's costing estimates and consideration of the variety of issues asserted by commenters, such as documentation of equipment costs, foundations, noise attenuation, and the cost of construction. EPA has also considered the comments regarding makeup water costs. The estimates of costs for this rule reflect a realistic and accurate basis for makeup water usage in wet cooling towers. These issues are discussed further in Chapter 2 of the *Technical Development Document*. With respect to EPA's estimates of O&M economies of scale, EPA revised its estimates based on comments received and further analysis. EPA conducted a thorough review of its data and the public comments. Although the comments did not persuasively describe errors in EPA's economies of scale estimates, they did prompt EPA to reconsider the concept. EPA's further research revealed that there are economies of scale associated with certain components of O&M, but that use of economies of scale for total O&M costs would not be appropriate. As such, EPA's estimates for operation and maintenance costs for wet cooling towers have been refined to reflect no economies of scale. See Chapter 2 of the *Technical Development Document* for further discussion.

In the NODA, EPA included further documentation to support its estimates of the costs of dry cooling systems (both for capital and O&M components). Despite the comments received expressing concern over the methodology employed by EPA to estimate the costs, EPA continues to view its empirical models as robust, accurate, and well suited for the purposes of the final rule. EPA acknowledges that basing cost curves for dry cooling systems on cooling flow is unconventional. However, the model is based on empirical data and accurately estimates the costs of dry cooling systems. Regarding the subject of winterization, EPA's costs inherently include this technological aspect as it is an incorporated design feature in modern dry cooling systems upon which the empirical models are correlated. See Chapter 4 of the *Technical Development Document* for further information regarding EPA's costing methodology for dry cooling.

One commenter questions EPA's estimates regarding the "design approach value" used in plant cooling systems. The commenter recommends that EPA adopt an approach value of 8°F instead of 10°F. The commenter claims that EPA has understated the size of the cooling towers with its approach value estimate. EPA provided significant documentation in the NODA regarding its estimates of cooling system design approach values. Specifically, data demonstrate that a 10 degree design approach for a wet cooling tower is acceptable industry practice. Chapter 3 of the *Technical Development Document* discusses this subject further and presents EPA's supporting data.

Comments from manufacturers express concern over potential energy losses due to abandoning the use of waste heat for process water heating. They expressed concern that the proposed rule would discourage the practice of process and cooling water reuse. The commenters assert that if these potential energy loss costs were added to the other costs of the proposed rule, that the total cost could be substantially higher, possibly by several million dollars. Thus, the commenters state, the proposed rule could pose a significant and perhaps insurmountable hurdle for construction of new manufacturing facilities. EPA considered these comments and is adopting a definition of cooling water for the final rule (see § 125.83) that addresses these concerns. At § 125.86(b)(1)(ii), EPA also specifies that the amount of water withdrawn for cooling purposes that is reused or recycled in subsequent industrial processes is equivalent to closed-cycle recirculating cooling water for the purposes of meeting the Track I capacity-reduction, requirements at § 125.84(b)(1). However, the amount of cooling water that is not reused or recycled must be minimized. Therefore, the commenters' concerns that costs could be substantially higher, possibly by several million dollars have been addressed in the final rule.

Further, some commenters claim that EPA has not considered the costs of a sufficient number of regulatory alternatives or alternative technologies. EPA included, in Section VIII of this preamble and the *Economic Analysis* (Chapter 10), cost information on the range of regulatory alternatives considered for the final rule.

One commenter on the NODA described the costs associated with potential delays in permit approvals. The commenter stated that should permitting delays extend the construction period, the associated costs would accumulate at a monthly rate associated with the finance costs associated with down-payments on equipment, the lost income from sales of electricity, and the cost of purchasing replacement power. For regulatory alternatives that have projected permitting delay, EPA has incorporated the commenter's suggestion to the extent possible. For the final rule, EPA is basing the regulatory option on a two-track compliance option that, under the "fast track," has no associated delay in permitting. In addition, EPA has not accounted for cost savings of the rule over the current, resource intensive, case-by-case regulatory approach. In that sense, the final rule overestimates compliance costs.

Another commenter to the NODA provided a case-study example for converting the Indian Point Units 2 and 3 to closed-cycle cooling water systems or dry cooling systems. The results show a small cost impact for closed-cycle cooling water systems and a modest cost impact for dry cooling, according to the commenter. In terms of the cost for producing power, the incremental cost for the installation and use of a closed-cycle cooling water system, according to the commenter's analysis is 0.01 to 0.03 cents per kWh. The commenter's analysis shows incremental costs for the installation and use of a hybrid cooling system between 0.14 and 0.19 cents per kWh and 0.21 to 0.27 cents per kWh for dry cooling. EPA evaluated the case-study analysis presented by the commenter for this retrofit situation and finds the costs to be relatively applicable (as the costing analysis was based on EPA's proposal cost estimates, EPA notes that some costing methodology revisions are not reflected in the commenter's analysis). EPA disagrees with several cost-related estimates made in the commenter's analysis, and therefore determines that the cost impacts of dry cooling technologies on the price of electricity is somewhat understated. See response to comment document for further discussion of this case-study analysis and EPA's technical review of the study.

2. Need For More Complete Assessment

A number of industry respondents criticized the economic analysis supporting the rule arguing that it has underestimated the cost of the proposal. Several comments noted that the technology cost, along with the baseline biological characterization, has been underestimated. A few comments asserted that EPA has not considered additional alternatives in selecting the preferred option to comply with requirements of the Executive Order 12866. Industry commenters noted that EPA has not selected the best technology available on a cost-benefit basis. Commenters also noted that the environmental cost of the technologies has not been reflected in the *Economic Analysis*. EPA recognizes that it selected best technology available for minimizing adverse environmental impact on the basis of what it determined to be an economically practicable cost for the industry as a whole. EPA did this by considering the cost of the rule as compared with the revenue of a facility, as well as the cost compared to the overall construction costs for a new facility. This approach is analogous to the economic achievability analyses it conducts for other technology-based rules under sections 301 and 306 of the CWA which use very similar language to section 316(b) and to which section 316(b) refers, and is consistent with the legislative history of section 316(b) of the CWA. At the same time, the record does contain analysis of the costs for a number of the regulatory alternatives considered under the rule.

After reviewing these comments, EPA has revised the *Economic Analysis*. As discussed in the NODA, EPA has gathered additional cost information to verify its cost estimates. It has collected additional information on benefit or the efficacy of the technologies used in the costing exercise. EPA has used more recent forecasts to estimate the number of electric generation facilities. The energy penalty associated with certain technology options, which was not included in the economic analysis for the proposal, has been included in the final economic analysis. EPA considered the costs for a number of alternatives to the requirements in today's final rule.

3. Accuracy of the Estimates

A number of commenters questioned the accuracy of the cost estimates. One commenter (Electric Power Supply Association) stated that EPA's estimates of the cost of the rule are based on several critical and arguable assumptions: (1) The rate of new facility development in the coming years, (2) the proportion of new facilities that would employ cooling water intake structures, (3) the costs of adopting one technology versus another, and (4) the cost of scientific and engineering studies. The combined effect of these assumptions, it is claimed, is that EPA underestimated the cost of the rule by as much as one-hundred-fold. Another commenter claimed that the cost of the rule would be more than five times higher than the EPA's estimates. The Utility Water Act Group (UWAG) estimated the cost of installing a cooling tower alone at $6,366.7 million for recirculating wet cooling towers and $11,245.3 million for dry cooling, assuming 100 percent of the combined-cycle facilities would be required to install towers.

EPA considers these estimates to be unreasonable. After careful review of comments received and additional analyses, EPA estimates the annualized compliance cost of the final rule to be $47.7 million. This cost estimate includes a revised forecast for new electric generation capacity, a revised technology baseline for regulated facilities, a revised estimate of the number of regulated manufacturing facilities, and inclusion of costs for a comprehensive demonstration study in Track II. The example costs presented by UWAG were, as described by the commenter, not directly comparable to EPA's cost estimates. The commenter included a significant equipment cost in its analysis—that of the steam condenser—that clearly is not applicable to the incremental costs of this rule, as all new facilities would install a steam condenser regardless of this rule. In addition, several estimates for design variables differ from those used by EPA and significantly bias the capital and operation and maintenance costs upward. EPA analyzes and discusses the UWAG example for costs in the response to comment document.

4. Energy Supply

Some industry respondents, including the Utility Water Act Group, argued that the section 316(b) proposal would be a significant threat to the national energy supply, would prohibit location of new power plants in most places, and would serve as a barrier to entry in the electric generation market. EPA disagrees with these assertions based on the siting impact analysis discussed at Section V.B.2., the relatively low cost of the rule as a proportion of revenues (as discussed in Section VIII), and the energy impact analysis described in Section X.J.

Some of the commenters stated or implied that the cost of the rule would have a significant impact on meeting growth in energy demand. EPA disagrees with this assertion because the compliance cost of the final rule is an insignificant component of not only new facility revenue but also the construction cost of a new plant. Thus, the cost of the rule is too small to affect the electric generation market. The cost of the final rule is so low primarily because 93 percent of the projected new in-scope combined-cycle facilities, which are responsible for most of the new electric generation capacity, have already planned to install recirculating wet cooling towers in the baseline. Therefore, they will incur, in addition to permit application cost, only a cost associated with selecting and implementing a design and construction technology such as a wedgewire screen or a fish return system on a traveling screen. In addition, estimates show that most new in-scope coal facilities also plan to install cooling towers independently of this rule. Thus, the rule requirements will not have any significant effect on the energy supply. Had EPA chosen dry cooling technology as the best technology available for minimizing adverse environmental impact, the energy impact would have been significant (i.e., upwards of 0.51 percent reduction (1,904 MW) of the projected new generating capacity).

Commenters asserted that the requirements of the rule could adversely affect the reliability of the electric power system, potentially increasing the risk of brownouts or blackouts or a curtailment of load provided to a particular user. EPA disagrees with this assertion. While Track I requirements (for facilities with intake flows equal to or greater than10 MGD) to reduce capacity commensurate with the use of a closed-cycle, recirculating cooling system and to select and install design and construction technologies would result in an additional use of electric power at a power plant not already planning to use these technologies, the magnitude of the electric use compared with total electric supply at the national level is negligible (approximately 0.03 percent (100 MW) of projected new capacity). Only four coal-fired and five combined-cycle plants are projected to install recirculating wet cooling towers because of the rule. Moreover, the magnitude of electricity required in the operation of design and construction technologies, such as a fish return system, is very small. Finally, future facilities are not necessarily required to install cooling towers; under Track II they have an option to conduct site-specific studies and seek to demonstrate that other technologies will reduce impacts to fish and shellfish to a level comparable to the level that would be achieved at their site with the Track I requirements for intake capacity and velocity. Thus, the efficiency issue associated with the recirculating wet cooling towers, raised in some comments, overemphasizes the effect on the power supply at the national level. Similarly, EPA does not believe that other requirements of the rule, such as the velocity limit and proportional flow requirements, will adversely affect efficiency at power plants. The Track I velocity requirements of the rule can be met by design changes including enlarging the opening of the cooling water intake structure and screens without reducing the flow and hence without influencing the cooling efficiency. The proportional flow limits in the rule would also be largely met by power plants without any discernible impact on their efficiency or net energy supply. As discussed in section V.B.1.c. above, EPA found that most existing facilities meet these requirements. The proportional limitation can be met during design by siting on an alternative waterbody or by choosing alternative technologies, for example. Additionally, see Section V.B.1. for a discussion of proportional flow limits.

Commenters expressed concern that the regulatory requirements would result in delays in the construction of the new power plants, thus affecting the power supply and electricity prices. However, under Track I in the final rule, facilities can build a power plant without any required pre-permit monitoring.

Some industry commenters asserted that the requirements of the rule could be a hindrance to cogeneration. EPA disagrees with this conclusion. Contrary to the assertion, Track I in the final rule provides incentives for cogeneration because it considers reuse of cooling water as process water and vice versa as equivalent to recirculation. Thus, a cogeneration facility can reuse cooling water as process water or vice versa and eliminate the need to install a recirculating wet cooling tower to save costs or reduce the size of any tower needed to meet the Track I intake capacity requirement.

5. Forecast for New Utility and Nonutility Electric Generators

Most comments on the forecast of new utility and nonutility electric generators claimed that EPA underestimated the number of new generators in scope of the proposed section 316(b) new facility rule. Commenters cited several reasons for the alleged underestimate: (1) The use of an incomplete, outdated, or biased database as the basis of the estimate; (2) an underestimation of the number of facilities that will operate a CWIS; (3) an underestimation of the size of new facilities; and (4) the use of new capacity forecasts that are based on conservative assumptions regarding anticipated growth in demand for electricity. Two commenters claimed that the underestimation may be five-fold. Commenters also suggested that EPA underestimated the intake flow of regulated (in scope) facilities and the number of new generators that will use a once-through cooling system. One commenter claimed that the proposed section 316(b) new facility rule would cause additional delays in bringing new electricity supply on line.

EPA used the most current and complete data available at the time to develop the projected number of new electric generators. To address the above comments, EPA updated and expanded its research as new data have become available. In support of the final section 316(b) new facility rule, EPA used the February 2001 version of the NEWGen database. Compared to the January 2000 NEWGen database used for proposal, the newer version contains more than twice the number of new projects (941 compared to 466). EPA researched more than three times as many greenfield combined-cycle facilities (320 compared to 94) and obtained cooling water source information on almost four times the number of facilities (199 compared to 56). While EPA recognizes the fast pace of changes in the electricity generation industry, EPA believes that the substantial increase in the number of greenfield electric generators analyzed will address concerns commenters had voiced. In addition, the much larger number of facilities identified as being in scope of the final section 316(b) new facility rule (57 compared to seven) will provide a more robust and representative basis for estimating the characteristics (including size and cooling system type) and costs of new greenfield generators. Finally, EPA is using the Department of Energy's (DOE) updated Annual Energy Outlook 2001 as the basis for its total new capacity forecast. The 2001 Outlook is based on higher economic growth (in the reference case, 3.0 percent) and electricity demand (in the reference case, 1.8 percent) compared to the Annual Energy Outlook 2000 (2.2 percent and 1.4 percent, respectively). It should be noted that, for both the proposed and the final section 316(b) new facility rule, EPA's projection of new electric generators is based on forecasts made by the DOE's Energy Information Administration (EIA), not forecasts made by EPA.

6. Forecast for New Manufacturers

EPA received few comments on the number of new manufacturers estimated for the proposed rule. One main concern was that the proposed regulations could adversely impact offshore and coastal oil and gas drilling operations. At proposal, EPA had not considered or projected impacts on this industrial category. Among other concerns, these commenters stated that: (1) offshore and coastal oil and gas drilling facilities have much more limited technology options for addressing any adverse environmental impact of cooling water intake than land-based facilities; (2) under current regulations (40 CFR 435.11), existing mobile oil and gas extraction facilities are considered new sources when they operate on new development wells and could be required to perform costly retrofits in order to comply with the 0.5 fps velocity requirement if they become subject to the proposed requirements for cooling water intake structures at new facilities; and (3) higher cooling water intake velocities are necessary in marine waters to control biofouling of cooling water intake structures.

EPA also received comments suggesting that certain industry segments should be exempted from the final section 316(b) new facility rule. One commenter claimed that EPA intended to exclude the wood products segment of the forest products industry from the proposed section 316(b) new facility rule because the proposal analysis did not explicitly analyze this segment. This commenter suggested this segment should be exempted because facilities generally use little water. Another commenter claimed that EPA has overestimated the number of new greenfield chemical facilities. This commenter stated that the actual number of new chemical facilities is very low and that therefore, according to OMB guidelines, regulation of that industry segment is not justified.

In response to these industry comments, EPA will propose and take final action on regulations for new offshore and coastal oil and gas facilities, as defined at 40 CFR 435.10 and 40 CFR 435.40, in the Phase III section 316(b) rule. EPA is deferring regulation of these facilities due to the unique engineering, cost, and economic issues associated with offshore and coastal drilling rigs, ships, and platforms. EPA will not categorically exempt new facilities in those land-based industry segments from the final section 316(b) new facility rule for any of the reasons suggested by commenters. EPA analyzed those industries that are most likely to experience adverse industry-level economic effects, based on their large-volume cooling water use. Any facility that meets the in-scope requirements set forth in § 125.81 will have to comply with the rule, irrespective of the number of in scope facilities in that segment, the industry's general cooling water characteristics, or whether the industry segment was explicitly analyzed in the proposal analysis. Should facilities in these other industrial categories face compliance costs wholly disproportionate to those EPA considered and found to be economically practicable in today's economic analysis, they can seek alternative requirements in accordance with the provisions at § 125.85.

I. Benefits

1. Cooling Water Intake Structure Impact Analysis Component of the Benefits Analysis for the Proposed Section 316(b) New Sources Rule

Comments related to EPA's cooling water intake structure impact analysis in Chapter 11 of the new sources EEA were received from two industry commenters. The comments focused on four main topics: (1) Potential population-level consequences of impingement and entrainment, (2) potential compensatory responses of fish populations to mortality of early life stages, (3) potential impingement and entrainment survival, and (4) species and habitats that may be particularly sensitive to cooling water intake structure impacts.

Both commenters argued that EPA should have evaluated the impingement and entrainment numbers presented in Chapter 11 of the EEA in relation to the total population of affected species, and one commenter commissioned a fisheries scientist to conduct such an analysis. EPA believes that a population-level analysis of the data presented in Chapter 11 is inappropriate for several reasons. First, as stated by EPA in its presentation of the data in Chapter 11, the purpose of the data compilation was to provide information on the relative magnitude of impingement and entrainment, not to evaluate potential secondary effects on the affected populations. Thus, EPA did not attempt to assemble the other types of data that the commenter noted would be required to evaluate potential effects of these losses on the populations of affected species. Such data include survival rates of early life stages, growth rates, reproductive rates, population size at the time of impingement and entrainment, and potential carrying capacity of the population in the surrounding waterbody. EPA notes that in most cases the studies that EPA examined did not provide such data.

EPA also notes that the data uncertainties and potential biases associated with the impingement and entrainment data presented in Chapter 11 of the *Economic Analysis* (discussed by EPA in Section 11.2) should be taken into account in any analysis of the data, including evaluation of potential population-level effects. As EPA noted in Chapter 11, there is insufficient information in many of the source documents to determine how impingement and entrainment estimates may have been influenced by choices of which species to study, differences in collection and analytical methods among studies or across years, or changes in a facility over time. EPA is concerned that the consequences of such data uncertainties and biases are even greater for population-level analyses than they are for an analysis of individuals. As EPA noted, the data are not a statistical sample; therefore, "the data should be viewed only as general indicators of the potential range of impingement and entrainment losses." As one of the commenters acknowledges, "EPA's estimates were used primarily to understand the relative proportion of different species impinged and entrained."

Both commenters argued that analyses involving long-term predictions of fish populations must include estimates of potential density-dependence (compensation). Again, EPA wishes to emphasize that the data presented in Chapter 11 were not intended for a population-level analysis and are not suitable for such an evaluation. Thus, the argument that compensation must be considered is irrelevant in the context of EPA's EEA.

One of commenters argued that the annual impingement and entrainment rates summarized by EPA do not equate to harm or losses of organisms, because many organisms survive impingement and entrainment. While some organisms may survive impingement and entrainment, the reliability of estimated entrainment mortality rates has been questioned because of various measurement uncertainties and sources of potential bias. [91] Even if the results of existing studies are accepted, the data indicate that under normal operating conditions entrainment mortality can be quite high for many species. Depending on temperature conditions within the intake and the life stage involved, studies of Hudson River species found that entrainment mortality ranged from 93 to 100 percent for bay anchovy, 0 to 64 percent for Atlantic tomcod, 57 to 92 percent for herrings, 41 to 55 percent for white perch, and 18 to 55 percent for striped bass. [92] A recent industry-sponsored review of 36 entrainment survival studies found that anchovies and herrings have the highest entrainment mortality, generally in excess of 75 percent. [93]

The two commenters disagreed with EPA's conclusion that the littoral zone is a more sensitive area. EPA is no longer including consideration of the littoral zone in its final rule. See discussion in Section VI.C.

One commenter objected that EPA did not provide the original worksheets used by EPA to compile the impingement and entrainment data provided in Chapter 11 of the EEA, arguing that this would have facilitated an independent analysis by making it easier to "quickly identify the studies used." However, EPA notes that all data sources are provided in footnotes to the tables and full citations are provided in the references section at the end of Chapter 11. The methods used to compile and summarize these data are

[91] Boreman, J., L.W. Barnthouse, D.S. Vaughan, C.P. Goodyear, S.W. Christensen, K.D. Kumar, B.L. Kirk, and W. Van Winkle. 1982. The Impact of Entrainment and Impingement on Fish Populations in the Hudson River Estuary: Volume I, Entrainment Impact Estimates for Six Fish Populations Inhabiting the Hudson River Estuary. Prepared for the U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research by the Oak Ridge National Laboratory. ORNL/NUREG/TM–385/VI.

[92] Boreman, J., L.W. Barnthouse, D.S. Vaughan, C.P. Goodyear, S.W. Christensen, K.D. Kumar, B.L. Kirk, and W. Van Winkle. 1982. the Impact of Entrainment and Impingement on Fish Populations in the Hudson River Estuary: Volume I, Entrainment Impact Estimates for Six Fish Populations Inhabiting the Hudson River Estuary. Prepared for the U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research by the Oak Ridge National Laboratory. ORNL/NUREG/TM–385/VI.

[93] Electric Power Research Institute. Review of Entrainment Survival Studies: 1970–2000. Prepared by EA Engineering Science & Technology. December 2000.

provided in Section 11.2 of the chapter, along with a discussion of data uncertainties and potential biases.

Another technical issue raised by this commenter concerned the waterbody classification of two of the facilities in EPA's impingement and entrainment tables. For the waterbody classifications, EPA relied on the industry's 1995 Utility Data Institute database because results from EPA's section 316(b) industry survey were not yet available. This database indicated "river" for the waterbody type on which the intakes of Hudson River facilities are located. EPA agrees with the commenter that this is misleading, since the portion of the Hudson River where the intakes are located is a tidal river. For analysis supporting today's final rule, facility categorization for all facilities is based on the plant's response to the question on waterbody type in the Agency's section 316(b) industry survey administered for the existing facility rule. EPA has revised its data tables to place data from studies on Hudson River facilities under the "estuary and tidal river" classification. Similarly, EPA agrees with the commenter that although the intake of the Monroe plant is on the Raisin River, the facility is more appropriately classified as a Great Lakes facility because of the fish species involved. EPA has therefore revised its tables so that impingement and entrainment data for this facility are now included with data for the Great Lakes. However, as noted above, the final rule does not distinguish among waterbody types, so such classifications do not have a direct effect on the final regulations.

2. Responses to Comments on the Economic Valuation Components of the Benefits Analysis for the Proposed Section 316(b) New Sources Rule

The comments on the new sources benefits analysis (economic component) were all fairly generic in their statements and fairly consistent in their arguments. The main thrust throughout most of the relevant comments was to point out that the Agency had not developed a quantitative benefits analysis and, as such, it had failed to conform to its own guidance and the requirements of Executive Order 12866. Some comments noted that the benefits analysis did not generate relevant quantitative information that could be used to facilitate an informative comparison of benefits and costs, and several comments encouraged EPA to complete its benefits analysis. Industry comments have also repeatedly pointed out that the Agency should perform a site-specific benefits analysis. In addition, several of the comments addressed aspects of how a benefits analysis should be performed. Specifically, comments described (1) what the steps of benefits analysis need to be (identify, quantify, and then value benefits), (2) the use of best practices in applying "benefits transfer" techniques for developing plausible monetary values to apply, and (3) the need to properly consider baseline conditions.

As clearly noted and acknowledged in Chapter 11 of the EEA, "EPA was unable to conduct a detailed, quantitative analysis of the proposed rule because much of the information needed to quantify and value potential reductions in impingement and entrainment at new facilities was unavailable" (EEA, p. 11–1). The chapter then proceeds to detail the types of information that would be required to do the analysis for new sources (the chapter also offers some examples using available data to illustrate potential benefits based on site-specific studies of some existing facilities.)

The comments received are accurate in the sense that they point out what the Agency acknowledges at the outset, namely, that a quantitative benefits analysis was not feasible for the proposed rule for new facilities. The comments received, however, do not offer data or methods that would enable the Agency to overcome these constraints. In fact, a main thrust of industry's comments has been that the Agency is required to do a site-specific benefits analysis, given the site-specific nature of a benefits analysis.

Because the gaps still exist in the types of information required to conduct a more comprehensive benefits analysis, the Agency has been unable to appreciably expand upon the economic portions of its benefits analysis for today's final rule. However, EPA is developing a more comprehensive assessment of benefits for its upcoming rulemaking for existing facilities, because some of the key data limitations can be more readily overcome when baseline conditions for the facilities and the impacted aquatic ecosystems can be identified and studied (these perspectives are not available for new sources with unknown locations).

Finally, EPA notes that the Agency's Guidelines for Preparing Economic Analysis are, as the title states, "guidelines" and not strict requirements. Consistent with these guidelines and standard professional best practices, it is the Agency's intent to develop economic analyses that are as complete and reliable as is feasible for its rulemakings. However, it is neither required nor prudent for EPA to develop empirical estimates of benefits where data limitations or other critical constraints preclude doing so in a credible and reliable manner.

3. Comments on the Relevance and Estimation of Nonuse Values

Two comments were received that questioned the applicability of nonuse benefits to the section 316(b) rulemaking and critiqued EPA's discussion of how such nonuse values might be estimated based on existing literature.

These comments point out that the issue of nonuse values (also known in some literature as "passive use" values) has sometimes been controversial, which the Agency recognizes. Further, the comments accurately note that there are limited methods available for measuring nonuse values, and that the accuracy of these methods can be debated because there are no observable market transactions or other ways to infer values by using the revealed preferences of the American people.

EPA recognizes that challenges associated with the estimation of nonuse values have been widely discussed in the economics literature as well as in the context of regulatory analysis and damage case litigation. However, consistent with the broadly accepted view in the economics profession, the Agency believes that nonuse values are likely to exist and apply for many (if not all) of the beneficial ecological outcomes that stem from EPA regulatory actions, including enhancements to aquatic systems as can be anticipated from the proposed section 316(b) rulemaking. There is no convincing evidence to suggest that nonuse values strictly apply to only a small set of environmental resources or only to irreversible changes in the condition of those resources. Further, even if nonuse values were thought to apply only under limited circumstances, the proposed section 316(b) rule is likely to have beneficial impacts on species and resources of concern (*e.g.*, threatened or endangered fish species) and thereby meet even a narrowly defined applicability test.

EPA agrees with the comments in terms of recognizing that there are no clear preference methods available for estimating nonuse values. Nonetheless, there are a number of stated preference methods that can be and have been successfully applied to develop credible estimates of nonuse values. Research using some of the early applications of the contingent valuation method (CVM, which is one type of stated preference method that has been applied by economists for nonuse value estimation) indicated that nonuse estimates derived from inadequately designed CVM survey instruments may not be wholly reliable. Nonetheless, the body of research on stated preferences that has evolved over the past several years provides a broadening array of tools and methodological refinements that overcome many of the limitations inherent in some of the earlier applications of contingent valuation methods. EPA believes that well-designed, fully tested, and properly implemented stated preference approaches can provide useful and credible measures of nonuse values.

EPA would like to engage in a large-scale primary research effort to develop and apply state-of-the-art stated preference methods to the issue of estimating nonuse values for the ecological outcomes anticipated from section 316(b) regulatory options. However, the Agency lacks the budgetary resources, time, and appropriate authorities to pursue such research. Accordingly, the EEA discusses the viable alternative approach. Chapter 11 presents two types of benefits transfer approaches that the Agency has relied upon in past regulatory analyses and describes the findings of studies used in these exercises. While no estimates of nonuse benefits are made in the EEA, the discussion provided by the Agency establishes the appropriate concepts, approaches, and caveats that would be associated with the benefits transfer approach that would need to be used if the Agency were to develop such estimates.

J. Engineering and Economic Analysis Limitations

Some commenters argued that the industry profiles presented in the proposed rule were inaccurate. One commenter noted that, in particular, the pulp and paper industry has changed substantially since the early 1990's, the time period upon which EPA industry profile assumptions are based.

EPA's economic analysis is based on the forecasts for new facilities. To the extent that forecasts are uncertain, the estimates for costs are uncertain. The economic analysis is based on the 20-year forecast, while the life of the facility is assumed to be 30 years for annualizing costs. Facility life spans could differ from the 30-year life span, and as a result the annualized cost to these facilities could also differ. To estimate the number of new facilities for the chemical sector, EPA assumed, on the basis of comments that the estimate of 50 percent used at proposal was too high, that 25 percent of growth in product demand would be met from the new facilities. However, data were not readily available to verify this assumption. As a sensitivity analysis, EPA also calculated costs by assuming that 37.5 percent of the growth in new capacity in the chemicals sectors would occur at new facilities. In addition, for manufacturing facilities, EPA used the growth rates projected for three to five years to forecast growth over the 20-year time period.

In estimating costs, EPA assumed that new manufacturing facilities that would become operational over the 20-year period would be uniformly distributed over time. Actual growth could differ from this predicted pattern. The economic analysis is based on five major industry groups that account for the vast majority of cooling water withdrawal in the U.S. Some facilities in other industries may withdraw cooling water in excess of 2 MGD and may incur some costs to comply with the requirements of the rule. Such costs are not reflected in the economic analysis because of lack of reliable and readily available data. To the extent that facilities in other industries are affected, EPA believes that the costs and economic impacts would be similar to those considered by EPA and found to be economically practicable.

Numerous commenters argued that the cost estimates in the economic analysis are inaccurate, resulting in the underestimation of the total cost of the rule. Commenters disagreed with the cost analysis for many aspects of the rule, including but not limited to monitoring, operations and maintenance, contingency costs, and capital costs.

To the extent possible, EPA used information on the specific characteristics of planned new plants for which information is available to project the baseline characteristics of facilities affected by the rule.

Some commenters questioned the applicability and appropriateness of the economic analysis in relation to new (greenfield) facilities and existing facilities.

The estimates do not cover substantial modification of existing facilities. These facilities are not covered by the rule; hence, estimates for these facilities are not reflected in this analysis.

K. EPA Authority

Numerous commenters raised issues with regard to EPA's authority to implement section 316(b) in the proposed new facility rule. Commenters asserted that EPA's authority is limited to regulating CWISs and that by regulating dynamic flow, EPA is actually placing operational restrictions on the cooling system which in their view, are not part of a CWIS. Further, they argue that Congress did not give EPA authority to decide how much water a facility should withdraw, and thus, EPA may not regulate the gallons per day withdrawn, but must be limited to regulating physical and behavioral barriers located at the interface between the intake structure and the water body and separation and removal processes located between the point of withdrawal and the cooling water pumps. By these definitions, supply pumps and all other elements of the cooling water system are not intake structure technologies. Thus, commenters asserted EPA has no legal authority to require wet cooling or dry cooling.

In response, EPA emphasizes that it is not requiring wet cooling, but that it is establishing performance-based technology requirements on the dynamic flow of the cooling water intake structure that reduce impingement and entrainment at a level that is achieved by using closed-cycle cooling. Section 316(b) authorizes EPA to impose limitations on the location, design, construction and capacity of CWISs. EPA interprets the statute to authorize it to regulate that volume of the flow of water withdrawn through a cooling water intake structure as a means of addressing "capacity." *In re Brunswick Steam Electric Plant*, Decision of the General Counsel No. 41 (June 1, 1976). Such limitations on the volume of flow are consistent with the dictionary definition of "capacity"[94], the legislative history of the Clean Water Act[95], and the 1976 regulations.[96] *Id.* Indeed, as Decision of the General Counsel No. 41 points out, the major environmental impacts of cooling water intake structures are those affecting aquatic organisms living in the volumes of water withdrawn through the intake structure. Therefore, regulation of the volume of the flow of water withdrawn also advances the objectives of section 316(b).

Commenters also stated that EPA's proposed proportional flow withdrawal requirements lack a legal foundation since the references to location and capacity in section 316(b) refer to the CWIS itself, not the whole cooling system, and Congress did not authorize

[94] "Cubic contents; volume; that which can be contained." Random House Dictionary of the English Language, cited in Decision of the General Counsel No. 41.

[95] Legislative History of the Water Pollution Control Act Amendments of 1972, 93d Cong., 1st Sess., at 196–7 (1973).

[96] 40 CFR 402.11(c) (definition of "capacity"), 41 *FR* 17390 (April 26, 1976).

EPA to limit the siting of new facilities that use cooling water. To the extent that new facilities comply with this requirement by employing a wet cooling system or by obtaining water from other sources, EPA believes that this is within EPA's authority to regulate capacity, as stated above. Because the major environmental impacts of cooling water intake structures are those affecting aquatic organisms living in the volumes of water withdrawn through the intake structure, in the limited circumstances where the volume of water withdrawn would exceed the proportional flow requirements and the facility would need to locate elsewhere to meet the requirement, EPA believes this regulation of location also advances the objectives of section 316(b).

Some commenters argued that section 316(b) is no more stringent than section 316(a) and thus section 316(b) compels EPA to interpret "adverse environmental impact" as an impact with a demonstrated impact on a "balanced indigenous population." EPA does not agree that the CWA compels EPA to interpret "adverse environmental impact" as that term is used in section 316(b) in the Act by reference to the phrase "balanced indigenous population" under section 316(a). The CWA is silent with respect to what is meant by "adverse environmental impact" under section 316(b), whereas the CWA specifically mentions "balanced indigenous population" as a variance under section 316(a). The main guiding principles for statutory interpretations were articulated in *Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 838, 843 (1984). There the court stated, if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute. The court need not conclude that the agency construction was the only one it permissibly could have adopted to uphold the construction, or even the reading the court would have reached if the question initially had arisen in a judicial proceeding. Thus, if a statute is ambiguous and an agency's interpretation of the statute is reasonable, a court must defer to the agency. Here, EPA's interpretation of the statute is reasonable and furthers the purposes of the CWA. This interpretation is further supported because Congress used different terms in section 316(b) than it used in section 316(a). Congress did not refer to a "balanced indigenous population" in section 316(b) of the CWA. Where Congress includes particular language in one section of a statute, but omits it in another section of the same act, it is generally presumed that Congress acted intentionally and purposely in the disparate inclusion or exclusion. *Bates v. U.S.*, 522 U.S. 23 (1997). *See also Florida Public Telecommunications Ass'n, Inc. v. F.C.C.*, 54 F.3d 857 (D.C. Cir. 1995). Further, section 316(a) and section 316(b) address two different issues. Section 316(a) addresses the discharge of heated water while section 316(b) address the withdrawal of huge volumes of water. Thus, it is reasonable to view the two different sections of the statute as addressing different environmental problems in different ways. *In re Brunswick Steam Electric Plant*, Decision of the General Counsel No. 41 (June 1, 1976). For purposes of implementing section 316(b) in the new facility rule, EPA thinks it is reasonable to interpret the phrase adverse environmental impacts as including a range of impacts, including impingement and entrainment, diminishment of compensatory reserve, stresses to the population or ecosystem, harm to threatened or endangered species, impairment of state water quality standards, see Section V, above.

Some commenters stated that section 316(b), which focuses on intakes, not discharges, does not authorize EPA to establish a rule authorizing States to set additional cooling water intake structure requirements to meet state water quality standards. EPA addresses this issue in Section V.B. above.

L. Restoration

In the proposed rule EPA requested comments on a variety of mandatory, discretionary, and voluntary regulatory approaches involving restoration measures (65 *FR* 49089). Many commenters supported a role for restoration or mitigation. These commenters stated that restoration is a well-accepted concept that should have a voluntary role in section 316(b) determinations and constitutes an appropriate means for sources to reduce the potential for causing adverse environmental impact to below the level of regulatory concern, or reduced regulatory concern. Commenters further stated that restoration should not be. mandatory and that EPA lacks authority to require it but should not preclude restoration measures from playing an important role in section 316(b) permitting decisions. These same commenters stated that restoration should not be considered the best technology available for minimizing adverse environmental impact because it is not a technology that addresses the location, design, construction, or capacity of a cooling water intake structure.

Other commenters strongly opposed restoration measures as substitute for direct controls, arguing that they are not the "best technology available for minimizing adverse environmental impact," but the commenters thought restoration measures may have a role in compensating for past harms to the aquatic environment or as an additional consideration above the protections offered by direct controls. Another commenter added that restoration measures, in the context of section 316(b), are generally unworkable and that the only measurable restoration method would be offsetting, in which an applicant would stop use of an older intake facility that does more harm than the proposed one.

Some commenters also stated that restoration should be included in permitting considerations when it is determined that dry cooling is not feasible. In this case, the facility should use a wet closed-cycle recirculating system and restoration should be considered. These commenters also suggested that, if restoration is allowed, there should be consultation with other State and Federal resource agencies to avoid inconsistent approaches. Finally, commenters stated that section 316(b) does not authorize mandatory restoration.

Today's final rule for new facilities includes restoration measures as part of Track II. EPA is not including restoration in Track I because this track is intended to be expeditious and provide certainty for the regulated community and a streamlined review process for the permitting authority. To do this for new facilities, EPA has defined the best technology available for minimizing adverse environmental impact in terms of reduction of impingement and entrainment, an objective measure of environmental performance. By contrast, restoration measures in general require complex and lengthy planning, implementation, and evaluation of the effects of the measures on the populations of aquatic organisms or the ecosystem as a whole.

EPA is including restoration measures in Track II to the extent that the Director determines that the measures taken will maintain the fish and shellfish in the waterbody in a manner that represents performance comparable to that achieved in Track I. Applicants in Track II need not undertake restoration measures, but they may choose to undertake such measures. Thus, to the extent that such measures achieve performance comparable to that achieved in Track I, it is within EPA's authority to authorize the use of such measures in the place of the Track I requirements. This is similar to the compliance alternative approach EPA took in the effluent guidelines program for Pesticide Chemicals: Formulating, Packaging and Repackaging. There EPA established a numeric limitation but also a set of best management practices that would accomplish the same numeric limitations. See 61 FR 57518, 57521 (Nov. 6, 1997). EPA believes that section 316(b) of the Clean Water Act provides EPA with sufficient authority to authorize the use of voluntary restoration measures in lieu of the specific requirements of Track I where the performance is substantially similar under the principles of *Chevron USA* v. *NRDC*, 467 U.S. 837, 844–45 (1984). Here, Congress is silent concerning the role of restoration technologies in the statute and in the legislative history, either by explicitly authorizing or explicitly precluding their use. EPA also believes that appropriate restoration measures or conservation measures that are undertaken on a voluntary basis by a new facility to meet the requirements of the rule fall within EPA's authority to regulate the "design" of cooling water intake structures. *Bailey* v. *U.S.*, 516 U.S. 137 (1995)(In determining meaning of words used in a statute, court considers not only the bare meaning of the word, but also its placement and purpose in the statutory scheme.)

This interpretation of the statute fits well within the purpose of section 316(b) of the CWA. The purpose of section 316(b) is to minimize adverse environmental impact from cooling water intake structures. Restoration measures that result in the performance comparable to that achieved in Track I further this objective while offering a significant degree of flexibility to both permitting authorities and facilities.

EPA recognizes that restoration measures have been used at existing facilities implementing section 316(b) on a case-by-case, best professional judgment basis as an innovative tool or as a tool to conserve fish or aquatic organisms, compensate for the fish or aquatic organisms killed, or enhance the aquatic habitat harmed or destroyed by the operation of cooling water intake structures. Under Track II, this flexibility will be available to new facilities to the extent that they can demonstrate performance comparable to that achieved in Track I. For example, if a new facility that chooses Track II is on an impaired waterbody, that facility may choose to demonstrate that velocity controls in concert with measures to improve the productivity of the waterbody will result in performance comparable to that achieved in Track I. The additional measures may include such things as reclamation of abandoned mine lands to eliminate or reduce acid mine drainage along a stretch of the waterbody, establishment of riparian buffers or other barriers to reduce runoff of solids and nutrients from agricultural or silvicultural lands, removal of barriers to fish migration, or creation of new habitats to serve as spawning or nursery areas. Another example might be a facility that chooses to demonstrate that flow reductions and less protective velocity controls, in concert with a fish hatchery to restock fish being impinged and entrained with fish that perform a similar function in the community structure, will result in performance comparable to that achieved in Track I.

EPA recognizes that it may not always be possible to establish quantitatively that the reduction in impact on fish and shellfish is comparable using the types of measures discussed above as would be achieved in Track I, due to data and modeling limitations. Despite such limitations, EPA believes that there are situations where a qualitative demonstration of comparable performance can reasonably assure substantially similar performance. EPA is thus providing, in § 125.86, that the Track II Comprehensive Demonstration Study should show that either: (1) The Track II technologies would result in reduction in both impingement mortality and entrainment of all life stages of fish and shellfish of 90 percent or greater of the reduction that would be achieved through Track I (quantitative demonstration) or, (2) if consideration of impacts other than impingement mortality and entrainment is included, the Track II technologies will maintain fish and shellfish in the waterbody at a substantially similar level to that which would be achieved under Track I (quantitative or qualitative demonstration).

EPA does not intend the foregoing discussion or today's rule to be authoritative with respect to any ongoing permit proceedings for existing facilities or previously issued existing facility permits, which should continue to be governed by existing legal authorities. EPA will address the issue of restoration further in Phase II and Phase III.

VII. Implementation

Under the final rule, section 316(b) requirements would be implemented through the NPDES permit program. These regulations establish application, monitoring, recordkeeping, and reporting requirements for new facilities. The regulations also require the Director to review application materials submitted by each new facility and include the requirements and monitoring and recordkeeping requirements in the permit.

EPA will develop a model permit and permitting guidance to assist Directors in implementing these requirements. In addition, the Agency will develop implementation guidance for owners and operators that will address how to comply with the application requirements, the sampling and monitoring requirements, technology plans, and the recordkeeping and reporting requirements in these regulations.

A. When Does the Rule Become Effective?

This rule becomes effective thirty (30) days from the date of publication. After the effective date of the regulation, new facilities are required to submit the application data for cooling water intake structures required under these regulations.

B. What Information Must I Submit to the Director When I Apply for My New or Reissued NPDES Permit?

The NPDES application process under 40 CFR 122.21 requires that facilities submit information and data 180 days prior to the commencement of a discharge. If you are the owner or operator of a facility that meets the new facility definition, you will be required to submit the information that is required under 40 CFR 122.21 and § 125.86 of today's final rule with your initial permit application and with subsequent applications for permit reissuance. The Director will review the information you provide and will confirm whether your facility is a new facility and establish the appropriate requirements to be applied to the cooling water intake structure(s).

At 40 CFR 122.21, today's rule requires all owners or operators of new facilities to submit three general categories of information when they apply for an NPDES permit. The general categories of information include (1) physical data to characterize the source water body in the vicinity where the cooling water intake structures are located, (2) data to characterize the design and operation of the cooling water intake structures, and (3) existing data (if they are available) to characterize the baseline biological condition of the source waterbody. All applicants must also submit a statement specifying whether they will comply with either Track I or Track II

(§ 125.86(a)(1)), and source waterbody flow information (§§ 125.86(b)(3) or 125.86(c)(1)). If you are a Track I applicant, you must also submit (1) data to show you will meet the Track I flow and velocity requirements and (2) a design and construction technology plan demonstrating that you have selected design and construction technologies necessary to minimize impingement mortality and/or entrainment if you are located where such technologies are necessary. If you are a Track II applicant, you must also submit a comprehensive demonstration study with detailed information on source waterbody and intake structure characteristics, and a verification monitoring plan. Applicants seeking an alternative requirement under § 125.85 must submit data that demonstrate that their compliance costs would be wholly out of proportion to the costs considered by EPA in establishing the requirements of §§ 125.84(a) through (e) or that compliance with the rule would cause significant adverse impacts on local air quality, local water resources or local energy markets.

The following describes the application requirements for all new facilities and the requirements specific to Tracks I and II in more detail.

1. All New Facilities

a. Source Water Physical Data

All new facilities must provide the source water physical data required at 40 CFR 122.21(r)(2) in their permit applications. These data are needed to characterize the facility and evaluate the type of waterbody and species affected by the cooling water intake structure. This information will also be used by the permit writer to evaluate the appropriateness of the design and construction technologies selected by the applicant for use at their site in subsequent permit proceedings. Specific data items that must be submitted include (1) a narrative description and scale drawings showing the physical configuration of all source waterbodies used by the facility, including areal dimensions, depths, salinity and temperature regimes, and other documentation; (2) an identification and characterization of the source waterbody's hydrological and geomorphological features, as well as the methods used to conduct any physical studies to determine the intake's zone of influence and the results of such studies; and (3) locational maps.

b. Cooling Water Intake Structure Data

All new facilities must submit the cooling water intake structure data required at 40 CFR 122.21(r)(3) to characterize the cooling water intake structure and evaluate the potential for impingement and entrainment of aquatic organisms. Information on the design of the intake structure and its location in the water column will allow the permit writer to evaluate which species or life stages would potentially be subject to impingement and entrainment. A diagram of the facility's water balance would be used to identify the proportion of intake water used for cooling, make-up, and process water. The water balance diagram also provides a picture of the total flow in and out of the facility, allowing the permit writer to evaluate compliance with the Track I flow reduction requirements (if applicable). Specific data on the intake structure include (1) a narrative description of the configuration of each of your cooling water intake structures and where it is located in the waterbody and in the water column; (2) latitude and longitude in degrees, minutes, and seconds for each of your cooling water intake structures; (3) a narrative description of the operation of each of your cooling water intake structures, including design intake flows, daily hours of operation, number of days of the year in operation, and seasonal changes, if applicable; (4) a flow distribution and water balance diagram that includes all sources of water to the facility, recirculating flows, and discharges; (5) engineering drawings of the cooling water intake structure.

c. Source Water Baseline Biological Characterization Data

All new facilities must submit the source water baseline biological characterization data required in 40 CFR 122.21(r)(4) with their permit application. This information will characterize the biological community in the vicinity of the cooling water intake structure as well as the operation of the cooling water intake structures. The Director may use this information in subsequent permit renewal proceedings to determine if the applicant's design and construction technology plan should be revised. This supporting information must include existing data (if available), which may be supplemented with new field studies if the applicant so chooses. The applicant must submit the following specific data (1) a list of the data that are not available and efforts made to identify sources of the data; (2) if available, a list of species (or relevant taxa) in the vicinity of the cooling water intake structure, and identification of the species and life stages that would be most susceptible to impingement and entrainment (including both nekton and meroplankton) (Species identified should include the range of species in the system including the forage base); (3) if available, identification and evaluation of the primary period of reproduction, larval recruitment, and period of peak meroplankton abundance for relevant taxa; (4) if available, information sufficient to provide data representative of the seasonal and daily biological activity in the vicinity of the cooling water intake structure; (5) if available, identification of all threatened or endangered species that might be susceptible to impingement and entrainment at your cooling water intake structures; (6) documentation of any public participation or consultation with Federal or State agencies undertaken in collecting the data; (7) if the above data are supplemented with data collected in actual field studies, a description of all methods and quality assurance procedures for data collection, sampling, and analysis, including a description of the study area; identification of the biological assemblages to be sampled or evaluated (both nekton and meroplankton); and data collection, sampling, and analysis methods. The sampling or data analysis methods used must be appropriate for a quantitative survey and based on a consideration of methods used in other biological studies performed within the same source waterbody. The study area should include, at a minimum, the area of influence of the cooling water intake structure.

d. Source Water Flow Data

All facilities must demonstrate compliance with the source water flow requirements in §§ 125.84(b)(3) and (c)(2). Information to show that a new facility is in compliance with these requirements must be submitted to the Director in accordance with §§ 125.86(b)(3) and (c)(1).

If your facility is located on a freshwater river or stream, you must submit data that supports that you are withdrawing less than five (5) percent of the annual mean flow. The documentation might include either publicly available flow data from a nearby U.S. Geological Survey (USGS) gauging station or actual instream flow monitoring data that the facility has collected itself. The waterbody flow should be compared with the total design flow of all cooling water intake structures at the new facility.

If your cooling water intake structure is withdrawing water from an estuary or a tidal river, you need to calculate the tidal excursion and provide the flow data for your facility and the supporting calculations. The tidal excursion distance can be computed using three different methods ranging from simple to complex. The simple method involves using available tidal velocities that can be obtained from the Tidal Current Tables formerly published by the National Ocean Service of the National Oceanic and Atmospheric Administration (NOAA) and currently printed and distributed by private companies (available at bookstores or marine supply stores). The midrange method involves computing the tidal excursion distance using the Tidal Prism Method. [97] The complex method involves the use of a two-dimensional or three-dimensional hydrodynamic model. The simplest method to use is the following:

(1) Locate the facility on either a NOAA nautical chart or a base map created from the USGS 1:100,000 scale Digital Line Graph (DLG) data available on the USGS website. These DLG Data can be imported into a computer-aided design (CAD) program or geographic information system (GIS). If these tools are unavailable, 1:100,000 scale topographic maps (USGS) can be used.

(2) Obtain maximum flood and ebb velocities (in meters per second) for the waterbody in the area of the cooling water intake structure from NOAA Tidal Current Tables.

(3) Calculate average flood and ebb velocities (in meters per second) over the entire flood or ebb cycle by using the maximum flow and ebb velocities from 2 above.

$$\text{Velocity}_{\text{Average Flood}} = \text{Velocity}_{\text{Maximum Flood}} * {}^{2}\!/\!{}_{\pi} \qquad \text{(Equation 1)}$$

$$\text{Velocity}_{\text{Average Ebb}} = \text{Velocity}_{\text{Maximum Ebb}} * {}^{2}\!/\!{}_{\pi} \qquad \text{(Equation 2)}$$

(4) Calculate the flood and ebb tidal excursion distance using the average flood and ebb velocities from 3 above.

$$\text{Distance}_{\text{Flood Tidal Excursion}} = \text{Velocity}_{\text{Average Flood}} * 6.2103 * 3600\ {}^{\text{s}}\!/\!{}_{\text{hr}} \qquad \text{(Equation 3)}$$

$$\text{Distance}_{\text{Ebb Tidal Excursion}} = \text{Velocity}_{\text{Average Ebb}} * 6.2103 * 3600\ {}^{\text{s}}\!/\!{}_{\text{hr}} \qquad \text{(Equation 4)}$$

(5) Using the total of the flood and ebb distances from above, define the diameter of a circle that is centered over the opening of the cooling water intake structure.

(6) Define the area of the waterbody that falls within the area of the circle (see Appendix 2 to Preamble). The area of the waterbody, if smaller than the total area of the circle might be determined either by using a planimeter or by digitizing the area of the waterbody using a CAD program or GIS. For cooling water intake structures located offshore in large waterbodies, the area of the waterbody might equal the entire area of the circle (see D in Appendix 3 to Preamble). For cooling water intake structures located flush with the shoreline, the area might be essentially a semicircle (see C in Appendix 3 to Preamble). For cooling water intake structures located in the upper reaches of a tidal river, the area might be some smaller portion of the area of the circle (see A in Appendix 3 to Preamble).

(7) Calculate the average depth of the waterbody area defined in 6 above. Depths can easily be obtained from bathymetric or nautical charts available from NOAA. In many areas, depths are available in digital form.

(8) Calculate a volume by multiplying the area of the waterbody defined in 6 by the average depth from 7. Alternatively, the actual volume can be calculated directly with a GIS system using digital bathymetric data for the defined area.

If your cooling water is withdrawn from a lake or reservoir, you must submit information such as a narrative description of the waterbody thermal stratification and any supporting documentation and engineering calculations to show that your cooling water intake structure meets the requirement not to alter the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies). Typically, this natural thermal stratification will be defined by the thermocline, which may be affected to a certain extent by the withdrawal of cooler water and the discharge of heated water into the system. This information demonstrates to the permit writer that you are maintaining the thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies) such that it maintains appropriate habitat for the biological makeup of the waterbody.

2. Track I Facilities

a. Flow Reduction Information

New facilities larger than 10 MGD that choose Track I must submit the data on flow reduction required in § 125.86(b)(1) with their permit applications. New facilities between 2 and 10 MGD that choose to comply with the Track I requirements at § 125.84(b) must also submit this data. The information required includes a narrative description of the water balance of the closed-cycle recirculating cooling water system for the facility and an

[97] Diana, E., A.Y. Kuo, B.J. Neilson, C.F., Cerco, and P.V. Hyer. 1987. *Tidal prism model manual*, Virginia Institute of Marine Science, Gloucester Point, VA.

engineering demonstration that the intake flows have been minimized to the maximum extent reasonably possible. You should also consider all feasible methods to re-use blowdown in other plant operations. New facilities between 2 and 10 MGD that choose to comply with the Track I requirements at § 125.84(c) must submit data that shows that the facility's total design water intake flow is less than 10 MGD. *See* § 122.21(r)(3)(iii).

b. Velocity Information

New facilities that choose Track I must submit the data on velocity required in § 125.86(b)(2) with their permit applications. The information required includes a narrative description of the design, structure, equipment, and operation used to meet the performance requirement and any engineering calculations used to calculate design through-screen velocity.

c. Design and Construction Technology Plan

If you select Track I, § 125.86(b)(4) and (b)(5) require you to include a Construction Technology Plan in your application that demonstrates that your facility has selected and will implement the design and construction technologies necessary to minimize impingement mortality and/or entrainment when certain conditions exist at the site. If you select Track I and choose to comply with the requirements of § 125.84(c) (which are available to facilities between two and ten MGD) you much install technologies to reduce impingement at some locations and you must install technologies to reduce entrainment at all sites. *See* § 125.84(c)(3) and (4). Examples of such technologies that may be appropriate for your site include, but are not be limited to (1) fish-handling and return systems, (2) wedgewire screens, (3) fine mesh screens, (4) barrier nets, and (5) aquatic filter barrier systems. The Agency recognizes that selection of the specific technology or group of technologies for your site will depend on individual facility and waterbody conditions.

In the application, you need to describe the technology(ies) you will implement at your facility to meet the requirements in § 125.84(b)(4) and (5) or § 125.84(c)(3) and (4), the basis for their selection, and the expected level of performance. During subsequent permit terms, the Director may require you to implement additional or different design and construction technologies if the initial technologies you selected and implemented do not meet the requirement of minimizing impingement mortality and entrainment.

3. Track II Facilities

a. Comprehensive Demonstration Study

If you select Track II, § 125.86(c)(2) requires you to perform and submit to the Director the results of a Comprehensive Demonstration Study, including data and detailed analyses to demonstrate that you will reduce the impacts to fish and shellfish to levels comparable to the level you would achieve were you to implement the Track I requirements at § 125.84(b)(1), and (2). To meet the "comparable level" requirement, you must demonstrate that you have reduced both impingement mortality and entrainment of all life stages of fish and shellfish to 90 percent or greater of the reduction that would be achieved through Track I, or if your demonstration includes consideration of impacts other than impingement mortality and entrainment, that the measures taken will maintain the fish and shellfish in the waterbody at a substantially similar level to that which would be achieved through Track I. Your proposed technologies may specifically include the reuse of spent cooling water as industrial process water and the associated reductions in process water withdrawals from the source waterbody as a means for reducing intake capacity and impingement and entrainment.

The Comprehensive Demonstration Study has four parts:

- A proposal for how information will be collected;
- A Source Water Biological Study;
- An evaluation of potential cooling water intake structure effects; and
- A Verification Monitoring Plan.

These plans and evaluations must be submitted to the Director with the permit application.

Under § 125.86(c)(2)(iii)(B), you may submit data from previous biological studies performed in the vicinity of the proposed or actual intake if the data are no more than 5 years old so that they reasonably represent existing conditions. You must demonstrate that such existing data are fully representative of the current conditions in the vicinity of the intake and provide documentation showing that the data were collected by using established and reliable quality assurance procedures.

Before performing the study you must submit to the Director a plan stating how information will be collected to support the study. This plan must provide (1) a description of the proposed technology(ies) to be evaluated; (2) a list and description of any historical studies characterizing the physical and biological conditions in the vicinity of the proposed or actual intakes and their relevancy to the proposed study; (3) a summary of any public participation or consultation with Federal or State agencies undertaken in development of the plan; and (4) a sampling plan for data that will be collected in actual field studies in the source waterbody that documents all methods and quality assurance procedures for data collection, sampling, and analysis. The study area for such field studies must include, at a minimum, the area of influence of the cooling water intake structure and at least 100 meters beyond. The area of influence is the portion of water subject to the forces of the intake structure such that a particle within the area is likely to be pulled into the intake structure.

You must submit the results of a Source Water Biological Study in accordance with § 125.86(c)(2)(iv)(A). This characterization must include (1) a taxonomic identification and characterization of aquatic biological resources (nekton and meroplankton) to provide a summary of historic and contemporary aquatic biological resources; a determination and description of the target populations of concern (those species and life stages that would be most susceptible to impingement and entrainment); and a description of the abundance and temporal and spatial characterization of the target populations based on the collection of multiple years of data to capture the seasonal and daily biological activity in the vicinity of the cooling water intake structure; (2) an identification of all threatened or endangered species that might be susceptible to impingement and entrainment by the cooling water intake structures; and (3) a description of additional chemical, water quality, and other anthropogenic stresses on the source waterbody. The Director might coordinate a review of your list of threatened or endangered species with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service staff to ensure that potential impacts to threatened or endangered species have been addressed.

The study must evaluate the potential for cooling water intake structure effects in accordance with § 125.86(c)(2)(iv)(A). This evaluation must include (1) a statement of the baseline against which the comparative analyses will be made. The impingement and entrainment baselines must be calculated for the facility by assuming a design of a once-through cooling water system employing a trash rack and traveling screens; (2) an engineering estimate of the efficacy of proposed technologies in reducing impacts to fish and shellfish to a level comparable to the level that would be achieved by meeting the Track I requirements at the site. To demonstrate that the technologies meet the "comparable level" requirement, the demonstration must show that both impingement and entrainment of all life stages of fish and shellfish have been reduced to 90 percent or greater of the reduction that could be achieved through Track I, or, if impacts other than impingement mortality and entrainment are considered, that the measures taken will maintain the fish and shellfish in the waterbody at a substantially similar level to that which would be achieved through Track I. The efficacy projection must include a site-specific evaluation of technology suitability for reducing impingement and entrainment based on design, location, and operational specification applied to the characterization and a site-specific evaluation of any additional measures based on the physical, chemical, and biological characteristics of the site; and (3) a characterization of impingement and entrainment survival estimates of the proposed alternative technology based on case studies in the vicinity of the cooling water intake structure and/or site-specific technology prototype studies, and a characterization of fish and shellfish propagation and survival based, for example, on case studies documenting the efficacy of any additional measures performed at similar sites.

To demonstrate that you will reduce impingement mortality and entrainment to a level of reduction comparable to the level that you would achieve if you implemented Track I requirements at your site, you will need to develop a conceptual engineering design of a hypothetical recirculating water system for your facility, including the estimated intake flow. The estimated intake flow should take into account an optimized system in which the volume of intake flow/blowdown is minimized to the maximum extent feasible. The conceptual design should also include proposed design and construction technologies that would be used to minimize impingement mortality and entrainment pursuant to § 125.84(b)(4) and (5). Finally, you should estimate the expected level of impingement and entrainment associated with the hypothetical intake structure for all species found in substantial numbers in source waterbody in the vicinity of the intake structure. In estimating entrainment, 100 percent mortality may be assumed to preclude the need to perform entrainment survival studies.

You must then calculate and document the expected level of performance of the proposed alternative technologies for all species found in significant numbers in the source waterbody in the vicinity of the intake structure. Such documentation may consist of pilot-scale testing at the proposed facility, *representative* performance data from *comparable* facilities, or both. In preparing the documentation you should specifically show that the pilot-scale or comparable facility data address the following factors that may affect technology performance:

- Physical and chemical watershed conditions (temperature, freezing and thawing, tidal conditions, wave action, sediment and debris, flow, etc.);
- Biological watershed conditions (individual species, life stages, predator species, seasonality, etc.);
- Engineering feasibility and long-term reliability, and
- Operation and maintenance issues.

Available data suggests that alternative design and construction technologies for cooling water intake structures can achieve the level of reduction in impingement mortality and entrainment required under Track I. Technologies such as fine and wide-mesh wedgewire screens, as well as aquatic filter barrier systems, have been shown to reduce mortality from impingement by up to 99 percent or greater compared with conventional once-through systems. In addition, other types of barrier nets may achieve reductions of 80 to 90 percent, and modified screens and fish return systems, fish diversion systems, and fine mesh traveling screens and fish return systems have achieved reductions in impingement mortality ranging from 60 to 90 percent greater than conventional once-through systems. Similarly, with regard to entrainment, although there is less available full scale performance data, aquatic filter barrier systems, fine mesh wedgewire screens, and fine mesh traveling screens with fish return systems have been shown to achieve 80 to 90 percent greater reduction in mortality from entrainment compared with conventional once-through systems. Several additional factors suggest that these performance levels can be improved upon. First, some of the cooling water intake structure technology performance data reviewed is from the 1970's and 1980's and does not reflect recent developments and innovation (e.g., aquatic filter barrier systems, sound barriers). Second, these conventional barrier and return system technologies have not been optimized on a widespread level to date, as would be encouraged by this rule. Such optimization can be best achieved by new facilities, which can match site conditions to available technologies. Third, EPA believes that many facilities could achieve further reductions (estimated 15–30 percent) in impingement and entrainment by providing for seasonal flow restrictions, variable speed pumps, and other innovative flow reduction alternatives. Finally, new facilities seeking to comply under Track II can choose the specific location of their cooling water intake structures to further optimize the level of reduction in impingement mortality and entrainment (i.e., locate the cooling water intake structure outside of biologically productive or sensitive areas to the extent this would serve to reduce environmental impact). For additional discussion, *see* Section V.B.2.

Finally, new facilities complying under Track II must submit a Verification Monitoring Plan in accordance with § 125.86(c)(2)(iv)(A). The plan must include information on how the facility will conduct a monitoring study to verify the full-scale performance of the proposed technologies and of any additional measures. The plan must describe the frequency of monitoring and the parameters to be monitored. The Director will use the verification monitoring to verify that you are meeting the level of impingement and entrainment expected and that fish and shellfish are being maintained at the level expected. The Director will then determine whether to approve the use of the suite of alternative technologies in subsequent permit issuance. Verification monitoring must start during the first year that the cooling water intake structure begins operation and continue for a sufficient period of time to demonstrate that the facility is reducing impingement mortality and entrainment to a level of reduction comparable to the level the facility would have been achieved by implementing the flow reduction and design velocity requirements of Track I.

4. Data To Support a Request for Alternative Requirements

If, pursuant to § 125.85(a), you request that an alternative requirement less stringent than those specified in § 125.84 be required in your permit, § 125.85(b) places the burden on you to show that your compliance costs are wholly out of proportion to the costs EPA considered during development of the requirements at issue, or that compliance with the national standard will result in significant adverse impact to local air quality, local water resources, or local energy markets. Compliance costs that EPA considered were subdivided into one-time costs and recurring costs. Examples of one-time costs include capital and permit application costs. Examples of recurring costs include operation and maintenance costs, permit renewal costs, and monitoring, recordkeeping, and reporting costs.

C. How Will the Director Determine the Appropriate Cooling Water Intake Structure Requirements?

The Director's first step would be to determine whether the facility is covered by this rule If the answer is yes to all the following questions, the facility must comply with the requirements of this final rule.

(1) Is the facility a "new facility" as defined in § 125.83?

(2) Does the new facility withdraw cooling water from waters of the U.S.; *OR* does the facility obtain cooling water by any sort of contract or arrangement with an independent (supplier or multiple suppliers) of cooling water if the supplier(s) withdraw(s) water from waters of the U.S. and is not a public water system?

(3) Is at least 25 percent of the water withdrawn by the facility used for cooling purposes?

(4) Does the new facility have a design intake flow of greater than 2 million gallons per day (MGD)? [98]

(5) Does the new facility discharge pollutants to waters of the U.S., including storm water-only discharges, such that the facility has or is required to have an NPDES permit?

If these final regulations are applicable to the applicant, the second step would be to determine the locational factors associated with the new facility's cooling water intake structure. The Director would first review the information that the new facility provided to validate the source waterbody type in which the cooling water intake structure is located (freshwater stream or river, lake or reservoir, estuary or tidal river, or ocean). (As discussed above, the applicant would need to identify the source waterbody type in the permit application and provide the appropriate documentation to support the waterbody type classification.) The Director would review the supporting material the applicant provided in the permit application. The Director would also review the engineering drawings and the locational maps the applicant provided, documenting the physical placement of the cooling water intake structure.

For Track I facilities, the Director's next step would be to review the design requirements for intake flow and velocity. For a new facility with an intake flow equal to or greater than 10 MGD that is required to reduce its intake flow to a level commensurate with that which could be attained by a closed-cycle recirculating cooling water system, the Director would review the *narrative description of the closed-cycle* recirculating cooling water system design and any engineering calculations to ensure that the new facility is complying with the requirement and that the make-up and blowdown flows have been minimized. If the flow reduction requirement is met by reusing or recycling water withdrawn for cooling purposes, the Director must review documentation that the amount of cooling water that is not reused or recycled has been minimized.

The velocity requirement is based on the design through-screen or through-technology velocity as defined in § 125.83. For Track I facilities, the maximum design velocity would always be 0.5 ft/s. To determine whether the new facility meets the maximum design velocity requirement, the Director would review the narrative description of the design, structure, equipment, and operation used to meet the velocity requirement. The Director would also review the design calculations that demonstrate that the maximum design velocity would be met. In reissuing permits, the Director would review velocity monitoring data to confirm that the facility is not exceeding the initial design velocity calculated at the start of commercial service.

Under Track I, the Director would then review the applicant's Design and Construction Technology Plan (if the applicant is located in an area where such technologies are required) and the applicant's Source Water Baseline Biological Characterization data. During each permit renewal, the Director would then review monitoring data, application data, and other supporting information to determine whether the applicant needs to implement additional or different design and construction technologies (see discussion of § 125.89(a)(2) below).

Under Track II, the Director would receive and should review the applicant's proposed plan for preparing the Comprehensive Demonstration Study. When the applicant proposes to rely on existing studies, the Director would assess the data quality and the relevance to the proposed facility. When new biological surveys are proposed, the Director would determine whether they fully characterize the waterbody potentially impacted by impingement and entrainment. Where pilot-scale demonstrations are proposed, the Director would evaluate whether they are generally representative of full-scale operations. After the study is completed, the Director would review the applicant's analysis, specifically to determine whether the proposed alternative technology(ies) will reduce *impingement mortality and entrainment* to a level of reduction comparable to the level that the facility would achieve if it complied with the Track I requirements for reducing intake capacity and design velocity, or if the proposed measures in conjunction with the proposed technologies will maintain the fish and shellfish in the waterbody at a substantially similar level to that which would be achieved. The Director would also review the facility's Technology Verification Plan for post-operational monitoring to demonstrate that the technologies are performing as predicted.

The proportional flow requirement applicable to all facilities is based on waterbody type. To determine whether the new facility meets the flow requirement, the Director would first verify the new facility's determination of the waterbody flow for the respective waterbody type (e.g., annual mean flow and low flow for freshwater river or stream). The Director would review the source-water flow data the facility provided in the permit application. The Director should consider using available USGS data (for freshwater rivers and streams) to verify the flow data in the permit application. Then the Director would review any supporting documentation and engineering calculations that demonstrate that the new facility would meet the flow requirements. To verify the flow data the new facility provides for an estuary or a tidal river, the Director would review the facility's calculation of the tidal excursion.

The final regulations at § 125.84(e) require compliance with any more stringent requirements relating to the location, design, construction, or capacity of a cooling water intake structure or monitoring requirements at a new facility that a Director deems necessary to comply with any provision of State law, including state water quality standards, including designated

[98] If the answer is no to these flow parameters and yes to all the other questions, the Director would use best professional judgment on a case-by-case basis to establish permit conditions that ensure compliance with section 316(b).

uses, criteria, and antidegradation provisions.

D. What Will I Be Required to Monitor?

At § 125.87, today's final rule requires biological monitoring and visual or remote inspections at all facilities. Track I facilities and Track II facilities that rely on specified velocity levels as part of their alternative technology(ies) are also required to monitor screen head loss and velocity.

Both Track I and Track II facilities must conduct biological monitoring for impingement and entrainment to assess the presence, abundance, life stages, and mortality (eggs, larvae, post larvae, juveniles, and adults) of aquatic organisms (fish and shellfish) impinged or entrained during operation of the cooling water intake structure. These data would also be used by the permitting authority in subsequent permit terms to determine whether additional or modified design and construction technologies are reasonably necessary (see discussion of § 125.89(a)(2) in D. below). The facility would be required to conduct impingement and entrainment sampling over a 24-hour period no less than once per month when the cooling water intake structure is in operation and report results to the Director annually. After two years, the Director may approve an applicant's request for less frequent biological monitoring if the facility provides data to support the request showing that less frequent monitoring would still allow for the detection of any seasonal and daily variations in the species and numbers of individuals that are impinged or entrained. The Director should approve a request for reduced frequency in biological monitoring only if the supporting data show that the technologies are consistently performing as projected under all operating and environmental conditions and less frequent monitoring would still allow for the detection of any future performance fluctuations.

Under § 125.87(b), Track I facilities are required to monitor the head loss across the intake screens to obtain a correlation of those values with the design intake velocity (Track I) or other specified velocity (Track II) at minimum ambient source-water surface elevation (according to best professional judgment based on available hydrological data). The maximum head loss across the screen for each cooling water intake structure must be used to determine compliance with the velocity requirement in § 125.84(b)(2) and (c)(1). The data collected by monitoring this parameter would provide the Director with additional information after the design and construction of the cooling water intake structure to demonstrate that the facility is operating and maintaining the cooling water intake structure in a manner such that the velocity requirement continues to be met. The Agency considers this the most appropriate parameter to monitor, because, although the facility might be designed to meet the requirement, proper operation and maintenance is necessary to maintain the open area of the screen and intake structure, ensuring that the design intake velocity is maintained. Head loss can easily be monitored by measuring and comparing the height of the water in front of and behind the screen or other technology. Track I facilities that use devices other than screens would be required to measure the actual velocity at the point of entry through the device. Velocity can be measured with velocity meters placed at the entrance into the device.

Weekly visual or remote inspections are required to provide a mechanism for both the new facility and the Director to ensure that any technologies that have been implemented for minimizing adverse environmental impact are being maintained and operated in a manner that ensures that they function as designed. EPA has promulgated this requirement so that facilities that develop plans and install technologies could not operate them improperly so that adverse environmental impact is not minimized to the extent expected. The Director would determine the actual scope and implementation of the visual inspections based on the types of technologies installed at your facility. For example, inspections could be as simple as observing bypass and other fish handling systems to ensure that debris has not clogged the system and rendered it inoperable.

E. How Will Compliance Be Determined?

This rule will be implemented by the Director placing conditions consistent with this rule in NPDES permits. Compliance with permit conditions implementing this rule require the following data and information:

- Data submitted with the NPDES permit application to show that the facility is in compliance with location, design, construction, and capacity requirements (§ 125.86).
- Compliance monitoring data and records, including those for impingement and entrainment monitoring, to show that impingement and entrainment impacts are being minimized (§ 125.87(a)).
- Through-screen or through-technology velocity monitoring data and records to show that the facility is being operated and maintained as designed to continue to meet the velocity requirement (§ 125.87(b)).
- Records from visual or remote inspections to show that technologies installed are being operated properly and function as they were designed (§ 125.87(c)).

Facilities are required to keep records and report the above information in a yearly status report in § 125.88. In addition, Directors may perform their own compliance inspections as deemed appropriate in accordance with 40 CFR 122.41.

F. What Are the Respective Federal, State, and Tribal Roles?

Section 316(b) requirements are implemented through NPDES permits. As discussed in Section II.A today's final regulations would amend 40 CFR 123.25(a)(36) to add a requirement that authorized State programs have sufficient legal authority to implement today's requirements (40 CFR part 125, subpart I). Therefore, today's final rule potentially affects authorized State and Tribal NPDES permit programs. Under 40 CFR 123.62(e), any existing approved section 402 permitting program must be revised to be consistent with new program requirements within one year from the date of promulgation, unless the NPDES-authorized State or Tribe must amend or enact a statute to make the required revisions. If a State or Tribe must amend or enact a statute to conform with today's final rule, the revision must be made within two years of promulgation. States and Tribes seeking new EPA authorization to implement the NPDES program must comply with the requirements when authorization is requested.

In addition to updating their programs to be consistent with today's rule, States and Tribes authorized to implement the NPDES program would be required to implement the cooling water intake structure requirements following promulgation of the final regulations. The requirements must be implemented upon permit issuance and reissuance. Duties of an authorized State or Tribe under this regulation include

- Verification of a permit applicant's determination of source waterbody classification and the flow or volume of certain waterbodies at the point of the intake;
- Verification that the intake structure maximum flow rate is less than the maximum allowable as a proportion of waterbody flow for certain waterbody types;

- Verification that a Track I permit applicant's design intake velocity calculations meet applicable regulatory requirements;
- Verification that a Track I permit applicant's intake design and reduction in capacity are commensurate with a level that can be attained by a closed-cycle recirculating cooling water system that has minimized make-up and blowdown flows;
- Verification that a Track II permit applicant's Comprehensive Demonstration Study demonstrates that the proposed alternative technologies will reduce the impacts to fish and shellfish to levels comparable to those the facility would achieve if it met the Track I requirements;
- Development of draft and final NPDES permit conditions for the applicant implementing applicable section 316(b) requirements pursuant to this rule; and
- Ensuring compliance with permit conditions based on section 316(b) requirements.

EPA will implement these requirements where States or Tribes are not authorized to implement the NPDES program.

G. Are Permits for New Facilities Subject to Requirements Under Other Federal Statutes?

EPA's NPDES permitting regulations at 40 CFR 122.49 contain a list of Federal laws that might apply to federally issued NPDES permits. These include the Wild and Scenic Rivers Act, 16 U.S.C. 1273 *et seq.*; the National Historic Preservation Act of 1966, 16 U.S.C. 470 *et seq.*; the Endangered Species Act, 16 U.S.C. 1531 *et seq.*; the Coastal Zone Management Act, 16 U.S.C. 1451 *et seq.*; and the National Environmental Policy Act, 42 U.S.C. 4321 *et seq.* See 40 CFR 122.49 for a brief description of each of those laws. In addition, the provisions of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801 *et seq.*, relating to essential fish habitat might be relevant. Nothing in this final rulemaking authorizes activities that are not in compliance with these or other applicable Federal laws.

H. Alternative Requirements

Today's rule establishes national requirements for new facilities. EPA has taken into account all the information that it was able to collect, develop, and solicit regarding the location, design, construction, and capacity of cooling water intake structures at new facilities. EPA concludes that these requirements reflect the best technology available for minimizing adverse environmental impact on a national level. In some cases, however, data that could affect the economic practicability of requirements might not have been available to be considered by EPA during the development of today's rule. Therefore, EPA is including § 125.85 to allow for adjustment of the requirements of § 125.84 in certain limited circumstances.

Section 125.85 would allow the Director, in the permit development process, to set alternative best technology available requirements that are less stringent than the nationally applicable requirements. Under § 125.85(a), any interested person may request that alternative requirements be imposed in the permit. Section 125.85(a) provides that alternative requirements that are less stringent than the requirements of § 125.84 would be approved only if the Administrator determines that compliance with the requirement at issue would result in compliance costs wholly out of proportion to the costs considered during development of the requirement at issue or in significant adverse impacts on local air quality, local water resources or local energy markets; the alternative requirement requested is no less stringent than justified by the wholly out of proportion cost or significant adverse impact; and the alternative requirements will ensure compliance with other applicable provisions of the Clean Water Act and any applicable requirements of State law.

Because new facilities have a great degree of flexibility in their siting, in how their cooling water intake structures are otherwise located, and in the design, construction, and sizing of the structure, cost is the primary factor that would justify the imposition of less stringent requirements as part of the alternative requirements approach. This is because other factors affecting the location, design, construction, and capacity of cooling water intake structures at new facilities can be addressed by modifications that may have cost implications. EPA notes that alternate discharge standards are not allowed in the somewhat analogous case of the new source performance standards that EPA establishes under section 306 of the CWA for the discharge of effluent from new sources in particular industrial categories. However, because EPA is acting under a separate authority in this rule, section 316(b) of the CWA, and because section 316(b) of the CWA is silent concerning this issue, EPA believes it is reasonable to interpret section 316(b) to give EPA discretion to establish alternative requirements for new facility cooling water intake structures. EPA takes this position because this final rule would establish requirements for cooling water intake structures at any type of new facility in any industrial category above the flow threshold.[99] Thus, in some instances it might be possible that the costs of complying with today's final requirements would be wholly out of proportion to the costs EPA considered and determined to be economically practicable. As discussed in the *Economic Analysis* Chapter 7, EPA has analyzed the cost of compliance with today's final requirements for all facilities projected to be built in the reasonably foreseeable future, as well as other types of facilities that might be built at later dates (such as large base-load steam electric generating facilities that do not use combined-cycle technology) and concludes that these compliance costs would be economically practicable for all types of facilities the Agency considered. However, should an individual new facility demonstrate that costs of compliance for a new facility would be wholly out of proportion to the costs EPA considered and determined to be economically practicable, the Director would have authority to adjust best technology available requirements accordingly.

Under § 125.85(a), alternative requirements would not be granted based on a particular facility's ability to pay for technologies that would result in compliance with the requirements of § 125.84. Thus, so long as the costs of compliance are not wholly out of proportion to the costs EPA considered and determined to be economically practicable, the ability of an individual facility to pay in order to attain compliance with the rule would not support the imposition of alternative requirements.

EPA has allowed for alternative requirements where the facility demonstrates, to the satisfaction of the Director, that at a local level, the air quality impacts, non-impingement and entrainment aquatic effects, or energy impacts of complying with the requirements of § 125.84 are significant and justify a different approach to regulating cooling water intake structures.

Section 125.85(a) specifies procedures to be used in the establishment of alternative requirements. The burden is

[99] Except for facilities in the offshore and coastal subcategories of the oil and gas extraction point source category as defined under 40 CFR 435.10 and 40 CFR 435.40.

on the person requesting the alternative requirement to demonstrate that alternative requirements should be imposed and that the appropriate requirements of § 125.85 (a) have been met. The person requesting the alternative requirements should refer to all relevant information, including the support documents for this rulemaking, all associated data collected for use in developing each requirement, and other relevant information that is kept on public file by EPA.

VIII. Economic Analysis

The total estimated annualized compliance costs of today's final rule is $48 million.[100] This estimate includes incremental costs incurred by new facilities that begin operation between 2001 and 2020. Facilities not already meeting section 316(b) requirements incur several types of costs under today's final rule. One-time costs of the rule include capital technology costs and costs for the initial permit application. Recurring costs include operating and maintenance (O&M) costs, permit renewal costs, and costs for monitoring, record keeping, and reporting. EPA's cost estimates are presented in Chapters 6 and 7 of the *Economic Analysis* and in the *Technical Development Document.*

Today's final rule provides for a two-track approach to comply with the rule's requirements. Facilities that already plan to install a closed-cycle cooling system in the baseline are assumed to choose Track I, the "fast track." These facilities will incur only the costs of installing fish baskets and a fish return system if they would not have already elected to install these technologies independent of the rule. EPA records document that the screens were sized to reduce the velocity. Facilities that do not plan to install a closed-cycle cooling system in the baseline are assumed to choose Track II. These facilities will install alternative technologies of their choice that will reduce impingement mortality and entrainment to a level of reduction comparable to the level the facility would achieve if it met the Track I requirements. The alternative technologies considered in the cost analysis are further discussed in Chapter 5 of the Technical Development Document.

Chapter 2 of the *Technical Development Document* outlines EPA's approach to estimating the facility-level costs associated with this rule. EPA estimated costs for a series of model facilities, based on their cooling system type (once-through or recirculating system), the type of water body from which the intake structure withdraws (freshwater or marine water), and a measure of the facility's size (generating capacity for steam-electric generating capacity plants and design intake flow for manufacturers). Model facility characteristics were derived from specific new facilities predicted to be built based on Resource Data International's NEWGen Database, and from existing facilities based on responses to the section 316(b) industry survey of existing facilities (see discussion below) and U.S. Department of Energy information. EPA estimated compliance costs for the 121 new facilities estimated to begin operation between 2001 and 2020, based on model facility characteristics and the requirements of today's final rule. EPA amortized capital cost estimates over 30 years.[101] EPA projected construction of 121 new facilities over the next 20 years after promulgation of the final rule.

A. Electric Generation Sector

For the period 2001 through 2020, EPA estimates that 83 new electric generation facilities will be subject to today's final rule.[102] EPA identified these facilities based on three main data sources: (1) The U.S. Department of Energy's *Annual Energy Outlook 2001* (AEO2001); (2) Resource Data International's NEWGen Database (February 2001 version); and (3) the section 316(b) industry survey of existing facilities. Because the facilities are new facilities that have not yet been built, EPA necessarily had to project certain aspects of the facilities. Hence, the facilities are model facilities. For more information on EPA's facility modeling, see Chapter 5 of the *Economic Analysis.*

EPA estimated facility-level costs for the 83 new electric generation facilities found to be within the scope of this rule by comparing each facility's projected baseline characteristics with the incremental requirements of the rule. If a facility already planned to fulfill any of the applicable requirements independent of the rule, the cost estimates did not include any costs for meeting that requirement. For example, EPA estimates that 74 of the 83 proposed new generating facilities already plan to build a recirculating wet cooling tower, so only 9 facilities are assumed to incur costs for complying with the flow reduction requirement at § 124.84(b)(1) of the final rule.

EPA used annual forecasts of new capacity additions from the AEO2001 to predict how many of the 83 new generating facilities will begin operation in each year between 2001 and 2020. EPA then distributed the new facilities estimated to install a cooling tower evenly over the years with projected new facilities. For example, EPA estimates that three of the 14 new in-scope coal-fired facilities are planning to build a once-through system in the baseline. The cost analysis therefore assumes that the 1st, 6th, and 11th coal-fired facility to begin operation will incur costs of a recirculating wet cooling tower. An additional coal facility which plans to have a cooling pond was treated as having a once-through system in the baseline and was also costed with a cooling tower.[103] This facility was assumed to be the 2nd to begin operation. EPA's assumptions on when new Track I coal facilities will begin operation leads to an overestimate of the total costs of this rule because higher cost facilities are over represented among the coal facilities beginning operation early in the 20-year analysis period. Additionally, EPA estimates that five of the 69 new in-scope combined-cycle facilities would install a recirculating wet cooling tower as a result of the rule. The cost analysis therefore assumes that the 1st, 16th, 30th, 44th, and 58th combined-cycle facility to begin operation will incur costs of a recirculating wet cooling tower.

Total annualized costs for the 83 new facility electric generators are estimated to be $34.7 million (using a 7 percent discount rate). The lowest annualized compliance cost for any electric generator is estimated to be

[100] The estimated annualized compliance costs are presented as a single cost to represent the highestpotential implementation costs to industry. For example, although such costs are based on estimates of howmany facilities will choose compliance under Track I and Track II, even facilities estimated to follow TrackII have been assumed to ultimately have to install closed-cycle recirculating cooling water systems.

[101] The amortization period was selected to correspond to the estimated useful life of the technologiesrequired for compliance with this rule. EPA conducted a sensitivity analysis using a 15-yearamortization period (see Chapter 7 of the *Economic Analysis*).

[102] See Section IV.A. above or Chapter 5 of the *Economic Analysis* for underlying estimates and methods used for estimating the cost of the rule.

[103] In some states, a cooling pond is considered a water of the U.S. In these states, a plant with such a cooling system would have to comply with the recirculating requirements of the final section 316(b) New Facility Rule. In those states where a cooling pond is not considered a water of the U.S., a plant would not have to comply with the recirculating requirements of this rule. The costing analysis made the conservative assumption that facilities with a cooling pond would have to comply with the recirculating requirements. These recirculating facilities with cooling ponds were therefore costed as if they had a once-through system in the baseline.

approximately $170,000; the lowest annualized cost per megawatt of generating capacity is estimated to be $153. The highest annualized cost is estimated to be $19.1 million; the highest cost per megawatt of generating capacity is estimated to be $11,640. Sixty-nine facilities are expected to have relatively low annualized compliance costs (below $200,000 per facility), while 8 facilities will have annualized costs exceeding $1 million per facility.[104] The other facilities would have costs between $200,000 and $1 million per facility.

B. Manufacturing Sector

For the period 2001 through 2020, EPA projected that 38 new manufacturing facilities will incur costs to comply with today's final rule. All of these facilities are model facilities estimated based on industry growth rates (derived from the U.S. Industry and Trade Outlook 2000 and industry-specific sources, such as Kline's Guide to the Chemical Industry) and responses to the section 316(b) industry survey. Facility-specific operational characteristics of the cooling water intake structures, economic and financial characteristics of the projected new facilities, and waterbody type and other locational information were not available. EPA assumed that the characteristics of new facilities in a given 4-digit SIC code will be similar to the characteristics of existing facilities in that same SIC code. Compliance costs were therefore calculated based on the characteristics of existing facilities by SIC code, source water type, cooling system type, and flow, using data from the section 316(b) industry survey of existing facilities. EPA used the same unit costs and methods as for new electric generators.

Total annualized costs for the 38 new manufacturing facilities are estimated to be $13.0 million. The lowest annualized compliance cost for any facility is approximately $175,000; the highest annualized cost is $1.6 million; the average annualized costs for the remaining 36 manufacturing facilities centers around $494,000 per facility. Five of the manufacturing facilities incur annualized costs less than $200,000 per facility, and one chemicals facility incurs annualized costs exceeding $1 million.

Exhibit 4 provides a summary of the estimated annualized compliance costs for today's final rule.

EXHIBIT 4.—NATIONAL ANNUALIZED COSTS OF COMPLIANCE WITH THE SECTION 316(B) NEW FACILITY REGULATION

[in $2000, millions]

Industry category	Number of projected new in-scope facilities	Capital and permit application costs	Recurring costs	Total annualized compliance costs
Electric Generators:				
Combined-Cycle	69	$3.7	$9.6	$13.3
Coal-Fired	14	4.1	17.3	21.4
Total Generators	83	7.8	26.9	34.7
Manufacturing Facilities:				
SIC 26 Pulp & paper	2	0.2	0.3	0.5
SIC 28 Chemicals	22	2.7	4.1	6.8
SIC 29 Petroleum	2	0.3	0.5	0.8
SIC 331 Iron & steel	10	1.9	2.8	4.6
SIC 333/335 Aluminum	2	0.1	0.1	0.2
Total Manufacturing	38	5.2	7.8	13.0
All Projected New Facilities	121	12.9	34.7	47.7

C. Economic Impacts

The estimated annualized compliance costs would represent a small portion of the estimated revenues for almost all of the new facilities subject to today's rule. Costs as a percentage of baseline revenues would be less than 1 percent for all but nine of the facilities. Of these nine facilities, only 3 would experience costs as a percentage of baseline revenues of 3 percent or more.[105] EPA's discussion of cost impacts is presented in Chapter 7 of the *Economic Analysis*. Impacts at the industry level are expected to be very limited because the projected number and total capacity of the new facilities that are within the scope of today's final rule are generally small compared with the industry as a whole. Because EPA does not expect many facilities to be affected and does not expect the costs of the rule to create a barrier to entry or to create a significant change in productivity, EPA does not expect today's final rule to cause significant changes in industry productivity, competition, prices, output, foreign trade, or employment. The baseline revenues and the modest costs for each facility subject to today's rule are sufficient to preclude any barriers to entry.

EPA therefore expects the final rule to be economically practicable for the industries as a whole. The rule is not expected to result in any significant impact on generation and distribution of electricity, because most of the electric generation facilities are expected to meet most of the rule's requirements in the baseline. Only a small percentage of the total number of facilities in each of the manufacturing sectors will be affected by the final rule. EPA therefore concludes that this rule will not result in a significant impact on industries or the economy.

D. Cost and Economic Impacts of Other Alternatives

In addition to today's final rule, EPA estimated the costs and economic impacts of several alternative regulatory options. The first alternative option that EPA considered would be to apply the Track I requirements of today's final rule only to facilities withdrawing from

[104] The higher-cost electric generators are expected to begin operation in the years 2004, 2005 (two facilities), 2007 (two facilities), 2010, 2013, and 2017.

[105] Three coal facilities would have annualized costs between 3.3 percent and 5.2 percent of revenues. Sixelectric generators would have annualized costs greater than 1 but less than 3 percent of revenues.

estuaries, tidal rivers, Great Lakes, and oceans. Under this option, the definition and number of new facilities subject to the rule would not change, but some facilities would incur less stringent compliance requirements. EPA estimates that the total annualized compliance costs for this alternative would be $36.3 million. The second alternative option considered by EPA would impose more stringent compliance requirements on the electric generating segment of the industry. It is based wholly or in part on a zero intake-flow (or nearly zero, extremely low-flow) requirement, commensurate with levels achievable through the use of dry cooling systems. New manufacturing facilities would not be subject to these stricter requirements but would have to comply with the requirements of today's final rule. EPA estimated costs for this alternative by assuming that the dry cooling standard would apply to electric generators on all waters of the U.S. The costs of this option are estimated to be $490.7 million per year.

The first alternative regulatory option considered by EPA would have lower total costs than today's final rule. A regulatory framework based on dry cooling towers for some or all electric generators is the most expensive option. Compared with today's final rule, this option would impose an additional cost of $443 million, or $6,910 per megawatt of generating capacity, on the electric generating sector.

IX. Potential Benefits Associated With Reducing Impingement and Entrainment

To provide an indication of the potential benefits of adopting best technology for cooling water intake structures, this section presents information from existing sources on impingement and entrainment losses associated with cooling water intake structures and the economic benefits associated with reducing these losses. Benefits of the regulation come from preventing situations such as those discussed below. Examples are drawn from existing sources because the information needed to quantify and value potential reductions in losses at new facilities is not available. The reason the information is unavailable is that the exact location of future facilities is unknown. Also unknown are details of cooling water intake structure characteristics, such as the exact configuration of intake, the species present near an intake, the life stages of the species at the time they are present, and the susceptibility of these species to impingement and entrainment. For some facilities listed in the new NEWGen database, there is some general information about facility locations, but details of intake characteristics and the ecology of the surrounding waterbody are unavailable. For facilities projected into the future, there is no locational information at all. Site-specific information is critical in predicting benefits, because studies at existing facilities demonstrate that benefits are highly variable across facilities and locations. Even similar facilities on the same waterbody can have very different benefits depending on the aquatic ecosystem in the vicinity of the facility and intake-specific characteristics such as location, design, construction, and capacity.

In general, the probability of impingement and entrainment at future cooling water intake structure locations depends on intake and species characteristics that influence the intensity, time, and spatial extent of interactions of aquatic organisms with a facility's cooling water intake structure and the physical, chemical, and biological characteristics of the source waterbody. Flows commensurate with closed-cycle cooling systems (which are one part of the basis for best technology available) withdraw water from a natural waterbody, circulate the water through the condensers, and then send it to a cooling tower or cooling pond before recirculating it back through the condensers. Because cooling water is recirculated, closed-cycle systems generally reduce the water flow from 72 percent to 98 percent, thereby using only 2 percent to 28 percent of the water used by once-through systems. It is generally assumed that this would result in a comparable reduction in impingement mortality and entrainment.

Fish species with free-floating, early life stages are highly susceptible to cooling water intake structure impacts. Such planktonic organisms lack the swimming ability to avoid being drawn into intake flows. Species that spawn in nearshore areas, have planktonic eggs and larvae, and are small as adults experience even greater impacts, because both new recruits and reproducing adults are affected (*e.g.*, bay anchovy in estuaries and oceans). In general, higher impingement and entrainment are observed in estuaries and near coastal waters because of the presence of spawning and nursery areas.

The final regulatory framework also recognizes that for any given species and cooling water intake structure location, the proportion of the sourcewater flow supplied to the cooling water intake structure is a major factor affecting the potential for impingement and entrainment. In general, if the quantity of water withdrawn is large relative to the flow of the source waterbody, water withdrawal would tend to concentrate organisms and increase numbers impinged and entrained. Thus, the final flow requirements seek to reduce impingement and entrainment by limiting the proportion of the waterbody flow that can be withdrawn.

The following five examples from studies at existing facilities offer some indication of the relative magnitude of monetary damages associated with cooling water intake structures. These examples exhibit the magnitude of impingement and entrainment, on a per facility basis, that could be significantly reduced in the future for similar steam electric facilities under this final rule. In the following discussion, the potential benefits of lowering intake flows to a level commensurate with those of a closed-cycle recirculating cooling water system (for the projected 90 percent of facilities not already planning to use such systems) is illustrated by comparisons of once-through and closed-cycle cooling systems (*e.g.*, the Brayton Point and Hudson River facilities). The potential benefits of additional requirements defined by regional permit directors are demonstrated by operational changes implemented to reduce impingement and entrainment (*e.g.*, the Pittsburg and Contra Costa facilities). The Ludington example demonstrates how impingement and entrainment losses of forage species can lead to reductions in economically valuable species. Finally, the potential benefits of implementing additional design and construction technologies to increase survival of organisms impinged or entrained is illustrated by the application of modified intake screens and fish return systems (*e.g.*, the Salem Nuclear Generating Station).

The first example of the potential benefits of minimizing intake flow and associated impingement and entrainment is provided by data for the Brayton Point facility, located on Mt. Hope Bay in Massachusetts. In July 1984, the operation of Unit 4 was changed from closed-cycle cooling and piggyback operation to once-through cooling. Although conversion to once-through cooling increased intake flow by about 41 percent, the facility requested the change because of electrical problems associated with salt contamination from Unit 4's closed-cycle cooling canal equipped with spray modules. The lower losses expected under closed-cycle operation can be estimated by comparing losses before and after this modification. Based on reports providing predicted [106] or actual [107] losses after the Unit 4 modification, EPA estimates that the average annual reduction in entrainment losses of adult equivalents of catchable fish resulting from closed-cycle operation of a single unit at Brayton Point (reducing the flow of that unit from 1,045 MGD to 703 MGD) would range from 207,254 Atlantic menhaden (Brevoortia tyrannus) [1] and 155,139 winter flounder (Pleuronectes americanus) [2] to 20,198 tautog (Tautoga onitis) [2] and 7,250 weakfish (Cynoscion regalis) [2] per year. Assuming a proportional change in harvest, the lower losses associated with a closed-cycle system would be expected to result in an increase of 330,000 to 2 million pounds per year in commercial landings and 42,000 to 128,000 pounds per year in recreational landings.

The second example of the potential benefits of low intake flow is provided by an analysis of impingement and entrainment losses at five Hudson River power plants. Estimated fishery losses under once-through compared with closed-cycle cooling indicate that an average reduction in intake flow of about 95 percent at the three facilities responsible for the greatest impacts would result in a 30 to 80 percent reduction in fish losses, depending on the species involved.[108] An economic analysis estimated monetary damages under once-through cooling based on the assumption that annual percentage reductions in year-classes of fish result in proportional reductions in fish stocks and harvest rates.[109] A low estimate of damages was based on losses at all five facilities, and a high estimate was based on losses at the three facilities that account for most of the impacts. Damage estimates under once-through cooling ranged from about $1.3 million to $6.1 million annually in 1999 dollars. Over the next 20 years, EPA projects that 9 out of 83 new power plants would be built without recirculating systems in the absence of this rule. Most of the costs projected for the final rule are associated with installing recirculating systems as a result of this final rule.

The third example demonstrates how impingement and entrainment losses of forage species can lead to reductions in economically valued species. A random utility model (RUM) was used to estimate fishery impacts of impingement and entrainment by the Ludington Pumped Storage plant on Lake Michigan.[110 111] This method estimates changes in demand for beneficial use of the waterbody as a function of changes in catch rates. The Ludington facility is responsible for the loss of about 1 to 3 percent of the total Lake Michigan production of alewife, a forage species that supports valuable trout and salmon fisheries. It was estimated that losses of alewife result in a loss of nearly 6 percent of the angler catch of trout and salmon each year. On the basis of RUM analysis, the study estimated that if Ludington operations ceased, catch rates of trout and salmon species would increase by 3.3 to 13.7 percent annually, amounting to an estimated recreational angling benefit of $0.95 million per year (in 1999 dollars) for these species alone.

The fourth example indicates the potential benefits of technologies that have been required in past section 316(b). Two plants in the San Francisco Bay/Delta, Pittsburg, and Contra Costa in California have made changes to their intake operations to reduce impingement and entrainment of striped bass *Morone saxatilis*). These changes include flow reduction through variable speed pumps. These operational changes have also reduced incidental take of several threatened or endangered fish species, including the delta smelt (*Hypomesus transpacificus*) and several runs of chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Oncorhynchus mykiss*). According to technical reports by the facilities, use of these technologies reduced striped bass losses by 78 to 94 percent, representing an increase in striped bass recreational landings averaging about 100,000 fish each year.[112 113 114 115 116] A local study estimated that the consumer surplus of an additional striped bass caught by a recreational angler is $8.87 to $13.77.[117] This implies a benefit to the recreational fishery, from reduced impingement and entrainment of striped bass alone, in the range of $887,000 to $1,377,000 annually. The monetary benefit of reduced impingement and entrainment of threatened or endangered species might be substantially greater.

The final example indicates the potential benefits of technologies that can be applied to reduce impingement. In its 1999 permit renewal application, the Salem Nuclear Generating Station in the Delaware Estuary evaluated the potential benefits of dual-flow, fine mesh traveling screens designed to achieve an approach velocity of 0.5 ft/s.[118] Based on the facility's projections of net increases in recreational fisheries that would occur with this technology, EPA estimates that angler consumer surplus would increase by $531,247, to $1,780,104 annually in 1999 dollars. Assuming that nonuse benefits are at least 50 percent of recreational use benefits, nonuse benefits associated with the screens might be expected to amount to up to $890,052 per year.

A more detailed discussion of cooling water intake structure impacts and potential benefits can be found Chapter 11 of the *Economic Analysis* document.

[106] Marine Research, Inc. and New England Power Company. 1981. Final Environmental Impact Report and Sections 316(a) and 316(b) Demonstrations Made in Connection with the Proposed conversion of Generating Unit No. 4 from Closed-Cycle to Once-through Cooling.

[107] New England Power Company and Marine Research Inc. 1995. Brayton Point Station Annual Biological and Hydrological Report, January-December 1994.

[108] Boreman, J. And C.P. Goodyear. 1988. Estimates of entrainment mortality for striped bass and other fish species inhabiting the Hudson River Estuary. *American Fisheries Society Monograph* 4:152–160.

[109] Rowe, R.D., C.M. Lang, L.G. Chestnut, D.A. Latimer, D.A. Rae, S.M. Bernow, and D.E. White. 1995. *The New York Electricity Externality Study, Volume 1*. Empire State Electric Energy Research Corporation.

[110] Jones, C.A., and Y.D. Sung. 1993. *Valuation of Environmental Quality at Michigan Recreational Fishing Sites: Methodological Issues and Policy Applications*. Prepared under EPA Contract No. CR–816247 for the U.S. EPA, Washington, DC.

[111] Pumped storage facilities do not use cooling water and are therefore not subject to this final rule. However, the concept of economic valuation of losses in forage species is transferable to other types of stressors, including cooling water intake structures.

[112] Pacific Gas & Electric Company. 1996. Best Technology Available: 1995 Technical Report for the Contra Costa and Pittsburg Power Plants. Prepared for Central Valley and San Francisco Bay Regional Water Quality Control Boards.

[113] Pacific Gas & Electric Company. 1997. Best Technology Available: 1996 Technical Report for the Contra Costa and Pittsburg Power Plants. Prepared for Central Valley and San Francisco Bay Regional Water Quality Control Boards.

[114] Pacific Gas & Electric Company. 1998. Best Technology Available: 1997 Technical Report for the Contra Costa and Pittsburg Power Plants. Prepared for Central Valley and San Francisco Bay Regional Water Quality Control Boards.

[115] Pacific Gas & Electric Company. 1999. Best Technology Available: 1998 Technical Report for the Contra Costa and Pittsburg Power Plants. Prepared for Central Valley and San Francisco Bay Regional Water Quality Control Boards.

[116] South Energy California. 2000. Best Technology Available: 1999 Technical Report for the Contra Costa and Pittsburg Power Plants. Prepared for Central Valley and San Francisco Bay Regional Water Quality Control Board.

[117] Huppert, D.H. 1989. Measuring the value of fish to anglers: application to central California anadromous species. *Marine Resource Economics* 6:89–107.

[118] Public Service Electric and Gas Company. 1999. Appendix F, 1999 Permit Renewal Application, NJPDES Permit No. NJ0005622.

X. Regulatory Requirements

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order 12866, (58 *FR* 51735, October 4, 1993) the Agency must determine whether the regulatory action is "significant" and therefore subject to the Office of Management and Budget (OMB) review and the requirements of the Executive Order. The Order defines a "significant regulatory action" as one that is likely to result in a rule that may:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or Tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, it has been determined that this final rule is a "significant regulatory action." As such, this action was submitted to OMB for review. Changes made in response to OMB suggestions or recommendations will be documented in the public record.

B. Paperwork Reduction Act

The Office of Management and Budget (OMB) has approved the information collection requirements contained in this rule under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* and has assigned OMB control number 2040–0241. The information collection requirements relate to new electric generation and manufacturing facilities collecting information for baseline biological characterization, monitoring of impingement and entrainment, preparing comprehensive demonstrations, verifying compliance, and preparing yearly reports.

Since the proposal, EPA used updated sources and revised the number of facilities that will be subject to this rule (See Section IV.A.1 of this preamble). These new data sources resulted in an increase in the number of facilities projected as subject to this rule from 98 in the proposed rule analysis to 121 in the final rule. As a result, the cost and burden estimates for today's final rule have increased somewhat.

In the final rule, EPA has revised the requirements of the source water baseline biological characterization to allow the use of existing information, which lowers the cost incurred by new facilities. However, today's rule includes a Comprehensive Demonstration requirement for those facilities choosing Track II. Cost and burden estimates for today's final rule were revised accordingly.

Burden is defined as the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

The total burden of the information collection requirements associated with today's rule is estimated at 121,127 hours. The corresponding estimates of cost other than labor (labor and non-labor costs are included in the total cost of the rule discussed in Section VIII of this preamble) is $5.3 million for 18 facilities and 44 States and one Territory for the first three years after promulgation of the rule. Non-labor costs include activities such as capital costs for remote monitoring devices, laboratory services, photocopying, and the purchase of supplies. The burden and costs are for the information collection, reporting, and recordkeeping requirements for the three-year period beginning with the effective date of today's rule. Additional information collection requirements will occur after this initial three-year period as new facilities continue to be permitted and such requirements will be counted in a subsequent information collection request. EPA does not consider the specific data that would be collected under this final rule to be confidential business information. However, if a respondent does consider this information to be confidential, the respondent may request that such information be treated as confidential. All confidential data will be handled in accordance with 40 CFR 122.7, 40 CFR part 2, and EPA's Security Manual Part III, Chapter 9, dated August 9, 1976.

Compliance with the applicable information collection requirements imposed under this final rule (*see* §§ 122.21(r), 125.86, 125.87, 125.88, and 125.89) is mandatory. Before new facilities can begin operation, they would be required first to perform several data-gathering activities as part of the permit application process. Today's rule would require several distinct types of information collection as part of the NPDES application. In general, the information would be used to identify which of the requirements in today's final rule applies to the new facility, how the new facility would meet those requirements, and whether the new facility's cooling water intake structure reflects the best technology available for minimizing environmental impact. Specific data requirements of today's rule follow:

- Intake structure data, consisting of intake structure design and a facility water balance diagram, to evaluate the potential for impingement and entrainment of aquatic organisms; and
- Information on design and construction technologies implemented to ensure compliance with the applicable requirements set forth in today's rule.

In addition to the information requirements of the permit application, NPDES permits normally specify monitoring and reporting requirements to be met by the permitted entity. New facilities that fall within the scope of this rule would be required to perform biological monitoring of impingement and entrainment, monitoring of the screen or through-screen technology velocity, and visual inspections of the cooling water intake structure and any additional technologies. Additional ambient water quality monitoring may also be required of facilities depending on the specifications of their permits. The facility would be expected to analyze the results from its monitoring efforts and provide these results in an annual status report to the permitting authority. Finally, facilities would be required to maintain records of all submitted documents, supporting materials, and monitoring results for at least three years. (Note that the director may require that records be kept for a longer period to coincide with the life of the NPDES permit.)

All impacted facilities would carry out the specific activities necessary to fulfill the general information collection requirements. The estimated burden includes developing a water balance diagram that can be used to identify the proportion of intake water used for cooling, make-up, and process water. Some of the facilities (those choosing Track II) would gather performance data to determine the effectiveness of alternative technologies that reduce impingement and entrainment to levels commensurate with reductions achieved through use of recirculating wet cooling towers and document the basis of their determination in a demonstration study. The burden estimates include sampling, assessing the source waterbody, estimating the magnitude of impingement and entrainment, and reporting results in a comprehensive demonstration for certain facilities. The burden also includes conducting a pilot study to show that alternative technologies to be installed are equivalent in performance to the fast track technologies, if data are not publicly available for assessing the performance of certain technologies. Some of the facilities would need to perform additional activities related to velocity and flow reduction requirements. The burden estimates also incorporate the cost of preparing a narrative description of the design, structure, equipment, and operational features required to meet velocity and flow reductions.

In addition to the activities mentioned above, some facilities would need to prepare and submit a plan describing design characteristics of additional technologies to be installed that will reduce impingement and entrainment and maximize survival of aquatic organisms. The estimates for some facilities also incorporate the cost of sampling, analyzing, and reporting the type and number of impinged and entrained organisms; velocity monitoring; and biweekly inspections of installed technologies.

Exhibit 5 presents a summary of the maximum burden estimates for a facility to prepare a permit application and monitor and report on cooling water intake structure operations as required by this rule.

EXHIBIT 5.—MAXIMUM BURDEN AND COSTS PER FACILITY FOR NPDES PERMIT APPLICATION AND MONITORING AND REPORTING ACTIVITIES

Activities	Burden (hr)	Labor cost	Other direct costs (lump sum)[a]
Start-up activities	43	$1,585	$50
Permit application activities	146	4,598	500
Source waterbody flow information	104	3,010	100
Source water baseline biological characterization data	265	8,975	750
CWIS flow reduction requirements (Track I)	108	3,261	400
CWIS velocity requirements (Track I)	138	4,428	1,000
Design and construction technology plan (Track I)	85	2,840	50
Comprehensive demonstration study plan (Track II)[b]	383	13,563	1,000
Source water baseline biological characterization study (Track II)	5,178	274,845	13,000
Evaluation of potential CWIS effects (Track II)	2,577	135,141	500
Subtotal	9,027	452,246	17,350
Maximum Burden and Costs per Facility for Annual Monitoring and Reporting Activities			
Biological monitoring (impingement)	388	20,240	650
Biological monitoring (entrainment)	776	41,035	4,000
Velocity monitoring	163	4,993	100
Visual inspection of installed technology and remote monitoring equipment[c]	253	8,159	100
Verification monitoring (Track II)[d]	122	5,146	500
Yearly Status report activities	348	13,071	750
Subtotal	2,050	92,644	6,100

[a] Cost of supplies, filing cabinets, photocopying, boat renting, etc.
[b] The Comprehensive Demonstration Study also has contracted service costs associated with it.
[c] Remote monitoring equipment also has capital and O&M costs associated with it
[d] The verification monitoring also has contracted services associated with it.

EPA believes that all 44 States and one territory with NPDES permitting authority will undergo start-up activities in preparation for administering the provisions of the new facility rule. As part of these start-up activities, States and Territories are expected to train junior technical staff to review materials submitted by facilities, and then use these materials to evaluate compliance with the specific conditions of each facility's NPDES permit.

Each State's/Territory's actual burden associated with reviewing submitted materials, writing permits, and tracking compliance depends on the number of new in-scope facilities that will be built in the State/Territory during the ICR approval period. EPA expects that State and Territory technical and clerical staff will spend time gathering, preparing, and submitting the various documents. EPA's burden estimates reflect the general staffing and level of expertise that is typical in States/Territories that administer the NPDES permitting program. EPA considered the time and qualifications necessary to complete various tasks such as reviewing submitted documents and supporting materials, verifying data sources, planning responses, determining specific permit requirements, writing the actual permit, and conferring with facilities and the interested public. Exhibit 6 provides a summary of the burden estimates for States/Territories performing various activities associated with the final rule.

EXHIBIT 6.—ESTIMATING STATE/TERRITORY BURDEN AND COSTS FOR ACTIVITIES

Activities	Burden (hrs)	Labor cost	Other direct cost
Start-up activities (per state/territory)	100	$3,514	$50
State/territory permit issuance activities (per facility)	723	29,128	350
Annual state/territory activities (per facility)	50	1,670	50

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information, unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR Chapter 15. EPA is amending the table in 40 CFR part 9 of currently approved ICR control numbers issued by OMB for various regulations to list the information requirements contained in this final rule.

C. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector. Under section 202 of UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that might result in expenditures to State, local, and Tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that might significantly or uniquely affect small governments, including Tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant intergovernmental mandates, and informing, educating, and advising small governments on compliance with regulatory requirements.

EPA has determined that this rule does not contain a Federal mandate that might result in expenditures of $100 million or more for State, local, and Tribal governments, in the aggregate, or the private sector in any one year. Total annualized compliance and implementation costs are estimated to be $47.9 million. Of the total costs, the private sector accounts for $43.8 million and the government sector (includes direct compliance costs for facilities owned by government entities) accounts for $4.1 million. EPA calculated annualized costs by estimating initial and annual expenditures of facilities and regulatory authorities over the 30-year period (2001–2030), calculating the present value of that stream of expenditures using a 7 percent discount rate. EPA estimates that the highest undiscounted cost incurred by the private sector in any one year is approximately $71.2 million and the highest cost incurred by government sector in any one year is approximately $19.0 million. Thus, today's rule is not subject to the requirements of sections 202 and 205 of UMRA.

EPA has determined that this final rule contains no regulatory requirements that might significantly or uniquely affect small governments. Thus, today's final rule is not subject to the requirements of section 203 of UMRA. A municipality that owns or operates a new electric generation facility is the primary category of small government operations that might be affected by this rule. Existing data indicate that only four government owned facilities will be constructed in the next twenty years. All four are expected to be owned by large governments. Of these, two are expected to be State owned, one is projected to be owned by a municipality and one by a municipality market. In addition, to minimize cost, this final rule excludes facilities that take in less than two (2) million gallons per day. Details and methodologies used for these estimates are included in the *Economic Analysis* document, which is in the docket.

D. Regulatory Flexibility Act (RFA), as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 U.S.C. 601 et seq.

The RFA generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

Today's rule is intended to minimize the adverse environmental impact from cooling water intake structures and regulates new facilities that use cooling water withdrawn directly from waters of the U.S. The primary impact would be on new steam electric generating facilities (SIC 4911); however, a number of new facilities in other industries likely will also be regulated, including, but not limited to, paper and allied products (primary SIC 26), chemical and allied products (primary SIC 28), petroleum and coal products (primary SIC 29), and primary metals (primary SIC 33).

For the purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) A small business according to the Small Business Administration (SBA) size standards; (2) A small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is a not-for-profit enterprise which is independently owned and operated and is not dominant in its field. After considering the economic impacts of today's rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. This rule is expected to regulate only a small number of facilities owned by small entities, representing a very small percentage of all facilities owned by small entities in their respective industries. EPA has estimated that 11 new facilities owned by small entities would be regulated by this final rule. Of the 11 new facilities owned by small entities, 8 are steam electric generating facilities and 3 are manufacturing facilities. This rule will not regulate any small governments or small organizations.

1. Electric Generation Sector

EPA has described the process by which prospective new steam electricity generating facilities subject to today's rule were identified in Section IV.A of this preamble and in Chapter 5 of the *Economic Analysis* document. As described in Chapter 8 of that document, EPA then identified those facilities subject to the rule whose owner would be defined as a small business. The analysis used the definitions of small businesses established by the Small Business Administration (SBA). (The SBA defines small businesses based on Standard Industrial Classification (SIC) codes and size standards expressed by the number of employees, annual receipts, or electric output.) The SBA defines a small steam electric generator as a firm whose facilities generate 4 million megawatt-hours output or less. EPA has determined that 8 facilities owned by small businesses in the steam electric generating industry are likely to be regulated by today's rule.

The estimated annualized compliance costs that facilities owned by small entities would likely incur represent between 0.11 and 0.44 percent of estimated facility annual sales revenue. All but one electric generating facilities owned by a small firm incur costs less than 0.3 percent of revenues. The results of this screening analysis indicated very low impacts at the facility level. Consequently, the costs to the parent small entity would be even lower.

The absolute number of small entities potentially subject to this rule is low. This is not unexpected since the total number of facilities subject to this rule is also low, even though the electric power industry is currently experiencing a rapid expansion and transition due to deregulation and new Clean Air Act requirements for emissions controls, and a large number of generating plants are under construction or planned for the early years of the final rule. First, there is a trend toward construction of combined-cycle technologies using natural gas, which use substantially less cooling water than other technologies. Second, there has been a decline in the use of surface water as the source of cooling water. An analysis of new combined-cycle facilities, identified from the NEWGen database shows a trend toward less use of surface cooling water. The analysis showed that 66 percent of the analyzed facilities use alternative sources of cooling water (*e.g.*, grey water, ground water, municipal water, or dry cooling). EPA believes this reflects the increased competition for water, an heightened awareness of the need for water conservation, and increased local opposition to the use of surface water for power generation. Taken together, the trend toward combined-cycle generating technologies, which have small cooling water requirements per unit of output, and the movement away from the use of surface cooling water result in a low projected number of regulated facilities, despite the expected expansion in new generating capacity.

2. Manufacturing Sector

Chapter 5 of the *Economic Analysis* document shows that 38 new manufacturing facilities are expected to incur compliance costs under today's rule. Since EPA's estimate of new manufacturing facilities is based on industry growth forecasts and not on specific planned facilities, actual parent firm information was not available. EPA, therefore, developed profiles of representative new facilities based on the characteristics of existing facilities identified in EPA's Industry Survey of existing facilities.

Using SBA size standards for the firm's SIC Code, only 3 of the 38 new manufacturing facilities are projected to be owned by a small entity. One of the 3 facilities is in the chemicals sector and two are in the metals sector (in both sectors, a small entity is defined as a firm with fewer than 1,000 employees). EPA compared annualized costs to annual sales revenue to assess impacts for manufacturing firms. The test was applied at the facility rather than the firm level, which provides a conservative estimate of the impacts because the ratio of costs to revenues were relatively lower at the firm level than at the individual facility level. The impact analysis showed a negligible impact on small entities: very low effects on facility sales revenue (ranging from 0.04 to 0.08 percent).

EPA has conducted extensive outreach to industry associations and organizations representing small government jurisdictions to identify small-entity manufacturing facilities. Based on the outreach effort and a review of the relevant industry trade literature, EPA concludes that, although the exact number of facilities owned by small entities that would be subject to the rule is difficult to quantify, it is evident that for the foreseeable future few, if any, small entities would be affected. EPA estimates that only 2.9 percent of future facilities in the next twenty years owned by small entities will use cooling water at levels that would bring them within the scope of this regulation.

The small number of small entities subject to this rule in the manufacturing sector is not surprising because the facilities likely to be subject to the rule are large industrial facilities that are not generally owned by small entities. There are many reasons for the limited projected number of in-scope new facilities owned by small entities. Depending on which industry sector is considered, these include industry downsizing; expansion of capacity at existing facilities as a means of meeting increased demand; mergers and acquisitions that reduce the overall number of firms; and addition of a significant number of facilities in at least one industry sector as part of a recently completed expansion cycle so that additional new facilities are not expected for the foreseeable future. The segments of the industries that are the primary users of cooling water are mostly large, capital intensive enterprises with few, if any, small businesses within their ranks.

A final reason why this rule does not have a significant economic impact on a substantial number of small entities is that EPA has established a two (2) MGD flow as the level below which facilities would not be subject to the requirements of the rule. This minimum flow level exempts many facilities using small amounts of water, including facilities owned by small entities, while covering approximately 99 percent of the total cooling water withdrawn from the waters of the U.S. Therefore, EPA concludes that there will be a negligible increase in the number of small facilities in these manufacturing industries subject to today's final rule. Exhibit 7 summarizes the results of small entity analysis.

EXHIBIT 7.—SUMMARY OF RFA/SBREFA ANALYSIS

Type of facility	Number of facilities owned by small entities	Annual compliance costs/annual sales revenue
Steam electric generating facilities	8	0.11%–0.44%
Manufacturing facilities	3	0.04%–0.08%
Total	11	0.04% to 0.44%

Although this rule will not have a significant economic impact on a substantial number of entities, EPA nonetheless has tried to reduce the impact of this rule on small entities. In particular, EPA does not require that a facility with intake flows equal to or greater than 2 MGD and less than 10 MGD reduce its intake flow to a level commensurate with use of a closed-cycle recirculating cooling system. Instead, these facilities are required to use the less costly design and construction technologies for minimizing entrainment at all locations. See 125.84(c)(4). EPA believes that the requirements of § 125.84(c) are an economically practicable way for these facilities to reduce impingement mortality and entrainment. EPA consulted many times with the Small Business Administration on matters associated with this rule. Upon invitation, EPA met several times with a mix of small businesses interested in this rule.

E. Executive Order 13132: Federalism

Executive Order 13132 (64 *FR* 43255, August 10, 1999) requires EPA to develop an accountable process to ensure "meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications." "Policies that have federalism implications" is defined in the Executive Order to include regulations that have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government."

This final rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. Rather, this final rule would result in minimal administrative costs on States that have an authorized NPDES program. The annualized state implementation cost over the 30-year analysis period (2001 to 2030) is approximately $240,000 total for all States per year. Also, based on meetings and subsequent discussions with local government representatives from municipal utilities, EPA believes that the final new facility rule may affect, at most, only two large municipalities that own steam electric generating facilities. The annual impacts on these facilities is not expected to exceed 1,304 burden hours and $36,106 (non-labor costs) per facility.

The national cooling water intake structure requirements would be implemented through permits issued under the NPDES program. Forty-four States and the Virgin Islands are currently authorized pursuant to section 402(b) of the CWA to implement the NPDES program. In States not authorized to implement the NPDES program, EPA issues NPDES permits. Under the CWA, States are not required to become authorized to administer the NPDES program. Rather, such authorization is available to States if they operate their programs in a manner consistent with section 402(b) and applicable regulations. Generally, these provisions require that State NPDES programs include requirements that are as stringent as Federal program requirements. States retain the ability to implement requirements that are broader in scope or more stringent than Federal requirements. (See section 510 of the CWA)

Today's final rule would not have substantial direct effects on States or on local governments because it would not change how EPA and the States and local governments interact or their respective authority or responsibilities for implementing the NPDES program. Today's final rule establishes national requirements for new facilities with cooling water intake structures. NPDES-authorized States that currently do not comply with the final regulations might need to amend their regulations or statutes to ensure that their NPDES programs are consistent with Federal section 316(b) requirements. See 40 CFR 123.62(e). For purposes of this final rule, the relationship and distribution of power and responsibilities between the Federal government and the States and local governments are established under the CWA (e.g., sections 402(b) and 510); nothing in this final rule would alter that. Thus, Executive Order 13132 does not apply to this rule.

Although section 6 of Executive Order 13132 does not apply to this rule, EPA did consult with State governments and representatives of local governments in developing the rule. During the development of the section 316(b) rule for new facilities, EPA conducted several outreach activities through which State and local officials were informed about the proposed rule and they provided information and comments to the Agency.

EPA also held two public meetings in the summer of 1998 to discuss issues related to the section 316(b) rulemaking effort. Representatives from New York and Maryland attended the meetings and provided input to the Agency. The Agency also contacted Pennsylvania and Virginia to exchange information on this issue. In addition, EPA Regions 1, 3, 4, and 9 served as conduits for transmittal of section 316(b) information between the Agency and several States. In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicited comment on the proposed rule from State and local officials. More recently, EPA met with industry, environmental, and State and Federal government representatives, during May, June, and July 2001 to discuss regulatory alternatives for the new facility rule. The States that EPA consulted with or received public comment from, in general, supported the technology-based rule which focused on reducing the impingement mortality and entrainment resulting from cooling water intake structures. In particular, many States endorsed the 2 MGD threshold, capacity reduction, and proportional flow restrictions. A few States wanted more flexibility, whereas others wanted more stringent technology-based performance standards. EPA believes that it has achieved a balance between these two opposite concerns in establishing the two-track approach.

F. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898 requires that, to the greatest extent practicable and permitted by law, each Federal agency must make achieving environmental justice part of its mission. Executive Order 12898 provides that each Federal agency must conduct its programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under such programs, policies, and activities because of their race, color, or national origin.

Today's final rule would require that the location, design, construction, and capacity of cooling water intake structures at new facilities reflect the best technology available for minimizing adverse environmental impact. For several reasons, EPA does not expect that this final rule would have an exclusionary effect, deny persons the benefits of the NPDES program, or subject persons to discrimination because of their race, color, or national origin. The final rule applies only to new facilities with cooling water intake structures that withdraw waters of the U.S. As discussed previously, EPA anticipates that this final rule would not affect a large number of new facilities; therefore, any impacts of the final rule would be limited. The final rule does include location criteria that would affect siting decisions made by new facilities, these criteria are intended to prevent deterioration of our nation's aquatic resources. EPA expects that this final rule would preserve the health of aquatic ecosystems located in reasonable proximity to new cooling water intake structures and that all populations, including minority and low-income populations, would benefit from such improved environmental conditions. In addition, because the final rule would help prevent decreases in populations of fish and other aquatic species, it is likely to help maintain the welfare of subsistence and other low-income fishermen or minority low-income populations.

G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

Executive Order 13045 (62 *FR* 19885, April 23, 1997) applies to any rule that (1) is determined to be "economically significant" as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe might have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health and safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency. This final rule is not an economically significant rule as defined under Executive Order 12866 and does not concern an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. Therefore, it is not subject to Executive Order 13045.

H. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175, entitled "Consultation and Coordination with Indian Tribal Governments" (65 FR 67249, November 6, 2000), requires EPA to develop an accountable process to ensure "meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications." "Policies that have tribal implications" is defined in the Executive Order to include regulations that have "substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and the Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes."

This final rule does not have tribal implications. It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in Executive Order 13175. Given the available data on new facilities and the applicability thresholds in the final rule, EPA estimates that no new facilities subject to this final rule will be owned by tribal governments. This rule does not affect tribes in any way in the foreseeable future. Accordingly, the requirements of Executive Order 13175 do not apply to this rule.

I. Executive Order 13158: Marine Protected Areas

Executive Order 13158 (65 FR 34909, May 31, 2000) requires EPA to "expeditiously propose new science-based regulations, as necessary, to ensure appropriate levels of protection for the marine environment." EPA may take action to enhance or expand protection of existing marine protected areas and to establish or recommend, as appropriate, new marine protected areas. The purpose of the Executive Order is to protect the significant natural and cultural resources within the marine environment, which means "those areas of coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands thereunder, over which the United States exercises jurisdiction, consistent with international law."

Today's final rule implements section 316(b) of the Clean Water Act (CWA) for new facilities that use water withdrawn from rivers, streams, lakes, reservoirs, estuaries, oceans or other waters of the United States (U.S.) for cooling water purposes. The final rule establishes national technology-based performance requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities. The national requirements establish the best technology available for minimizing adverse environmental impact associated with the use of these structures. It also requires the permit applicant to select and implement design and construction technologies to minimize impingement mortality and entrainment.

EPA expects that this final regulation will reduce impingement and entrainment at new facilities. The rule will afford protection of aquatic organisms at individual, population, community, or ecosystem levels of ecological structures. Therefore, EPA expects today's rule will advance the objective of the Executive Order to protect marine areas.

J. Executive Order 13211 (Energy Effects)

This rule is not a "significant energy action" as defined in Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use" (66 FR 28355; May 22, 2001) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

Track I of the final section 316(b) new facility rule requires facilities with an intake flow equal to or greater than 10 MGD to install a recirculating system or other technologies that would reduce the design intake flow to a level commensurate with that of a recirculating system. For the purposes of this Statement of Energy Effects, EPA believes that facilities that do not already plan to install a recirculating system in the baseline will install a recirculating wet cooling tower to achieve compliance with the rule (9 power plants). Installation of a cooling tower imposes an "energy penalty," consisting of two components: (1) A reduction in unit efficiency due to increased turbine back-pressure; and (2) an increase in auxiliary power requirements to operate the recirculating wet cooling tower. EPA estimates that the installation of 9 recirculating wet cooling towers as a result of this rule (that is, those installed at new power plants that would otherwise not utilize recirculating wet cooling in absence of the rule) would reduce available generating capacity by a maximum of 100 megawatts (MW) nationally. EPA also considered the energy requirements of other compliance technologies, such as rotating screens, but found them insignificant and thus excluded them from this analysis.

EPA estimates that 4 new coal-fired power plants and 5 new combined-cycle power plants will install a recirculating wet cooling tower to comply with the final section 316(b) new facility rule. The estimated generating capacity of the four new coal facilities ranges from 63 MW to 3,564 MW. Each of the five combined-cycle facilities has a generating capacity of 1,031 MW. The estimated mean annual energy penalty is 1.65 percent of the generating capacity for coal-fired facilities and 0.40 percent for combined-cycle facilities. As a result, the installation of recirculating wet cooling towers to comply with the final rule is likely to reduce available energy supply by an average of approximately 74 MW per year over the next 20 years (2001 to 2020). The reduction will reach a maximum of 100 MW in 2017, when all 9 facilities are projected to have begun operation (*see* Section IV.A.1 of this preamble for details on the projected number and cooling water characteristics of new electric generators). These reductions are actually an overestimate due to the fact that some facilities may choose to comply with Track II and implement technologies other than recirculating wet cooling towers.

EPA believes that the estimated reduction in available energy supply as a result of the final section 316(b) rule does not constitute a significant energy effect. During the period covered by EPA's new facility projection, 2001 to 2020, the Energy Information Administration (EIA) forecasts total new capacity additions of 370 gigawatts (GW) (1 GW = 1,000 MW) and an average available generating capability of 921 GW. Compared to the EIA forecasts, the estimated energy effect of the final rule is insignificant, comprising only 0.03 percent of total new capacity (100 MW/370 GW) and 0.008 percent of the average available generating capability (74 MW/921 GW) at new facilities. Chapter 9 of the *Economic Analysis* provides more detail about the estimated energy effect of the final section 316(b) new facility rule. Chapter 3 of the *Technical Development Document* further discusses energy penalty estimation.

K. National Technology Transfer and Advancement Act

As noted in the proposed rule, section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) of 1995, Pub L. 104–113, section 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standard bodies. The NTTAA directs EPA to provide Congress, through the Office of Management and Budget (OMB), explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This final rule does not involve technical standards. Therefore, EPA did not consider the use of any voluntary consensus standards.

L. Plain Language Directive

Executive Order 12866 requires each agency to write all rules in plain language. EPA has written this final rule in plain language to make the rule easier to understand. EPA specifically solicited comment on how to make this rule easier to understand. EPA received no comments on the plain language of the proposal or NODA.

M. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not considered a "major rule" as defined by 5 U.S.C. 804(2). This rule will be effective January 17, 2002.

List of Subjects

40 CFR Part 9

Environmental protection, Reporting and recordkeeping requirements.

40 CFR Part 122

Environmental protection, Administrative practice and procedure, Confidential business information, Hazardous substances, Reporting and recordkeeping requirements, Water pollution control.

40 CFR Part 123

Environmental protection, Administrative practice and procedure, Confidential business information, Hazardous substances, Indian-lands, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Water pollution control.

40 CFR Part 124

Environmental protection, Administrative practice and procedure, Air pollution control, Hazardous waste, Indians-lands, Reporting and recordkeeping requirements, Water pollution control, Water supply.

40 CFR Part 125

Environmental protection, Reporting and recordkeeping requirements, Waste treatment and disposal, Water pollution control.

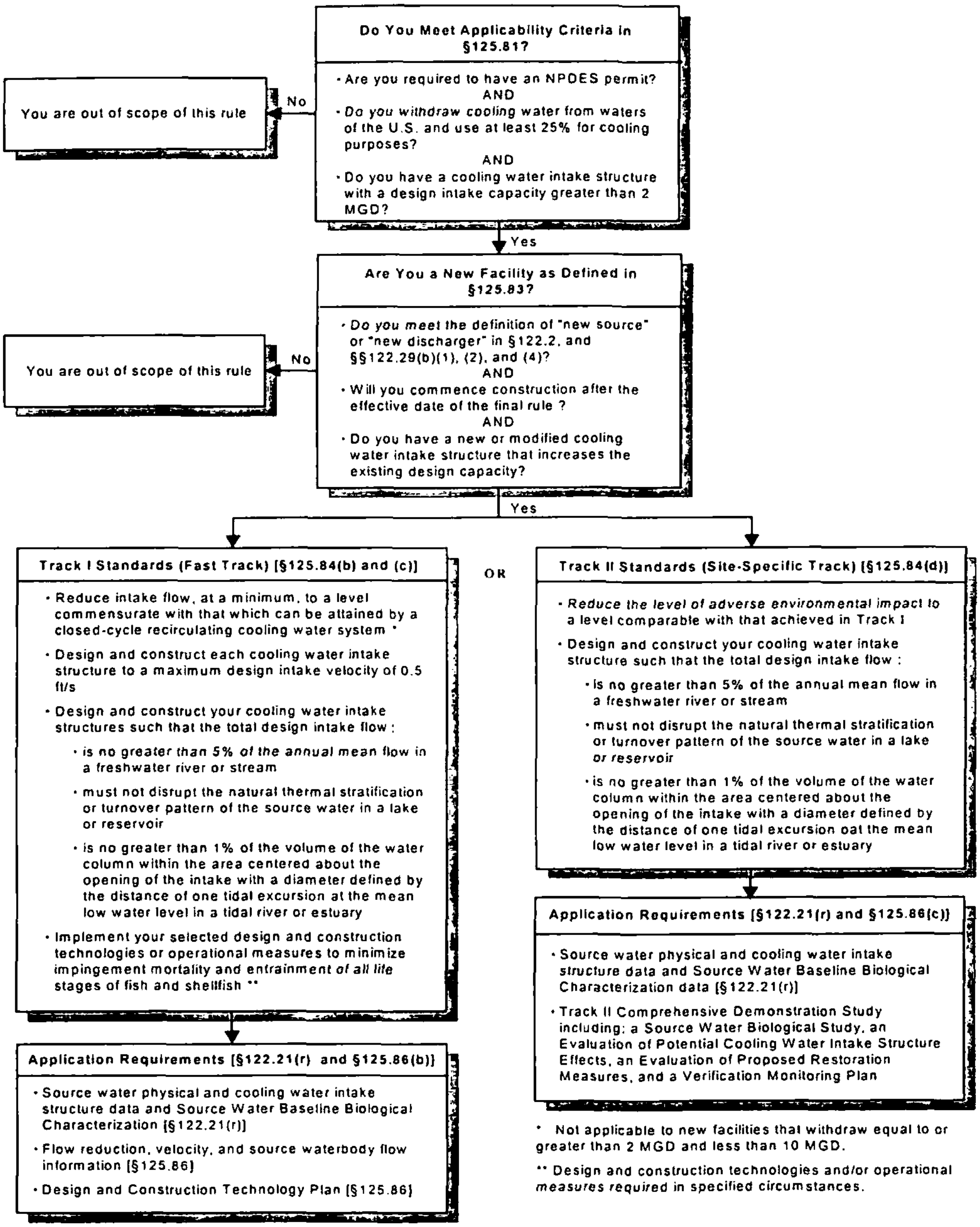
Dated: November 9, 2001.

Christine Todd Whitman,

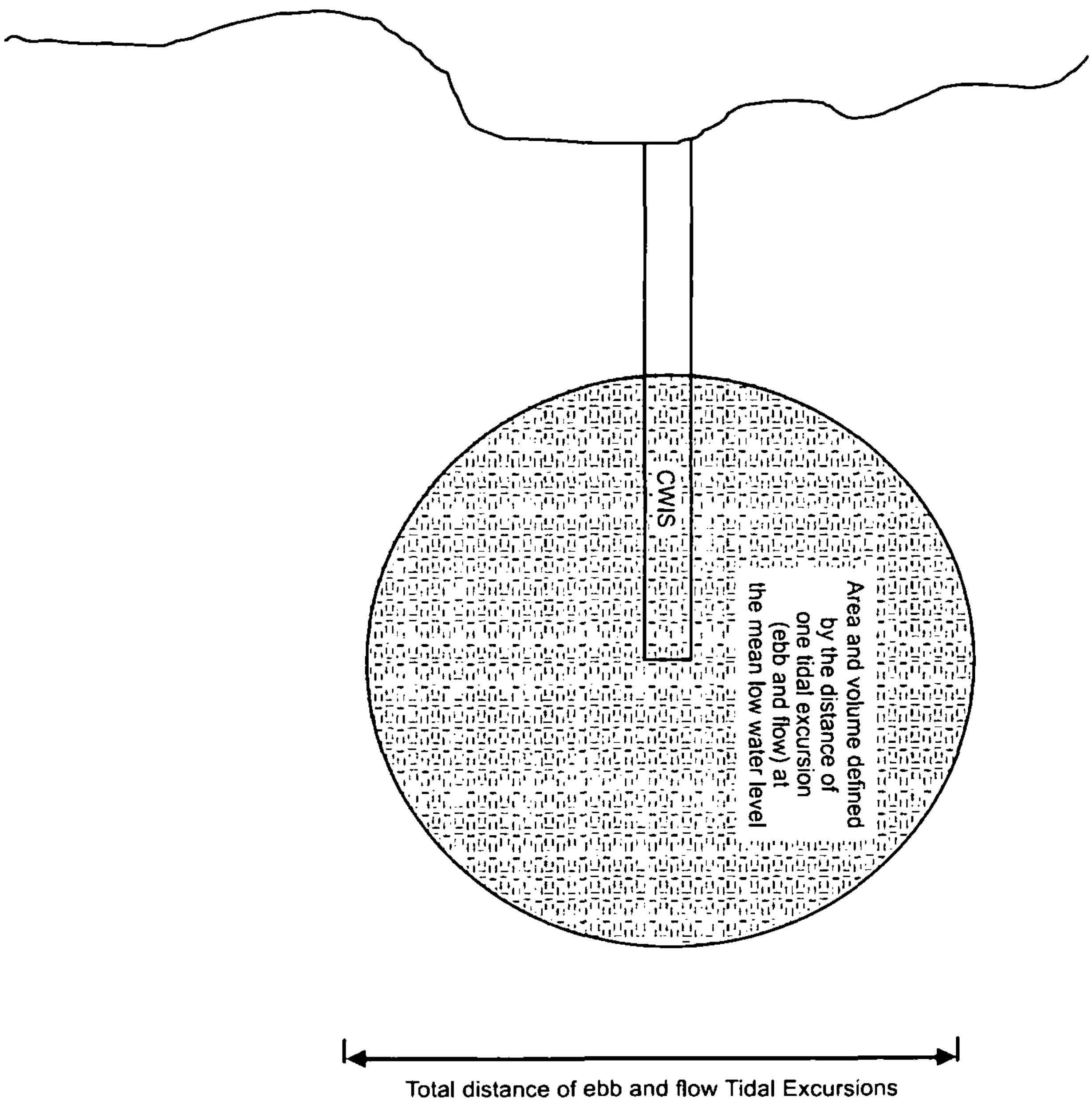
Administrator.

BILLING CODE 6560–50–P

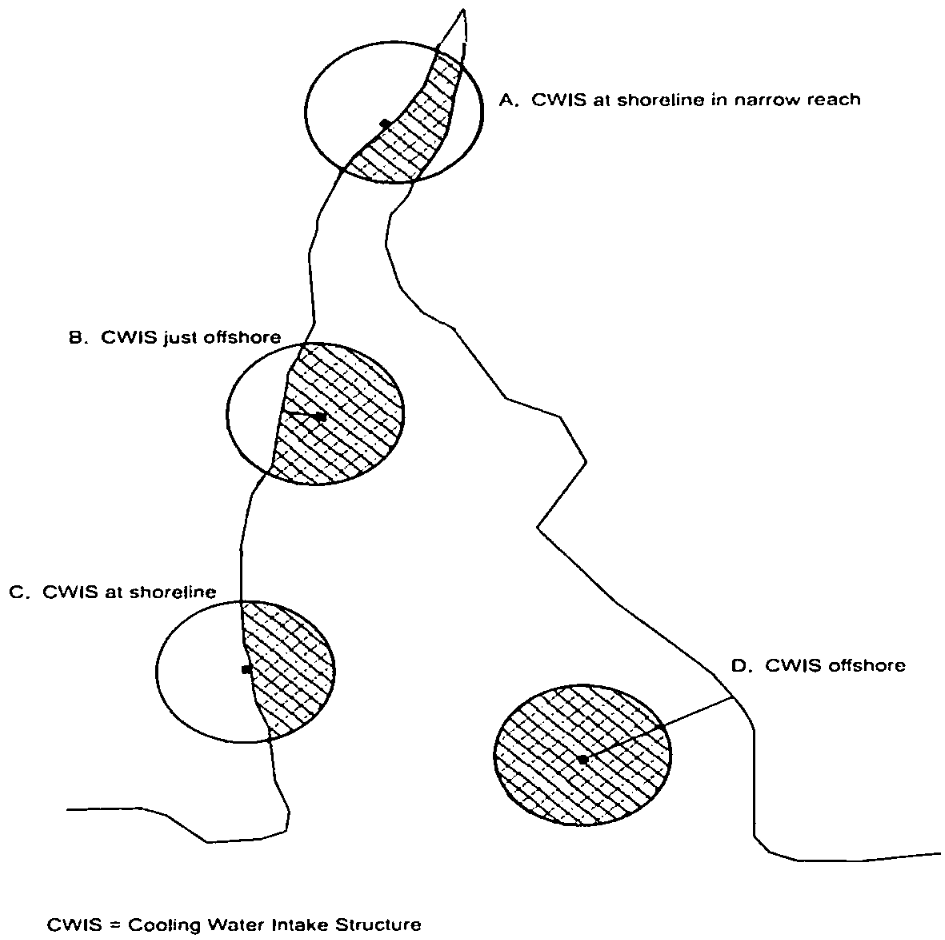
Appendix 1 to The Preamble—Section 316(b) New Facility Rule Framework



Appendix 2 to The Preamble—Illustration of Flow Requirement for Estuaries and Tidal Rivers



Appendix 3 to The Preamble—Examples of Areas and Volumes Defined in Estuaries or Tidal Rivers By The Tidal Excursion Distance



BILLING CODE 6560–50–C

For the reasons set forth in the preamble, chapter I of title 40 of the Code of Federal Regulations is amended as follows:

PART 9—OMB APPROVALS UNDER THE PAPERWORK REDUCTION ACT

1. The authority citation for part 9 continues to read as follows:

Authority: 7 U.S.C. 135 *et seq.*, 136–136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601–2671, 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251 *et seq.*, 1311, 1313d, 1314, 1318, 1321, 1326, 1330, 1342, 1344, 1345 (d) and (e), 1361; E.O. 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–1, 300j–2, 300j–3, 300j–4, 300j–9, 1857 *et seq.*, 6901–6992k, 7401–7671q, 7542, 9601–9657, 11023, 11048.

2. In § 9.1 the table is amended by adding entries in numerical order under the indicated heading to read as follows:

§ 9.1 OMB approvals under the Paperwork Reduction Act.

* * * * *

40 CFR citation	OMB Control No.
* * * * *	
EPA Administered Permit Programs: The National Pollutant Discharge Elimination System	
* * * * *	
122.21(r)	2040–0241
* * * * *	
Criteria and Standards for the National Pollutant Discharge Elimination System	
* * * * *	
125.86	2040–0241
125.87	2040–0241
125.88	2040–0241
125.89	2040–0241

* * * * *

PART 122—EPA ADMINISTERED PERMIT PROGRAMS: THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

1. The authority citation for part 122 continues to read as follows:

Authority: The Clean Water Act, 33 U.S.C. 1251 *et seq.*

2. Section 122.21 is amended by adding a new paragraph (r) to read as follows:

§ 122.21 Application for a permit (applicable to State programs, see § 123.25)

* * * * *

(r) *Applications for facilities with cooling water intake structures*—(1) *New facilities with new or modified cooling water intake structures.* New facilities with cooling water intake structures as defined in part 125, subpart I, of this chapter must report the information required under paragraphs (r)(2), (3), and (4) of this section and § 125.86 of this chapter. Requests for alternative requirements under § 125.85 of this chapter must be submitted with your permit application.

(2) *Source water physical data.* These include:

(i) A narrative description and scaled drawings showing the physical configuration of all source water bodies used by your facility, including areal dimensions, depths, salinity and temperature regimes, and other documentation that supports your determination of the water body type where each cooling water intake structure is located;

(ii) Identification and characterization of the source waterbody's hydrological and geomorphological features, as well as the methods you used to conduct any physical studies to determine your intake's area of influence within the waterbody and the results of such studies; and

(iii) Locational maps.

(3) *Cooling water intake structure data.* These include:

(i) A narrative description of the configuration of each of your cooling water intake structures and where it is located in the water body and in the water column;

(ii) Latitude and longitude in degrees, minutes, and seconds for each of your cooling water intake structures;

(iii) A narrative description of the operation of each of your cooling water intake structures, including design intake flows, daily hours of operation, number of days of the year in operation and seasonal changes, if applicable;

(iv) A flow distribution and water balance diagram that includes all sources of water to the facility, recirculating flows, and discharges; and

(v) Engineering drawings of the cooling water intake structure.

(4) *Source water baseline biological characterization data.* This information is required to characterize the biological community in the vicinity of the cooling water intake structure and to characterize the operation of the cooling water intake structures. The Director may also use this information in subsequent permit renewal proceedings to determine if your Design and Construction Technology Plan as required in § 125.86(b)(4) of this chapter should be revised. This supporting information must include existing data (if they are available). However, you may supplement the data using newly conducted field studies if you choose to do so. The information you submit must include:

(i) A list of the data in paragraphs (r)(4)(ii) through (vi) of this section that are not available and efforts made to identify sources of the data;

(ii) A list of species (or relevant taxa) for all life stages and their relative abundance in the vicinity of the cooling water intake structure;

(iii) Identification of the species and life stages that would be most susceptible to impingement and entrainment. Species evaluated should include the forage base as well as those most important in terms of significance to commercial and recreational fisheries;

(iv) Identification and evaluation of the primary period of reproduction, larval recruitment, and period of peak abundance for relevant taxa;

(v) Data representative of the seasonal and daily activities (e.g., feeding and water column migration) of biological organisms in the vicinity of the cooling water intake structure;

(vi) Identification of all threatened, endangered, and other protected species that might be susceptible to impingement and entrainment at your cooling water intake structures;

(vii) Documentation of any public participation or consultation with Federal or State agencies undertaken in development of the plan; and

(viii) If you supplement the information requested in paragraph (r)(4)(i) of this section with data collected using field studies, supporting documentation for the Source Water Baseline Biological Characterization must include a description of all methods and quality assurance procedures for sampling, and data analysis including a description of the study area; taxonomic identification of sampled and evaluated biological assemblages (including all life stages of fish and shellfish); and sampling and data analysis methods. The sampling and/or data analysis methods you use must be appropriate for a quantitative survey and based on consideration of methods used in other biological studies performed within the same source water body. The study area should include, at a minimum, the area of influence of the cooling water intake structure.

3. Section 122.44 is amended by adding paragraph (b)(3) to read as follows:

§ 122.44 Establishing limitations, standards, and other permit conditions (applicable to State NPDES programs, see § 123.25).

* * * * *

(b) * * *

(3) Requirements applicable to cooling water intake structures at new facilities under section 316(b) of the CWA, in accordance with part 125, subpart I, of this chapter.

* * * * *

PART 123—STATE PROGRAM REQUIREMENTS

1. The authority citation for part 123 continues to read as follows:

Authority: The Clean Water Act, 33 U.S.C. 1251 *et seq.*

2. Section 123.25 is amended by revising paragraph (a)(36) to read as follows:

§ 123.25 Requirements for permitting.

(a) * * *

(36) Subparts A, B, D, H, and I of part 125 of this chapter;

* * * * *

PART 124—PROCEDURES FOR DECISIONMAKING

1. The authority citation for part 124 continues to read as follows:

Authority: Resource Conservation and Recovery Act, 42 U.S.C. 6901 *et seq.*; Safe Drinking Water Act, 42 U.S.C. 300f *et seq.*; Clean Water Act, 33 U.S.C. 1251 *et seq.*; Clean Air Act, 42 U.S.C. 7401 *et seq.*

2. Section 124.10 is amended by redesignating paragraph (d)(1)(ix) as paragraph (d)(1)(x) and adding a new paragraph (d)(1)(ix) to read as follows:

§ 124.10 Public notice of permit actions and public comment period.

* * * * *

(d) * * *

(1) * * *

(ix) Requirements applicable to cooling water intake structures at new facilities under section 316(b) of the CWA, in accordance with part 125, subpart I, of this chapter.

* * * * *

PART 125—CRITERIA AND STANDARDS FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

1. The authority citation for part 125 continues to read as follows:

Authority: The Clean Water Act, 33 U.S.C. 1251 *et seq.*, unless otherwise noted.

2. Remove the existing heading for subpart I and add new subpart I to part 125 to read as follows:

Subpart I—Requirements Applicable to Cooling Water Intake Structures for New Facilities Under Section 316(b) of the Act

Sec.

Subpart I—Requirements Applicable to Cooling Water Intake Structures for New Facilities Under Section 316(b) of the Act

§ 125.80 What are the purpose and scope of this subpart?

(a) This subpart establishes requirements that apply to the location, design, construction, and capacity of cooling water intake structures at new facilities. The purpose of these requirements is to establish the best technology available for minimizing adverse environmental impact associated with the use of cooling water intake structures. These requirements are implemented through National Pollutant Discharge Elimination System (NPDES) permits issued under section 402 of the Clean Water Act (CWA).

(b) This subpart implements section 316(b) of the CWA for new facilities. Section 316(b) of the CWA provides that any standard established pursuant to sections 301 or 306 of the CWA and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

(c) New facilities that do not meet the threshold requirements regarding amount of water withdrawn or percentage of water withdrawn for cooling water purposes in § 125.81(a) must meet requirements determined on a case-by-case, best professional judgement (BPJ) basis.

(d) Nothing in this subpart shall be construed to preclude or deny the right of any State or political subdivision of a State or any interstate agency under section 510 of the CWA to adopt or enforce any requirement with respect to control or abatement of pollution that is more stringent than those required by Federal law.

§ 125.81 Who is subject to this subpart?

(a) This subpart applies to a new facility if it:

(1) Is a point source that uses or proposes to use a cooling water intake structure;

(2) Has at least one cooling water intake structure that uses at least 25 percent of the water it withdraws for cooling purposes as specified in paragraph (c) of this section; and

(3) Has a design intake flow greater than two (2) million gallons per day (MGD).

(b) Use of a cooling water intake structure includes obtaining cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States. Use of cooling water does not include obtaining cooling water from a public water system or the use of treated effluent that otherwise would be discharged to a water of the U.S. This provision is intended to prevent circumvention of these requirements by creating arrangements to receive cooling water from an entity that is not itself a point source.

(c) The threshold requirement that at least 25 percent of water withdrawn be used for cooling purposes must be measured on an average monthly basis. A new facility meets the 25 percent cooling water threshold if, based on the new facility's design, any monthly average over a year for the percentage of cooling water withdrawn is expected to equal or exceed 25 percent of the total water withdrawn.

(d) This subpart does not apply to facilities that employ cooling water intake structures in the offshore and coastal subcategories of the oil and gas extraction point source category as defined under 40 CFR 435.10 and 40 CFR 435.40.

§ 125.82 When must I comply with this subpart?

You must comply with this subpart when an NPDES permit containing requirements consistent with this subpart is issued to you.

§ 125.83 What special definitions apply to this subpart?

The following special definitions apply to this subpart:

Annual mean flow means the average of daily flows over a calendar year.

Historical data (up to 10 years) must be used where available.

Closed-cycle recirculating system means a system designed, using minimized makeup and blowdown flows, to withdraw water from a natural or other water source to support contact and/or noncontact cooling uses within a facility. The water is usually sent to a cooling canal or channel, lake, pond, or tower to allow waste heat to be dissipated to the atmosphere and then is returned to the system. (Some facilities divert the waste heat to other process operations.) New source water (make-up water) is added to the system to replenish losses that have occurred due to blowdown, drift, and evaporation.

Cooling water means water used for contact or noncontact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content. The intended use of the cooling water is to absorb waste heat rejected from the process or processes used, or from auxiliary operations on the facility's premises. Cooling water that is used in a manufacturing process either before or after it is used for cooling is considered process water for the purposes of calculating the percentage of a new facility's intake flow that is used for cooling purposes in § 125.81(c).

Cooling water intake structure means the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the U.S. The cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps.

Design intake flow means the value assigned (during the facility's design) to the total volume of water withdrawn from a source water body over a specific time period.

Design intake velocity means the value assigned (during the design of a cooling water intake structure) to the average speed at which intake water passes through the open area of the intake screen (or other device) against which organisms might be impinged or through which they might be entrained.

Entrainment means the incorporation of all life stages of fish and shellfish with intake water flow entering and passing through a cooling water intake structure and into a cooling water system.

Estuary means a semi-enclosed body of water that has a free connection with open seas and within which the seawater is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 parts per thousand (by mass) but is typically less than 30 parts per thousand (by mass).

Existing facility means any facility that is not a new facility.

Freshwater river or stream means a lotic (free-flowing) system that does not receive significant inflows of water from oceans or bays due to tidal action. For the purposes of this rule, a flow-through reservoir with a retention time of 7 days or less will be considered a freshwater river or stream.

Hydraulic zone of influence means that portion of the source waterbody hydraulically affected by the cooling water intake structure withdrawal of water.

Impingement means the entrapment of all life stages of fish and shellfish on the outer part of an intake structure or against a screening device during periods of intake water withdrawal.

Lake or *reservoir* means any inland body of open water with some minimum surface area free of rooted vegetation and with an average hydraulic retention time of more than 7 days. Lakes or reservoirs might be natural water bodies or impounded streams, usually fresh, surrounded by land or by land and a man-made retainer (e.g., a dam). Lakes or reservoirs might be fed by rivers, streams, springs, and/or local precipitation. Flow-through reservoirs with an average hydraulic retention time of 7 days or less should be considered a freshwater river or stream.

Maximize means to increase to the greatest amount, extent, or degree reasonably possible.

Minimum ambient source water surface elevation means the elevation of the 7Q10 flow for freshwater streams or rivers; the conservation pool level for lakes or reservoirs; or the mean low tidal water level for estuaries or oceans. The 7Q10 flow is the lowest average 7 consecutive day low flow with an average frequency of one in 10 years determined hydrologically. The conservation pool is the minimum depth of water needed in a reservoir to ensure proper performance of the system relying upon the reservoir. The mean low tidal water level is the average height of the low water over at least 19 years.

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

Natural thermal stratification means the naturally-occurring division of a waterbody into horizontal layers of differing densities as a result of variations in temperature at different depths.

New facility means any building, structure, facility, or installation that meets the definition of a "new source" or "new discharger" in 40 CFR 122.2 and 122.29(b)(1), (2), and (4) and is a greenfield or stand-alone facility; commences construction after January 17, 2002; and uses either a newly constructed cooling water intake structure, or an existing cooling water intake structure whose design capacity is increased to accommodate the intake of additional cooling water. New facilities include only "greenfield" and "stand-alone" facilities. A greenfield facility is a facility that is constructed at a site at which no other source is located, or that totally replaces the process or production equipment at an existing facility (*see* 40 CFR 122.29(b)(1)(i) and (ii)). A stand-alone facility is a new, separate facility that is constructed on property where an existing facility is located and whose processes are substantially independent of the existing facility at the same site (*see* 40 CFR 122.29(b)(1)(iii)). New facility does not include new units that are added to a facility for purposes of the same general industrial operation (for example, a new peaking unit at an electrical generating station).

(1) Examples of "new facilities" include, but are not limited to: the following scenarios:

(i) A new facility is constructed on a site that has never been used for industrial or commercial activity. It has a new cooling water intake structure for its own use.

(ii) A facility is demolished and another facility is constructed in its place. The newly-constructed facility uses the original facility's cooling water intake structure, but modifies it to increase the design capacity to accommodate the intake of additional cooling water.

(iii) A facility is constructed on the same property as an existing facility, but is a separate and independent industrial operation. The cooling water intake structure used by the original facility is modified by constructing a new intake bay for the use of the newly constructed facility or is otherwise modified to increase the intake capacity for the new facility.

(2) Examples of facilities that would not be considered a "new facility" include, but are not limited to, the following scenarios:

(i) A facility in commercial or industrial operation is modified and either continues to use its original cooling water intake structure or uses a new or modified cooling water intake structure.

(ii) A facility has an existing intake structure. Another facility (a separate and independent industrial operation), is constructed on the same property and connects to the facility's cooling water intake structure behind the intake pumps, and the design capacity of the cooling water intake structure has not been increased. This facility would not be considered a "new facility" even if routine maintenance or repairs that do not increase the design capacity were performed on the intake structure.

Ocean means marine open coastal waters with a salinity greater than or equal to 30 parts per thousand (by mass).

Source water means the water body (waters of the U.S.) from which the cooling water is withdrawn.

Thermocline means the middle layer of a thermally stratified lake or reservoir. In this layer, there is a rapid decrease in temperatures.

Tidal excursion means the horizontal distance along the estuary or tidal river that a particle moves during one tidal cycle of ebb and flow.

Tidal river means the most seaward reach of a river or stream where the salinity is typically less than or equal to 0.5 parts per thousand (by mass) at a time of annual low flow and whose surface elevation responds to the effects of coastal lunar tides.

§ 125.84 As an owner or operator of a new facility, what must I do to comply with this subpart?

(a)(1) The owner or operator of a new facility must comply with either:

(i) Track I in paragraph (b) or (c) of this section; or

(ii) Track II in paragraph (d) of this section.

(2) In addition to meeting the requirements in paragraph (b), (c), or (d) of this section, the owner or operator of a new facility may be required to comply with paragraph (e) of this section.

(b) *Track I requirements for new facilities that withdraw equal to or greater than 10 MGD.* You must comply with all of the following requirements:

(1) You must reduce your intake flow, at a minimum, to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system;

(2) You must design and construct each cooling water intake structure at your facility to a maximum through-screen design intake velocity of 0.5 ft/s;

(3) You must design and construct your cooling water intake structure such that the total design intake flow from all cooling water intake structures at your facility meets the following requirements:

(i) For cooling water intake structures located in a freshwater river or stream, the total design intake flow must be no greater than five (5) percent of the source water annual mean flow;

(ii) For cooling water intake structures located in a lake or reservoir, the total design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);

(iii) For cooling water intake structures located in an estuary or tidal river, the total design intake flow over one tidal cycle of ebb and flow must be no greater than one (1) percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level;

(4) You must select and implement design and construction technologies or operational measures for minimizing impingement mortality of fish and shellfish if:

(i) There are threatened or endangered or otherwise protected federal, state, or tribal species, or critical habitat for these species, within the hydraulic zone of influence of the cooling water intake structure; or

(ii) There are migratory and/or sport or commercial species of impingement concern to the Director or any fishery management agency(ies), which pass through the hydraulic zone of influence of the cooling water intake structure; or

(iii) It is determined by the Director or any fishery management agency(ies) that the proposed facility, after meeting the technology-based performance requirements in paragraphs (b)(1), (2), and (3) of this section, would still contribute unacceptable stress to the protected species, critical habitat of those species, or species of concern;

(5) You must select and implement design and construction technologies or operational measures for minimizing entrainment of entrainable life stages of fish and shellfish if:

(i) There are threatened or endangered or otherwise protected federal, state, or tribal species, or critical habitat for these species, within the hydraulic zone of influence of the cooling water intake structure; or

(ii) There are or would be undesirable cumulative stressors affecting entrainable life stages of species of concern to the Director or any fishery management agency(ies), and it is determined by the Director or any fishery management agency(ies) that the proposed facility, after meeting the technology-based performance requirements in paragraphs (b)(1), (2), and (3) of this section, would contribute unacceptable stress to these species of concern;

(6) You must submit the application information required in 40 CFR 122.21(r) and § 125.86(b);

(7) You must implement the monitoring requirements specified in § 125.87;

(8) You must implement the record-keeping requirements specified in § 125.88.

(c) *Track I requirements for new facilities that withdraw equal to or greater than 2 MGD and less than 10 MGD and that choose not to comply with paragraph (b) of this section.* You must comply with all the following requirements:

(1) You must design and construct each cooling water intake structure at your facility to a maximum through-screen design intake velocity of 0.5 ft/s;

(2) You must design and construct your cooling water intake structure such that the total design intake flow from all cooling water intake structures at your facility meets the following requirements:

(i) For cooling water intake structures located in a freshwater river or stream, the total design intake flow must be no greater than five (5) percent of the source water annual mean flow;

(ii) For cooling water intake structures located in a lake or reservoir, the total design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);

(iii) For cooling water intake structures located in an estuary or tidal river, the total design intake flow over one tidal cycle of ebb and flow must be no greater than one (1) percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level;

(3) You must select and implement design and construction technologies or operational measures for minimizing impingement mortality of fish and shellfish if:

(i) There are threatened or endangered or otherwise protected federal, state, or tribal species, or critical habitat for these species, within the hydraulic zone of influence of the cooling water intake structure; or

(ii) There are migratory and/or sport or commercial species of impingement concern to the Director or any fishery management agency(ies), which pass through the hydraulic zone of influence of the cooling water intake structure; or

(iii) It is determined by the Director or any fishery management agency(ies) that the proposed facility, after meeting the technology-based performance requirements in paragraphs (c)(1) and (2) of this section, would still contribute unacceptable stress to the protected species, critical habitat of those species, or species of concern;

(4) You must select and implement design and construction technologies or operational measures for minimizing entrainment of entrainable life stages of fish and shellfish;

(5) You must submit the application information required in 40 CFR 122.21(r) and § 125.86(b)(2), (3), and (4);

(6) You must implement the monitoring requirements specified in § 125.87;

(7) You must implement the recordkeeping requirements specified in § 125.88.

(d) *Track II.* The owner or operator of a new facility that chooses to comply under Track II must comply with the following requirements:

(1) You must demonstrate to the Director that the technologies employed will reduce the level of adverse environmental impact from your cooling water intake structures to a comparable level to that which you would achieve were you to implement the requirements of paragraphs (b)(1) and (2) of this section.

(i) Except as specified in paragraph (d)(1)(ii) of this section, this demonstration must include a showing that the impacts to fish and shellfish, including important forage and predator species, within the watershed will be comparable to those which would result if you were to implement the requirements of paragraphs (b)(1) and (2) of this section. This showing may include consideration of impacts other than impingement mortality and entrainment, including measures that will result in increases in fish and shellfish, but it must demonstrate comparable performance for species that the Director, in consultation with national, state or tribal fishery management agencies with responsibility for fisheries potentially affected by your cooling water intake structure, identifies as species of concern.

(ii) In cases where air emissions and/or energy impacts that would result from meeting the requirements of paragraphs (b)(1) and (2) of this section would result in significant adverse impacts on local air quality, significant adverse impact on local water resources not addressed under paragraph (d)(1)(i) of this section, or significant adverse impact on local energy markets, you may request alternative requirements under § 125.85.

(2) You must design and construct your cooling water intake structure such that the total design intake flow from all cooling water intake structures at your facility meet the following requirements:

(i) For cooling water intake structures located in a freshwater river or stream, the total design intake flow must be no greater than five (5) percent of the source water annual mean flow;

(ii) For cooling water intake structures located in a lake or reservoir, the total design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);

(iii) For cooling water intake structures located in an estuary or tidal river, the total design intake flow over one tidal cycle of ebb and flow must be no greater than one (1) percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level.

(3) You must submit the application information required in 40 CFR 122.21(r) and § 125.86(c).

(4) You must implement the monitoring requirements specified in § 125.87.

(5) You must implement the record-keeping requirements specified in § 125.88.

(e) You must comply with any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure or monitoring requirements at a new facility that the Director deems are reasonably necessary to comply with any provision of state law, including compliance with applicable state water quality standards (including designated uses, criteria, and antidegradation requirements).

§ 125.85 May alternative requirements be authorized?

(a) Any interested person may request that alternative requirements less stringent than those specified in § 125.84(a) through (e) be imposed in the permit. The Director may establish alternative requirements less stringent than the requirements of § 125.84(a) through (e) only if:

(1) There is an applicable requirement under § 125.84(a) through (e);

(2) The Director determines that data specific to the facility indicate that compliance with the requirement at issue would result in compliance costs wholly out of proportion to those EPA considered in establishing the requirement at issue or would result in significant adverse impacts on local air quality, significant adverse impacts on local water resources not addressed under § 125.84(d)(1)(i), or significant adverse impacts on local energy markets;

(3) The alternative requirement requested is no less stringent than justified by the wholly out of proportion cost or the significant adverse impacts on local air quality, significant adverse impacts on local water resources not addressed under § 125.84(d)(1)(i), or significant adverse impacts on local energy markets; and

(4) The alternative requirement will ensure compliance with other applicable provisions of the Clean Water Act and any applicable requirement of state law.

(b) The burden is on the person requesting the alternative requirement to demonstrate that alternative requirements should be authorized.

§ 125.86 As an owner or operator of a new facility, what must I collect and submit when I apply for my new or reissued NPDES permit?

(a)(1) As an owner or operator of a new facility, you must submit to the Director a statement that you intend to comply with either:

(i) The Track I requirements for new facilities that withdraw equal to or greater than 10 MGD in § 125.84(b);

(ii) The Track I requirements for new facilities that withdraw equal to or greater than 2 MGD and less than 10 MGD in § 125.84(c);

(iii) The requirements for Track II in § 125.84 (d).

(2) You must also submit the application information required by 40 CFR 122.21(r) and the information required in either paragraph (b) of this section for Track I or paragraph (c) of this section for Track II when you apply for a new or reissued NPDES permit in accordance with 40 CFR 122.21.

(b) *Track I application requirements.* To demonstrate compliance with Track I requirements in § 125.84(b) or (c), you must collect and submit to the Director the information in paragraphs (b)(1) through (4) of this section.

(1) *Flow reduction information.* If you must comply with the flow reduction requirements in § 125.84(b)(1), you must submit the following information to the

Director to demonstrate that you have reduced your flow to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system:

(i) A narrative description of your system that has been designed to reduce your intake flow to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system and any engineering calculations, including documentation demonstrating that your make-up and blowdown flows have been minimized; and

(ii) If the flow reduction requirement is met entirely, or in part, by reusing or recycling water withdrawn for cooling purposes in subsequent industrial processes, you must provide documentation that the amount of cooling water that is not reused or recycled has been minimized.

(2) *Velocity information.* You must submit the following information to the Director to demonstrate that you are complying with the requirement to meet a maximum through-screen design intake velocity of no more than 0.5 ft/s at each cooling water intake structure as required in § 125.84(b)(2) and (c)(1):

(i) A narrative description of the design, structure, equipment, and operation used to meet the velocity requirement; and

(ii) Design calculations showing that the velocity requirement will be met at minimum ambient source water surface elevations (based on best professional judgement using available hydrological data) and maximum head loss across the screens or other device.

(3) *Source waterbody flow information.* You must submit to the Director the following information to demonstrate that your cooling water intake structure meets the flow requirements in § 125.84(b)(3) and (c)(2):

(i) If your cooling water intake structure is located in a freshwater river or stream, you must provide the annual mean flow and any supporting documentation and engineering calculations to show that your cooling water intake structure meets the flow requirements;

(ii) If your cooling water intake structure is located in an estuary or tidal river, you must provide the mean low water tidal excursion distance and any supporting documentation and engineering calculations to show that your cooling water intake structure facility meets the flow requirements; and

(iii) If your cooling water intake structure is located in a lake or reservoir, you must provide a narrative description of the water body thermal stratification, and any supporting documentation and engineering calculations to show that the natural thermal stratification and turnover pattern will not be disrupted by the total design intake flow. In cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish you must provide supporting documentation and include a written concurrence from any fisheries management agency(ies) with responsibility for fisheries potentially affected by your cooling water intake structure(s).

(4) *Design and Construction Technology Plan.* To comply with § 125.84(b)(4) and (5), or (c)(3) and (c)(4), you must submit to the Director the following information in a Design and Construction Technology Plan:

(i) Information to demonstrate whether or not you meet the criteria in § 125.84(b)(4) and (b)(5), or (c)(3) and (c)(4);

(ii) Delineation of the hydraulic zone of influence for your cooling water intake structure;

(iii) New facilities required to install design and construction technologies and/or operational measures must develop a plan explaining the technologies and measures you have selected based on information collected for the Source Water Biological Baseline Characterization required by 40 CFR 122.21(r)(3). (Examples of appropriate technologies include, but are not limited to, wedgewire screens, fine mesh screens, fish handling and return systems, barrier nets, aquatic filter barrier systems, etc. Examples of appropriate operational measures include, but are not limited to, seasonal shutdowns or reductions in flow, continuous operations of screens, etc.) The plan must contain the following information:

(A) A narrative description of the design and operation of the design and construction technologies, including fish-handling and return systems, that you will use to maximize the survival of those species expected to be most susceptible to impingement. Provide species-specific information that demonstrates the efficacy of the technology;

(B) A narrative description of the design and operation of the design and construction technologies that you will use to minimize entrainment of those species expected to be the most susceptible to entrainment. Provide species-specific information that demonstrates the efficacy of the technology; and

(C) Design calculations, drawings, and estimates to support the descriptions provided in paragraphs (b)(4)(iii)(A) and (B) of this section.

(c) *Application requirements for Track II.* If you have chosen to comply with the requirements of Track II in § 125.84(d) you must collect and submit the following information:

(1) *Source waterbody flow information.* You must submit to the Director the following information to demonstrate that your cooling water intake structure meets the source water body requirements in § 125.84(d)(2):

(i) If your cooling water intake structure is located in a freshwater river or stream, you must provide the annual mean flow and any supporting documentation and engineering calculations to show that your cooling water intake structure meets the flow requirements;

(ii) If your cooling water intake structure is located in an estuary or tidal river, you must provide the mean low water tidal excursion distance and any supporting documentation and engineering calculations to show that your cooling water intake structure facility meets the flow requirements; and

(iii) If your cooling water intake structure is located in a lake or reservoir, you must provide a narrative description of the water body thermal stratification, and any supporting documentation and engineering calculations to show that the natural thermal stratification and thermal or turnover pattern will not be disrupted by the total design intake flow. In cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish you must provide supporting documentation and include a written concurrence from any fisheries management agency(ies) with responsibility for fisheries potentially affected by your cooling water intake structure(s).

(2) *Track II Comprehensive Demonstration Study.* You must perform and submit the results of a Comprehensive Demonstration Study (Study). This information is required to characterize the source water baseline in the vicinity of the cooling water intake structure(s), characterize operation of the cooling water intake(s), and to confirm that the technology(ies) proposed and/or implemented at your cooling water intake structure reduce the impacts to fish and shellfish to levels comparable to those you would achieve were you to implement the requirements in § 125.84(b)(1)and (2) of Track I. To meet the "comparable level"

requirement, you must demonstrate that:

(i) You have reduced both impingement mortality and entrainment of all life stages of fish and shellfish to 90 percent or greater of the reduction that would be achieved through § 125.84(b)(1) and (2); or

(ii) If your demonstration includes consideration of impacts other than impingement mortality and entrainment, that the measures taken will maintain the fish and shellfish in the waterbody at a substantially similar level to that which would be achieved through § 125.84(b)(1) and (2); and

(iii) You must develop and submit a plan to the Director containing a proposal for how information will be collected to support the study. The plan must include:

(A) A description of the proposed and/or implemented technology(ies) to be evaluated in the Study;

(B) A list and description of any historical studies characterizing the physical and biological conditions in the vicinity of the proposed or actual intakes and their relevancy to the proposed Study. If you propose to rely on existing source water body data, it must be no more than 5 years old, you must demonstrate that the existing data are sufficient to develop a scientifically valid estimate of potential impingement and entrainment impacts, and provide documentation showing that the data were collected using appropriate quality assurance/quality control procedures;

(C) Any public participation or consultation with Federal or State agencies undertaken in developing the plan; and

(D) A sampling plan for data that will be collected using actual field studies in the source water body. The sampling plan must document all methods and quality assurance procedures for sampling, and data analysis. The sampling and data analysis methods you propose must be appropriate for a quantitative survey and based on consideration of methods used in other studies performed in the source water body. The sampling plan must include a description of the study area (including the area of influence of the cooling water intake structure and at least 100 meters beyond); taxonomic identification of the sampled or evaluated biological assemblages (including all life stages of fish and shellfish); and sampling and data analysis methods; and

(iv) You must submit documentation of the results of the Study to the Director. Documentation of the results of the Study must include:

(A) *Source Water Biological Study.* The Source Water Biological Study must include:

(*1*) A taxonomic identification and characterization of aquatic biological resources including: a summary of historical and contemporary aquatic biological resources; determination and description of the target populations of concern (those species of fish and shellfish and all life stages that are most susceptible to impingement and entrainment); and a description of the abundance and temporal/spatial characterization of the target populations based on the collection of multiple years of data to capture the seasonal and daily activities (e.g., spawning, feeding and water column migration) of all life stages of fish and shellfish found in the vicinity of the cooling water intake structure;

(*2*) An identification of all threatened or endangered species that might be susceptible to impingement and entrainment by the proposed cooling water intake structure(s); and

(*3*) A description of additional chemical, water quality, and other anthropogenic stresses on the source waterbody.

(B) *Evaluation of potential cooling water intake structure effects.* This evaluation will include:

(*1*) Calculations of the reduction in impingement mortality and entrainment of all life stages of fish and shellfish that would need to be achieved by the technologies you have selected to implement to meet requirements under Track II. To do this, you must determine the reduction in impingement mortality and entrainment that would be achieved by implementing the requirements of § 125.84(b)(1) and (2) of Track I at your site.

(*2*) An engineering estimate of efficacy for the proposed and/or implemented technologies used to minimize impingement mortality and entrainment of all life stages of fish and shellfish and maximize survival of impinged life stages of fish and shellfish. You must demonstrate that the technologies reduce impingement mortality and entrainment of all life stages of fish and shellfish to a comparable level to that which you would achieve were you to implement the requirements in § 125.84(b)(1) and (2) of Track I. The efficacy projection must include a site-specific evaluation of technology(ies) suitability for reducing impingement mortality and entrainment based on the results of the Source Water Biological Study in paragraph (c)(2)(iv)(A) of this section. Efficacy estimates may be determined based on case studies that have been conducted in the vicinity of the cooling water intake structure and/or site-specific technology prototype studies.

(C) *Evaluation of proposed restoration measures.* If you propose to use restoration measures to maintain the fish and shellfish as allowed in § 125.84(d)(1)(i), you must provide the following information to the Director:

(*1*) Information and data to show that you have coordinated with the appropriate fishery management agency(ies); and

(*2*) A plan that provides a list of the measures you plan to implement and how you will demonstrate and continue to ensure that your restoration measures will maintain the fish and shellfish in the waterbody to a substantially similar level to that which would be achieved through § 125.84(b)(1) and (2).

(D) *Verification monitoring plan.* You must include in the Study the following:

(*1*) A plan to conduct, at a minimum, two years of monitoring to verify the full-scale performance of the proposed or implemented technologies, operational measures. The verification study must begin at the start of operations of the cooling water intake structure and continue for a sufficient period of time to demonstrate that the facility is reducing the level of impingement and entrainment to the level documented in paragraph (c)(2)(iv)(B) of this section. The plan must describe the frequency of monitoring and the parameters to be monitored. The Director will use the verification monitoring to confirm that you are meeting the level of impingement mortality and entrainment reduction required in § 125.84(d), and that the operation of the technology has been optimized.

(*2*) A plan to conduct monitoring to verify that the restoration measures will maintain the fish and shellfish in the waterbody to a substantially similar level as that which would be achieved through § 125.84(b)(1) and (2).

§ 125.87 As an owner or operator of a new facility, must I perform monitoring?

As an owner or operator of a new facility, you will be required to perform monitoring to demonstrate your compliance with the requirements specified in § 125.84.

(a) *Biological monitoring.* You must monitor both impingement and entrainment of the commercial, recreational, and forage base fish and shellfish species identified in either the Source Water Baseline Biological Characterization data required by 40 CFR 122.21(r)(3) or the Comprehensive Demonstration Study required by § 125.86(c)(2), depending on whether you chose to comply with Track I or Track II. The monitoring methods used must be consistent with those used for the Source Water Baseline Biological Characterization data required in 40 CFR 122.21(r)(3) or the Comprehensive Demonstration Study required by § 125.86(c)(2). You must follow the monitoring frequencies identified below for at least two (2) years after the initial permit issuance. After that time, the Director may approve a request for less frequent sampling in the remaining years of the permit term and when the permit is reissued, if supporting data show that less frequent monitoring would still allow for the detection of any seasonal and daily variations in the species and numbers of individuals that are impinged or entrained.

(1) *Impingement sampling.* You must collect samples to monitor impingement rates (simple enumeration) for each species over a 24-hour period and no less than once per month when the cooling water intake structure is in operation.

(2) *Entrainment sampling.* You must collect samples to monitor entrainment rates (simple enumeration) for each species over a 24-hour period and no less than biweekly during the primary period of reproduction, larval recruitment, and peak abundance identified during the Source Water Baseline Biological Characterization required by 40 CFR 122.21(r)(3) or the Comprehensive Demonstration Study required in § 125.86(c)(2). You must collect samples only when the cooling water intake structure is in operation.

(b) *Velocity monitoring.* If your facility uses surface intake screen systems, you must monitor head loss across the screens and correlate the measured value with the design intake velocity. The head loss across the intake screen must be measured at the minimum ambient source water surface elevation (best professional judgment based on available hydrological data). The maximum head loss across the screen for each cooling water intake structure must be used to determine compliance with the velocity requirement in § 125.84(b)(2) or (c)(1). If your facility uses devices other than surface intake screens, you must monitor velocity at the point of entry through the device. You must monitor head loss or velocity during initial facility startup, and thereafter, at the frequency specified in your NPDES permit, but no less than once per quarter.

(c) *Visual or remote inspections.* You must either conduct visual inspections or employ remote monitoring devices during the period the cooling water intake structure is in operation. You must conduct visual inspections at least weekly to ensure that any design and construction technologies required in § 125.84(b)(4) and (5), or (c)(3) and (4) are maintained and operated to ensure that they will continue to function as designed. Alternatively, you must inspect via remote monitoring devices to ensure that the impingement and entrainment technologies are functioning as designed.

§ 125.88 As an owner or operator of a new facility, must I keep records and report?

As an owner or operator of a new facility you are required to keep records and report information and data to the Director as follows:

(a) You must keep records of all the data used to complete the permit application and show compliance with the requirements, any supplemental information developed under § 125.86, and any compliance monitoring data submitted under § 125.87, for a period of at least three (3) years from the date of permit issuance. The Director may require that these records be kept for a longer period.

(b) You must provide the following to the Director in a yearly status report:

(1) Biological monitoring records for each cooling water intake structure as required by § 125.87(a);

(2) Velocity and head loss monitoring records for each cooling water intake structure as required by § 125.87(b); and

(3) Records of visual or remote inspections as required in § 125.87(c).

§ 125.89 As the Director, what must I do to comply with the requirements of this subpart?

(a) *Permit application.* As the Director, you must review materials submitted by the applicant under 40 CFR 122.21(r)(3) and § 125.86 at the time of the initial permit application and before each permit renewal or reissuance.

(1) After receiving the initial permit application from the owner or operator of a new facility, the Director must determine applicable standards in § 125.84 to apply to the new facility. In addition, the Director must review materials to determine compliance with the applicable standards.

(2) For each subsequent permit renewal, the Director must review the application materials and monitoring data to determine whether requirements, or additional requirements, for design and construction technologies or operational measures should be included in the permit.

(3) For Track II facilities, the Director may review the information collection proposal plan required by § 125.86(c)(2)(iii). The facility may initiate sampling and data collection activities prior to receiving comment from the Director.

(b) *Permitting requirements.* Section 316(b) requirements are implemented for a facility through an NPDES permit. As the Director, you must determine, based on the information submitted by the new facility in its permit application, the appropriate requirements and conditions to include in the permit based on the track (Track I or Track II) the new facility has chosen to comply with. The following requirements must be included in each permit:

(1) *Cooling water intake structure requirements.* At a minimum, the permit conditions must include the performance standards that implement the requirements of § 125.84(b)(1), (2), (3), (4) and (5); § 125.84(c)(1), (2), (3) and (4); or § 125.84(d)(1) and (2). In determining compliance with proportional flow requirement in §§ 125.84(b)(3)(ii); (c)(2)(ii); and (d)(2)(ii), the director must consider anthropogenic factors (those not considered "natural") unrelated to the new facility's cooling water intake structure that can influence the occurrence and location of a thermocline. These include source water inflows, other water withdrawals, managed water uses, wastewater discharges, and flow/level management practices (e.g., some reservoirs release water from below the surface, close to the deepest areas).

(i) For a facility that chooses Track I, you must review the Design and Construction Technology Plan required in § 125.86(b)(4) to evaluate the suitability and feasibility of the technology proposed to minimize impingement mortality and entrainment of all life stages of fish and shellfish. In the first permit issued, you must put a condition requiring the facility to reduce impingement mortality and entrainment commensurate with the implementation of the technologies in the permit. Under subsequent permits, the Director must review the performance of the technologies implemented and require additional or different design and construction technologies, if needed to minimize impingement mortality and entrainment of all life stages of fish and shellfish. In addition, you must consider whether more stringent conditions are reasonably necessary in accordance with § 125.84(e).

(ii) For a facility that chooses Track II, you must review the information submitted with the Comprehensive

Demonstration Study information required in § 125.86(c)(2), evaluate the suitability of the proposed design and construction technologies and operational measures to determine whether they will reduce both impingement mortality and entrainment of all life stages of fish and shellfish to 90 percent or greater of the reduction that could be achieved through Track I. If you determine that restoration measures are appropriate at the new facility for consideration of impacts other than impingement mortality and entrainment, you must review the Evaluation of Proposed Restoration Measures and evaluate whether the proposed measures will maintain the fish and shellfish in the waterbody at a substantially similar level to that which would be achieved through § 125.84(b)(1) and (2). In addition, you must review the Verification Monitoring Plan in § 125.86(c)(2)(iv)(D) and require that the proposed monitoring begin at the start of operations of the cooling water intake structure and continue for a sufficient period of time to demonstrate that the technologies, operational measures and restoration measures meet the requirements in § 125.84(d)(1). Under subsequent permits, the Director must review the performance of the additional and /or different technologies or measures used and determine that they reduce the level of adverse environmental impact from the cooling water intake structures to a comparable level that the facility would achieve were it to implement the requirements of § 125.84(b)(1) and (2).

(2) *Monitoring conditions.* At a minimum, the permit must require the permittee to perform the monitoring required in § 125.87. You may modify the monitoring program when the permit is reissued and during the term of the permit based on changes in physical or biological conditions in the vicinity of the cooling water intake structure. The Director may require continued monitoring based on the results of the Verification Monitoring Plan in § 125.86(c)(2)(iv)(D).

(3) *Record keeping and reporting.* At a minimum, the permit must require the permittee to report and keep records as required by § 125.88.

[FR Doc. 01-28968 Filed 12-17-01; 8:45 am]
BILLING CODE 6560-50-P

26

Federal Register

Friday,
July 9, 2004

Part II

Environmental Protection Agency

40 CFR Parts 9, 122 et al.

National Pollutant Discharge Elimination System—Final Regulations To Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 9, 122, 123, 124, and 125

[FRL–7625–9]

RIN 2040–AD62

National Pollutant Discharge Elimination System—Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Today's final rule implements section 316(b) of the Clean Water Act (CWA) for certain existing power producing facilities that employ a cooling water intake structure and are designed to withdraw 50 million gallons per day (MGD) or more of water from rivers, streams, lakes, reservoirs, estuaries, oceans, or other waters of the United States for cooling purposes. This final rule constitutes Phase II of EPA's section 316(b) regulation development and establishes national requirements, and procedures for implementing those requirements, applicable to the location, design, construction, and capacity of cooling water intake structures at these facilities. The rule applies to existing facilities that, as their primary activity, both generate and transmit electric power or generate electric power but sell it to another entity for transmission. The national requirements, which will be implemented through National Pollutant Discharge Elimination System (NPDES) permits, are based on the best technology available to minimize the adverse environmental impact associated with the use of cooling water intake structures.

Today's final rule establishes performance standards that are projected to reduce impingement mortality by 80 to 95 percent and, if applicable, entrainment by 60 to 90 percent. With the implementation of today's final rule, EPA intends to minimize the adverse environmental impact of cooling water intake structures by reducing the number of aquatic organisms lost as a result of water withdrawals associated with these structures.

DATES: This regulation is effective September 7, 2004. For judicial review purposes, this final rule is promulgated as of 1 p.m. Eastern Standard Time (EST) on July 23, 2004, as provided in 40 CFR 23.2.

ADDRESSES: The docket for today's final rule is available for public inspection at the Water Docket in the EPA Docket Center, (EPA/DC) EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC.

FOR FURTHER INFORMATION CONTACT: For additional technical information contact Martha Segall at (202) 566–1041 or Debra Hart at (202) 566–6379. The e-mail address for the above contacts is *rule.316b@epa.gov*.

SUPPLEMENTARY INFORMATION:

I. General Information

A. What Entities Are Regulated by This Action?

This final rule applies to Phase II existing facilities that are point sources; as their primary activity both generate and transmit electric power or generate electric power for sale to another entity for transmission; use or propose to use one or more cooling water intake structures with a total design intake flow of 50 million gallons per day (MGD) or more to withdraw water from waters of the United States; and use 25 percent of water withdrawn exclusively for cooling water purposes. This rule defines "existing facility" as any facility that commenced constructions on or before January 17, 2002, and any modification of, or any addition of a unit at such a facility that does not meet the definition of a new facility at § 125.83.

This rule defines the term "cooling water intake structure" to mean the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States. The cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps.

Category	Examples of regulated entities	Standard Industrial Classification (SIC) codes	North American Industry Classification System (NAICS) codes
Federal, State, and Local Government	Steam electric generating point source dischargers that employ cooling water intake structures.	4911 and 493	221112, 221113, 221119, 221121, 221122
Industry	Steam electric generating industrial point source dischargers that employ cooling water intake structures (this includes utilities and nonutilities).	4911 and 493	221112, 221113, 221119, 221121, 221122

This exhibit is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This exhibit lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in the exhibit could also be regulated. To determine whether your facility is regulated by this action, you should carefully examine the applicability criteria in § 125.91 of the rule. If you have questions regarding the applicability of this action to a particular entity, consult the person listed for technical information in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. How Can I Get Copies of This Document and Other Related Information?

1. Docket

EPA has established an official public docket for this action under Docket ID No. OW 2002–0049. The official public docket consists of the documents specifically referenced in this action, any public comments received, and other information related to this action. Although a part of the official docket, the public docket does not include information claimed as Confidential Business Information (CBI) or other information the disclosure of which is restricted by statute. The official public docket is the collection of materials that is available for public viewing at the Water Docket in the EPA Docket Center, (EPA/DC) EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Water Docket is (202) 566–2426. To view docket materials, please call ahead to schedule an appointment. Every user is entitled to copy 266 pages per day before incurring a charge. The Docket may charge 15 cents for each page over the 266-page limit plus an administrative fee of $25.00.

2. Electronic Access

You may access this **Federal Register** document electronically through the EPA Internet under the "**Federal Register**" listings at *http://www.epa.gov/fedrgstr/.*

An electronic version of the public docket is available through EPA's electronic public docket and comment system, EPA Dockets. You may use EPA Dockets at *http://www.epa.gov/edocket/* to view public comments, access the index listing of the contents of the official public docket, and to access those documents in the public docket that are available electronically. Although not all docket materials may be available electronically, you may still access any of the publicly available docket materials through the docket facility identified in section I.B.1. Once in the system, select "search," then key in the appropriate docket identification number.

C. Supporting Documentation

The final regulation is supported by three major documents:

1. Economic and Benefits Analysis for the Final Section 316(b) Phase II Existing Facilities Rule (EPA–821–R–04–005), hereafter referred to as the Economic and Benefits Analysis. This document presents the analysis of compliance costs, closures, energy supply effects, and benefits associated with the final rule.

2. Regional Analysis for the Final Section 316(b) Phase II Existing Facilities Rule (EPA–821–R–04–006), hereafter referred to as the Regional Analysis Document or the Regional Study(ies) Document. This document examines cooling water intake structure impacts and regulatory benefits at the regional level.

3. Technical Development Document for the Final Section 316(b) Phase II Existing Facilities Rule (EPA–821–R–04–007), hereafter referred to as the Technical Development Document. This document presents detailed information on the methods used to develop unit costs and describes the set of technologies that may be used to meet the final rule's requirements.

D. Table of Contents

II. Scope and Applicability of the Final Rule

This rule applies to owners and operators of existing facilities, as defined in § 125.93 of today's rule that meet all of the following criteria:

• The facility's primary activity is to generate electric power. The facility either transmits the electric power itself, or sells the electric power to another entity for transmission;

• The facility is a point source that uses or proposes to use one or more cooling water intake structures, including a cooling water intake structure operated by an independent supplier that withdraws water from waters of the United States and provides cooling water to the facility by any sort of contract or other arrangement;

• The cooling water intake structure(s) withdraw(s) cooling water from waters of the United States and at least twenty-five (25) percent of the water withdrawn is used exclusively for cooling purposes measured on an average annual basis;

• The facility is a point source; and

• The cooling water intake structures have a total design intake flow of 50 million gallons per day (MGD) or greater.

In the case of a Phase II existing facility that is co-located with a manufacturing facility, only that portion of the cooling water flow that is used by the Phase II facility to generate electricity for sale to another entity will be considered when determining whether the 50 MGD and 25 percent criteria are met. Facilities subject to this final rule are referred to as "Phase II existing facilities." Existing facilities with design flows below the 50 MGD threshold, as well as most existing manufacturing facilities, offshore seafood processors, and offshore and coastal oil and gas extraction facilities are not subject to this rule. Those facilities have different characteristics as compared to the large, power-generating facilities subject to today's rule. If an existing facility is a point source and has or is required to have an NPDES permit, but does not meet the applicability thresholds in today's rule, it is subject to permit conditions implementing section 316(b) of the CWA set by the permit director on a case-by-case basis, using best professional judgment. EPA expects to address at least some of these facilities in a separate rulemaking, referred to as Phase III.

In the preamble to the proposed rule EPA indicated that its intent was to exclude from regulation under the Phase II rule existing facilities whose primary business is manufacturing. See, *e.g.*, 67 FR 17124 (April 9, 2002). At the same time, in § 125.91(a)(3) of the proposed rule, the applicability criteria covered facilities that both generate and transmit electric power, or generate electric power but sell it to another entity for transmission. Numerous commenters indicated concerns that, as proposed, § 125.91(a)(3) would not clearly exclude all existing manufacturing facilities from the Phase II rule since some facilities generate electric power primarily for their own use, but transmit or sell any surplus. Therefore, for the final rule, EPA revised § 125.91 so that it reaches only those existing facilities that generate and transmit or sell electric power as their primary activity. The final rule does not apply to existing manufacturing facilities, including manufacturing facilities that generate power for their own use and transmit any surplus power, or sell it for transmission, provided the primary activity of the facility is not electric power generation.

A. What Is an "Existing Facility" for Purposes of the Section 316(b) Phase II Rule?

In today's rule, EPA is defining the term "existing facility" to include any facility that commenced construction as described in 40 CFR 122.29(b)(4)[1] on or before January 17, 2002. EPA established January 17, 2002 as the date for distinguishing new facilities from existing ones because that is the effective date of the Phase I new facility rule. In addition, EPA is defining the term "existing facility" in this rule to include modifications and additions to such facilities, the construction of which commences after January 17, 2002, that do not meet the definition of a new facility at 40 CFR 125.83, the definition used to define the scope of the Phase I rule. That definition states:

"*New facility* means any building, structure, facility, or installation that meets the definition of a 'new source' or 'new discharger' in [other NPDES regulations] and is a greenfield or stand-alone facility; commences construction after January 17, 2002; and uses either a newly constructed cooling water intake structure, or an existing cooling water intake structure whose design capacity is increased to accommodate the intake of additional cooling water. New facilities include only 'greenfield' and 'stand-alone' facilities. A greenfield facility is a facility that is constructed at a site at which no other source is located or that totally replaces the process or production equipment at an existing facility (see 40 CFR 122.29(b)(1)(i) and (ii). A stand-alone facility is a new, separate facility that is constructed on property where an existing facility is located and whose processes are substantially independent of the existing facility at the same site (see 40 CFR 122.29(b)(1)(iii). New facility does not include new units that are added to a facility for purposes of the same general industrial operation (for example, a new peaking unit at an electrical generating station)."[2]

The preamble to the final Phase I rule discusses this definition at 66 FR 65256; 65258–65259; 65285–65287, December 18, 2001.

EPA included in its Phase II proposed rule a freestanding definition of "existing facility." That definition read as follows:

"Existing facility means any facility that commenced construction before January 17, 2002; and

(1) Any modification of such a facility;

(2) Any addition of a unit at such a facility for purposes of the same industrial operation;

(3) Any addition of a unit at such a facility for purposes of a different industrial operation, if the additional unit uses an existing cooling water intake structure and the design capacity of the intake structure is not increased; or

(4) Any facility constructed in place of such a facility, if the newly constructed facility uses an existing cooling water intake structure whose design intake flow is not increased to accommodate the intake of additional cooling water." 67 FR 17221.

Upon further consideration, EPA has decided that it would be clearest to define existing facility primarily by stating that any facility that is not a new facility under 40 CFR 125.83 is an existing facility for purposes of this subpart. Accordingly, the language in this final rule is intended to be clear and consistent with EPA's definition of new facility in the Phase I rule at 40 CFR 125.83. In addition, the definition in today's regulation is also intended to ensure that sources excluded from the definition of new facility in the Phase I rule are captured by the definition of existing facility for the purposes of today's rule. At the same time, EPA believes that the approach taken in

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[1] Construction is commenced if the owner or operator has undertaken certain installation and site preparation activities that are part of a continuous on-site construction program, and it includes entering into certain specified binding contractual obligations as one criterion (40 CFR 122.29(b)(4)).

[2] The Phase I rule also listed examples of facilities that would be "new" facilities and facilities that would "not be considered a 'new facility' in two numbered paragraphs. These read as follows:

"(1) Examples of 'new facilities' include, but are not limited to: the following scenarios:

(i) A new facility is constructed on a site that has never been used for industrial or commercial activity. It has a new cooling water intake structure for its own use.

(ii) A facility is demolished and another facility is constructed in its place. The newly-constructed facility uses the original facility's cooling water intake structure, but modifies it to increase the design capacity to accommodate the intake of additional cooling water.

(iii) A facility is constructed on the same property as an existing facility, but is a separate and independent industrial operation. The cooling water intake structure used by the original facility is modified by constructing a new intake bay for the use of the newly constructed facility or is otherwise modified to increase the intake capacity for the new facility.

(2) Examples of facilities that would not be considered a 'new facility' include, but are not limited to, the following scenarios:

(i) A facility in commercial or industrial operation is modified and either continues to use its original cooling water intake structure or uses a new or modified cooling water intake structure.

(ii) A facility has an existing intake structure. Another facility (a separate and independent industrial operation), is constructed on the same property and connects to the facility's cooling water intake structure behind the intake pumps, and the design capacity of the cooling water intake structure has not been increased. This facility would not be considered a 'new facility' even if routine maintenance or repairs that do not increase the design capacity were performed on the intake structure."

today's rule is identical in terms of effect to the approach in the proposed rule. Thus, the approach taken in today's final rule is in no way intended to change the scope of the rule as compared with the proposal as far as the facilities treated as "existing" facilities under the rule. The change is in drafting technique, not in meaning.

The facility encompassed by today's regulation is the point source that uses a cooling water intake structure to generate electric power. This is because the requirements of CWA section 316(b) are implemented through NPDES permits, which are issued only to point source dischargers of pollutants to waters of the United States. A point source generating electric power would be subject to Phase I or Phase II even if the cooling water intake structure it uses is located elsewhere. Similarly, modifications or additions to the cooling water intake structure (or even the total replacement of an existing cooling water intake structure with a new one) does not convert an otherwise unchanged existing facility into a new facility, regardless of the purpose of such changes (*e.g.*, to comply with today's rule or to increase capacity). Rather, the determination as to whether a facility is new or existing focuses on the power-generating point source itself, *i.e.*, whether it is a greenfield facility or a stand-alone facility. This focus on the point source discharger is consistent with section 316(b), which by its express terms applies only to point sources.

Under this rule, an existing power generating facility that uses a cooling water intake structure and repowers by either replacing or modifying an existing generating unit would remain subject to regulation as a Phase II existing facility, unless the existing facility were completely demolished and another facility constructed in its place that used either a new intake structure or the existing structure with an increased design capacity. For example, the following facility modifications or additions would result in a facility being characterized as an existing facility under today's rule:

• An existing power generating facility undergoes a modification of its process short of total replacement of the process and concurrently increases the design capacity of its existing cooling water intake structures;

• An existing power generating facility builds a new process at its site for purposes of the same industrial operation and concurrently increases the design capacity of its existing cooling water intake structures;

• An existing power generating facility completely rebuilds its process but uses the existing cooling water intake structure with no increase in design capacity.

Phase II existing facilities subject to today's rule include point sources that do not presently use, but propose to use, cooling water intake structures and do not meet the definition of new facility at § 125.83. This is appropriate because there may be some cases in which an existing facility historically withdrew its cooling water from a municipal or other source, but then decides to withdraw cooling water from a water of the United States. In these cases, the facility may not previously have met all of the criteria applicable to an existing facility under today's rule (*i.e.*, the facility did not previously withdraw cooling waters from a water of the United States) but may make changes that would place the facility within the scope of today's rule. A comparable situation would be when a facility previously relied on units that do not require cooling water, and then adds or modifies a unit for purposes of the same industrial operation (*i.e.*, power generation) such that cooling water is subsequently required. For example, an existing power generating facility that adds a new generating unit at the same site for purposes of repowering and concurrently increases the design capacity of its existing cooling water intake structure(s), or adds a new intake structure where it did not previously need one, for example when converting a gas turbine to a combined cycle unit, would be considered an existing facility.

In the preamble to the Phase I rule, EPA noted that it had defined "existing facility" in a manner consistent with existing NPDES regulations with a limited exception. EPA noted that it had generally deferred regulation of new sources constructed on a site at which an existing source is located until the Agency had completed analysis of its survey data on existing facilities. 66 FR 65286. Accordingly, the Phase I rule treated almost all changes to existing facilities for purposes of the same industrial operation as existing facilities. These included the addition of new generating units at the same site, even where they required an increase in cooling water intake structure design capacity or the construction of a new cooling water intake structure, as well as the complete demolition of an existing facility and its replacement with a new facility, so long as it did not increase the design capacity of the cooling water intake structure. The only exception was the demolition of an existing facility and its replacement with a new facility accompanied by an increase in design capacity of the cooling water intake structure. As the preamble explained: "The definition of a new facility in the final rule applies to a facility that is repowered only if the existing facility has been demolished and another facility is constructed in its place, and modifies the existing cooling water intake structure to increase the design intake capacity." *Id.*[2a] By contrast, the Phase I rule treated the addition of a new unit for purposes of a different industrial operation as an existing facility only if it used an existing cooling water intake structure whose design intake flow was not increased.

The Phase II proposed rule continued this approach in its definition of "existing facility." It continued to treat all changes to existing facilities for purposes of the same industrial operation as an existing facility unless the change was a complete demolition and replacement of the facility accompanied by an increase in cooling water intake design capacity. It also continued to treat the addition of new units for purposes of a different industrial operation differently, only allowing them to be "existing facilities" if they used an existing cooling water intake structure and did not increase its design intake flow. 67 FR 17221. In putting forth this proposed definition, EPA noted that it had collected data from a variety of sources, including survey data, specifically relating to repowering facilities. *Id.* at 17131–17135. It also made a point of explaining the wide variety of repowering activities that an existing facility could undertake under the proposed rule—anything short of demolition of an existing facility and its replacement with a new facility combined with increasing the design capacity of a cooling water intake structure—while still being regulated as an "existing facility" rather than a "new facility." *Id.* at 17128.

On the basis of the analysis of the survey data and other information in the record, the Agency now has concluded that it should adhere to its provisional

[2a] Because they are part of the same "industrial operation," such units are not "stand-alone" facilities for purposes of the "new facility" definition. As the fifth sentence of the definition of "new facility" explains, they are categorically treated as "existing facilities" regardless of any other considerations unless they completely replace an existing facility and its cooling water design intake capacity is increased. Accordingly, there is thus no need to make a determination whether they are "substantially independent" of the existing facility at the same site under the fourth sentence of the definition in order to determine whether they are "existing" or "new facilities." The fifth sentence alone controls that question.

decision generally giving wide latitude to existing facilities to make changes or additions to their facilities at the same site. In particular, new units that are added to a facility for purposes of the same general industrial operation should be treated as existing facilities because limitations associated with an existing site make it inappropriate to subject such units to new facility requirements. These limitations include space, existing location on a waterbody, location in already congested areas which could affect (if Phase 1 requirements were applied) visibility impairment, highway and airport safety issues, noise abatement issues, salt drift and corrosion problems and additional energy requirements. Moreover, power generation facilities should not be discouraged from making any upgrade, modification, or repowering that would increase energy efficiency or supply out of concern that they would be considered a new facility for purposes of section 316(b). Additional benefits will be realized in terms of reducing industrial sprawl if incremental power generation is not discouraged at existing power generation sites. These considerations counsel in favor of treating new units locating at existing sites as existing rather than new facilities. EPA also noted when it promulgated the Phase I rule (*see* 66 FR 65286) that it is not feasible for the permit authority to judge whether the facility could have been located elsewhere for the purpose of determining whether the facility is subject to the new facility rules. Accordingly, EPA has decided to retain the Phase I definition's provision that a new facility does not include new units that are added to a facility for purposes of the same general industrial operation. As noted above, this decision is fully consistent with the approach to this issue laid out in the proposed Phase II rule.

The final rule definition of "existing facility" is sufficiently broad that it encompasses facilities that will be addressed under the Phase III rule (*e.g.*, existing power generating facilities with design flows below the 50 MGD threshold, certain existing manufacturing facilities, seafood processors, and offshore and coastal oil and gas extraction facilities). EPA notes, however, that these facilities are not covered under this rule because they do not meet the requirements of § 125.91.

B. What Is "Cooling Water" and What Is a "Cooling Water Intake Structure?"

Today's rule adopts for Phase II existing facilities the same definition of a "cooling water intake structure" that applies to new facilities. A cooling water intake structure is defined as the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States. Under the definition in today's rule, the cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, the intake pumps. Today's rule adopts the new facility rule's definition of "cooling water": Water used for contact or noncontact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content. The definition specifies that the intended use of cooling water is to absorb waste heat rejected from the processes used, or auxiliary operations on the facility's premises. The definition also indicates that water used in a manufacturing process either before or after it is used for cooling is process water for both cooling and non-cooling purposes and would not be considered cooling water for purposes of determining whether 25 percent or more of the flow is cooling water. This clarification is necessary because cooling water intake structures typically bring water into a facility for numerous purposes, including industrial processes; use as circulating water, service water, or evaporative cooling tower makeup water; dilution of effluent heat content; equipment cooling; and air conditioning. EPA notes that this clarification does not change the fact that only the intake water used exclusively for cooling purposes is counted when determining whether the 25 percent threshold in § 125.91(a)(4) is met.

This definition of "cooling water intake structure" differs from the definition provided in the 1977 Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92–500 (U.S. EPA, 1977). The final rule definition clarifies that the cooling water intake structure includes the physical structure that extends from the point at which water is withdrawn from the surface water up to and including the intake pumps. Inclusion of the term "associated constructed waterways" in today's rule is intended to clarify that the definition includes those canals, channels, connecting waterways, and similar structures that may be built or modified to facilitate the withdrawal of cooling water. The explicit inclusion of the intake pumps in the definition reflects the key role pumps play in determining the capacity (*i.e.*, dynamic capacity) of the intake. These pumps, which bring in water, are an essential component of the cooling water intake structure since without them the intake could not work as designed.

C. Is My Facility Covered if It Withdraws From Waters of the United States?

The requirements finalized today apply to cooling water intake structures that have the design capacity to withdraw amounts of water equal to or greater than the specified intake flow threshold from "waters of the United States." Waters of the United States include the broad range of surface waters that meet the regulatory definition at 40 CFR 122.2, which includes lakes, ponds, reservoirs, nontidal rivers or streams, tidal rivers, estuaries, fjords, oceans, bays, and coves. These potential sources of cooling water may be adversely affected by impingement and entrainment.

Some facilities discharge heated water to cooling ponds, then withdraw water from the ponds for cooling purposes. EPA recognizes that cooling ponds may, in certain circumstances, constitute part of a closed-cycled cooling system. See, *e.g.*, 40 CFR 125.83. However, EPA does not intend this rule to change the regulatory status of cooling ponds. Cooling ponds are neither categorically included nor categorically excluded from the definition of "waters of the United States" at 40 CFR 122.2. EPA interprets 40 CFR 122.2 to give permit writers discretion to regulate cooling ponds as "waters of the United States" where cooling ponds meet the definition of "waters of the United States." The determination whether a particular cooling pond is or is not a water of the United States is to be made by the permit writer on a case-by-case basis, informed by the principles enunciated in Solid Waste Agency of Northern Cook County (SWANCC) v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001). Therefore, facilities that withdraw cooling water from cooling ponds that are waters of the United States and that meet today's other criteria for coverage (including the requirement that the facility has or will be required to obtain an NPDES permit) are subject to today's rule. The EPA and the U.S. Army Corps of Engineers have jointly issued jurisdictional guidance concerning the term "waters of the United States" in light of the Supreme Court's decision in Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001) (SWANCC). A copy of that guidance was published as an Appendix to an Advanced Notice of Proposed

Rulemaking on the definition of the phrase "waters of the U.S.," see 68 FR 1991 (January 15, 2003), and may be obtained at (*http://www.epa.gov/owow/wetlands/ANPRM-FR.pdf*). Section 125.91(d) also provides, similar to the new facility rule, that facilities that obtain cooling water from a public water system or use treated effluent are not deemed to be using a cooling water intake structure for purposes of this rule.

D. Is My Facility Covered if It Is a Point Source Discharger?

Today's rule applies only to facilities that are point sources (*i.e.*, have an NPDES permit or are required to obtain one) because they discharge or might discharge pollutants, including storm water, from a point source to waters of the Unites States. This is the same requirement EPA included in the Phase I new facility rule at 40 CFR 125.81(a)(1). Requirements for complying with section 316(b) will continue to be applied through NPDES permits.

Based on the Agency's review of potential Phase II existing facilities that employ cooling water intake structures, the Agency anticipates that most existing power generating facilities that will be subject to this rule will control the intake structure that supplies them with cooling water, and discharge some combination of their cooling water, wastewater, and storm water to a water of the United States through a point source regulated by an NPDES permit. In this scenario, the requirements for the cooling water intake structure will be specified in the facility's NPDES permit. In the event that a Phase II existing facility's only NPDES permit is a general permit for storm water discharges, the Agency anticipates that the Director would write an individual NPDES permit containing requirements for the facility's cooling water intake structure. Alternatively, requirements applicable to cooling water intake structures could be incorporated into general permits. If requirements are placed into a general permit, they must meet the criteria set out at 40 CFR 122.28.

The Agency also recognizes that some facilities that have or are required to have an NPDES permit might not own and operate the intake structure that supplies their facility with cooling water. For example, electric power-generating facilities operated by separate entities might be located on the same, adjacent, or nearby property(ies): one of these facilities might take in cooling water and then transfer it to other facilities prior to discharge of the cooling water to a water of the United States. Section 125.91(c) of today's rule addresses such a situation. It provides that 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 supplier or suppliers withdraw water from waters of the United States but that is not itself a Phase II existing facility. This provision is intended to prevent facilities from circumventing the requirements of today's rule by creating arrangements to receive cooling water from an entity that is not itself a Phase II existing facility.

In addressing facilities that have or are required to have an NPDES permit that do not directly control the intake structure that supplies their facility with cooling water, section 125.91(d) also provides, similar to the new facility rule, that facilities that obtain cooling water from a public water system or use treated effluent are not deemed to be using a cooling water intake structure for purposes of this rule.

As EPA stated in the preamble to the final Phase I rule (66 FR 65256 December 18, 2001), the Agency encourages the Director to closely examine scenarios in which a facility withdraws significant amounts of cooling water from waters of the United States but is not required to obtain an NPDES permit. As appropriate, the Director should apply other legal requirements, such as section 404 or 401 of the Clean Water Act, the Coastal Zone Management Act, the National Environmental Policy Act, the Endangered Species Act, or similar State or Tribal authorities to address adverse environmental impact caused by cooling water intake structures at those facilities.

E. What Cooling Water Use and Design Intake Flow Thresholds Result in an Existing Facility Being Subject to This Rule?

This final rule applies to existing facilities that are point sources and use cooling water intake structures that (1) withdraw cooling water from waters of the United States and use at least twenty-five (25) percent of the water withdrawn exclusively for cooling purposes, and (2) have a total design intake capacity of 50 MGD or more measured on an average annual basis (see § 125.91). Today's rule further provides that where a Phase II existing facility is co-located with a manufacturing facility, only that portion of the cooling water intake flow that is used by the Phase II facility to generate electricity for sale to another entity will be considered for purposes of determining whether the 50 MGD and 25 percent criteria have been exceeded.

EPA chose the 50 MGD threshold to focus the rule on the largest existing power generating facilities. EPA estimates that the 50 MGD threshold will subject approximately 543 of 902 (60 percent) existing power generating facilities to this final rule and will address approximately 90 percent of the total flow withdrawn by these facilities. EPA established the 50 MGD threshold because the regulation of existing facilities with flows of 50 MGD or greater in Phase II will address those existing power generating facilities with the greatest potential to cause or contribute to adverse environmental impact. In addition, EPA has limited data on impacts at facilities withdrawing less than 50 MGD. Deferring regulation of such facilities to Phase III provides an additional opportunity for the Agency to collect impingement and entrainment data for these smaller facilities.

Similarly, because Phase II existing facilities typically use far more than 25 percent of the water they withdraw for cooling purposes, EPA established the 25 percent threshold to ensure that nearly all cooling water and the largest existing facilities using cooling water intake structures are addressed by today's requirements. As in the Phase I rule, water used for both cooling and non-cooling purposes does not count towards the 25 percent threshold. Thus, the rule does not discourage the reuse of cooling water as process water or vice versa. Water that serves as cooling water but is either previously or subsequently used as process water is not considered cooling water for purposes of determining the percentage of the water withdrawn that is used for cooling and whether that percentage equals or exceeds 25 percent. Water withdrawn for non-cooling purposes includes water withdrawn for warming by liquified natural gas facilities and water withdrawn for public water systems by desalinization facilities.

III. Legal Authority, Purpose, and Background of Today's Regulation

A. Legal Authority

Today's final rule is issued under the authority of sections 101, 301, 304, 308, 316, 401, 402, 501, and 510 of the Clean Water Act (CWA), 33 U.S.C. 1251, 1311, 1314, 1318, 1326, 1341, 1342, 1361, and 1370. This rule partially fulfills the obligations of the U.S. Environmental Protection Agency (EPA) under a consent decree in *Riverkeeper, Inc.* v. *Leavitt*, No. 93 Civ. 0314, (S.D.N.Y).

B. Purpose of Today's Regulation

Section 316(b) of the CWA provides that any standard established pursuant to section 301 or 306 of the CWA and applicable to a point source must require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact. Today's rule establishes requirements reflecting the best technology available for minimizing adverse environmental impact, applicable to the location, design, construction, and capacity of cooling water intake structures at Phase II existing power generating facilities that have the design capacity to withdraw at least fifty (50) MGD of cooling water from waters of the United States and use at least twenty-five (25) percent of the water they withdraw exclusively for cooling purposes.

C. Background

1. The Clean Water Act

The Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), 33 U.S.C. 1251 *et seq.*, seeks to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." 33 U.S.C. 1251(a). The CWA establishes a comprehensive regulatory program, key elements of which are (1) a prohibition on the discharge of pollutants from point sources to waters of the United States, except as authorized by the statute; (2) authority for EPA or authorized States or Tribes to issue National Pollutant Discharge Elimination System (NPDES) permits that regulate the discharge of pollutants; (3) requirements for limitations in NPDES permits based on effluent limitations guidelines and standards and water quality standards.

Today's rule implements section 316(b) of the CWA as it applies to "Phase II existing facilities" as defined in this rule. Section 316(b) addresses the adverse environmental impact caused by the intake of cooling water, not discharges into water. Despite this special focus, the requirements of section 316(b) are closely linked to several of the core elements of the NPDES permit program established under section 402 of the CWA to control discharges of pollutants into navigable waters. For example, while effluent limitations apply to the discharge of pollutants by NPDES-permitted point sources to waters of the United States, section 316(b) applies to facilities subject to NPDES requirements that withdraw water from waters of the United States for cooling and that use a cooling water intake structure to do so.

Section 402 of the CWA provides authority for EPA or an authorized State or Tribe to issue an NPDES permit to any person discharging any pollutant or combination of pollutants from a point source into waters of the United States. Forty-five States and one U.S. territory are authorized under section 402(b) to administer the NPDES permitting program. NPDES permits restrict the types and amounts of pollutants, including heat, that may be discharged from various industrial, commercial, and other sources of wastewater. These permits control the discharge of pollutants primarily by requiring dischargers to meet effluent limitations established pursuant to section 301 or section 306. Effluent limitations may be based on promulgated Federal effluent limitations guidelines, new source performance standards, or the best professional judgment of the permit writer. Limitations based on these guidelines, standards, or best professional judgment are known as technology-based effluent limits. Where technology-based effluent limits are inadequate to ensure attainment of water quality standards applicable to the receiving water, section 301(b)(1)(C) of the Clean Water Act requires permits to include more stringent limits based on applicable water quality standards. NPDES permits also routinely include monitoring and reporting requirements, standard conditions, and special conditions. In addition, NPDES permits contain conditions to implement the requirements of section 316(b). Section 301 of the CWA prohibits the discharge of any pollutant by any person, except in compliance with specified statutory requirements, including section 402.

Section 510 of the Clean Water Act provides, that except as provided in the Clean Water Act, nothing in the Act shall (1) preclude or deny the right of any State or political subdivision thereof to adopt or enforce any requirement respecting control or abatement of pollution; except that if a limitation, prohibition or standard of performance is in effect under the Clean Water Act, such State or political subdivision may not adopt or enforce any other limitation prohibition or standard of performance which is less stringent than the limitation prohibition or standard of performance under the Act. EPA interprets this to reserve for the States authority to implement requirements that are more stringent than the Federal requirements under state law. *PUD No. 1 of Jefferson County. Washington Dep't of Ecology*, 511 U.S. 700, 705 (1994).

Sections 301, 304, and 306 of the CWA require that EPA develop technology-based effluent limitations guidelines and new source performance standards that are used as the basis for technology-based minimum discharge requirements in wastewater discharge permits. EPA issues these effluent limitations guidelines and standards for categories of industrial dischargers based on the pollutants of concern discharged by the industry, the degree of control that can be attained using various levels of pollution control technology, consideration of various economic tests appropriate to each level of control, and other factors identified in sections 304 and 306 of the CWA (such as non-water quality environmental impacts including energy impacts). EPA has promulgated regulations setting effluent limitations guidelines and standards under sections 301, 304, and 306 of the CWA for more than 50 industries. See 40 CFR parts 405 through 471. EPA has established effluent limitations guidelines and standards that apply to most of the industry categories that use cooling water intake structures (*e.g.*, steam electric power generation, iron and steel manufacturing, pulp and paper manufacturing, petroleum refining, and chemical manufacturing).

Section 316(b) states, in full:

> Any standard established pursuant to section 301 or section 306 of [the Clean Water] Act and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

The phrase "best technology available" in CWA section 316(b) is not defined in the statute, but its meaning can be understood in light of similar phrases used elsewhere in the CWA. See *Riverkeeper* v. *EPA*, slip op. at 11 (2nd Cir. Feb. 3, 2004) (noting that the cross-reference in CWA section 316(b) to CWA section 306 "is an invitation to look to section 306 for guidance in discerning what factors Congress intended the EPA to consider in determining the 'best technology available' " for new sources).

In sections 301 and 306, Congress directed EPA to set effluent discharge standards for new sources based on the "best available demonstrated control technology" and for existing sources based on the "best available technology economically achievable." For new sources, section 306(b)(1)(B) directs EPA to establish "standards of performance." The phrase "standards of performance" under section 306(a)(1) is defined as being the effluent reduction that is "achievable through application of the best available demonstrated control technology, processes, operating methods or other alternatives * * *." This is commonly referred to as "best available demonstrated technology" or "BADT." For existing dischargers, section 301(b)(1)(A) requires the establishment of effluent limitations based on "the application of best practicable control technology currently available." This is commonly referred to as "best practicable technology" or "BPT." Further, section 301(b)(2)(A) directs EPA to establish effluent limitations for certain classes of pollutants "which shall require the application of the best available technology economically achievable." This is commonly referred to as "best available technology" or "BAT." Section 301 specifies that both BPT and BAT limitations must reflect determinations made by EPA under Clean Water Act section 304. Under these provisions, the discharge of pollutants from point sources is based not on the impact of the discharge on the receiving waters, but instead upon the capabilities of the equipment or "control technologies" available to control those discharges.

The phrases "best available demonstrated technology"; and "best available technology"—like "best technology available" in CWA section 316(b)—are not defined in the statute. However, section 304 of the CWA specifies factors to be considered in establishing the best practicable control technology currently available, and best available technology.

For best practicable control technology currently available, the CWA directs EPA to consider

> the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application, and shall also take into account the age of the equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, non-water quality environmental impact (including energy requirements), and such other factors as [EPA] deems appropriate.

33 U.S.C. 1314(b)(1)(b).

For "best available technology," the CWA directs EPA to consider:

> the age of equipment and facilities involved, the process employed, the engineering aspects * * * of various types of control techniques, process changes, the cost of achieving such effluent reduction, non-water quality environmental impacts (including energy requirements), and such other factors as [EPA] deems appropriate.

33 U.S.C. 1314(b)(2)(B).

Section 316(b) expressly refers to section 301, and the phrase "best technology available" is very similar to "best technology available" in that section. These facts, coupled with the brevity of section 316(b) itself, prompted EPA to look to section 301 and, ultimately, section 304 for guidance in determining the "best technology available to minimize adverse environmental impact" of cooling water intake structures for existing Phase II facilities.

By the same token, however, there are significant differences between section 316(b) and sections 301 and 304. See *Riverkeeper, Inc.* v. *United States Environmental Protection Agency,* slip op. at 13, (2nd Cir. Feb. 3, 2004) ("not every statutory directive contained [in sections 301 and 306] is applicable" to a section 316(b) rulemaking). Section 316(b) requires that cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. In contrast to the effluent limitations provisions, the object of the "best technology available" is explicitly articulated by reference to the receiving water: To minimize adverse environmental impact in the waters from which cooling water is withdrawn. This difference is reflected in EPA's past practices in implementing sections 301, 304, and 316(b). While EPA has established effluent limitations guidelines based on the efficacy of one or more technologies to reduce pollutants in wastewater in relation to cost without necessarily considering the impact on the receiving waters, EPA has previously considered the costs of technologies in relation to the benefits of minimizing adverse environmental impact in establishing 316(b) limits which historically have been done on a case-by case basis. *In Re Public Service Co. of New Hampshire,* 10 ERC 1257 (June 17, 1977); *In Re Public Service Co. of New Hampshire,* 1 EAD 455 (Aug. 4, 1978); *Seacoast Anti-Pollution League* v. *Costle,* 597 F. 2d 306 (1st Cir. 1979).

For this Phase II rulemaking, EPA therefore interprets CWA section 316(b) as authorizing EPA to consider not only technologies but also their effects on and benefits to the water from which the cooling water is withdrawn. Based on these two considerations, EPA has established in today's rule national requirements for facilities to install technology that is technically available, economically practicable, and cost-effective while at the same time authorizing a range of technologies that achieve comparable reductions in adverse environmental impact.

2. Consent Decree

Today's final rule partially fulfills EPA's obligation to comply with a consent decree, as amended. The Second Amended Consent Decree, which is relevant to today's rule, was filed on November 25, 2002, in the United States District Court, Southern District of New York, in *Riverkeeper, Inc.* v. *Leavitt,* No. 93 Civ 0314, a case brought against EPA by a coalition of individuals and environmental groups. The original Consent Decree, filed on October 10, 1995, provided that EPA was to propose regulations implementing section 316(b) by July 2, 1999, and take final action with respect to those regulations by August 13, 2001. Under subsequent interim orders, the Amended Consent Decree filed on November 22, 2000, and the Second Amended Consent Decree, EPA has divided the rulemaking into three phases and is working under new deadlines. As required by the Second Amended Consent Decree, on November 9, 2001, EPA took final action on a rule governing cooling water intake structures used by new facilities (Phase I). 66 FR 65255 (December 18, 2001). The Second Amended Consent Decree requires that EPA take final action by February 16, 2004, with respect to Phase II regulations that are "applicable to, at a minimum: (1) Existing utilities (*i.e.*, facilities that both generate and transmit electric power) that employ a cooling water intake structure, and whose intake flow levels exceed a minimum threshold to be determined by EPA during the Phase II rulemaking process; and (2) existing nonutility power producers (*i.e.*, facilities that generate electric power but sell it to another entity for transmission) that employ a cooling water intake structure, and whose intake flow levels exceed a minimum threshold to be determined by EPA during the Phase II rulemaking process." The consent decree further requires that EPA propose regulations governing cooling water intake structures used, at a minimum, by smaller-flow power plants and facilities in four industrial sectors (pulp and paper making, petroleum and coal products manufacturing, chemical and allied manufacturing, and primary metal manufacturing) by November 1, 2004, and take final action by June 1, 2006 (Phase III).

3. What Other EPA Rulemakings and Guidance Have Addressed Cooling Water Intake Structures?

In April 1976, EPA published a final rule under section 316(b) that addressed cooling water intake structures. 41 FR

17387 (April 26, 1976), see also the proposed rule at 38 FR 34410 (December 13, 1973). The rule added a new § 401.14 to 40 CFR Chapter I that reiterated the requirements of CWA section 316(b). It also added a new part 402, which included three sections: (1) § 402.10 (Applicability), (2) § 402.11 (Specialized definitions), and (3) § 402.12 (Best technology available for cooling water intake structures). Section 402.10 stated that the provisions of part 402 applied to "cooling water intake structures for point sources for which effluent limitations are established pursuant to section 301 or standards of performance are established pursuant to section 306 of the Act." Section 402.11 defined the terms "cooling water intake structure," "location," "design," "construction," "capacity," and "Development Document." Section 402.12 included the following language:

> The information contained in the Development Document shall be considered in determining whether the location, design, construction, and capacity of a cooling water intake structure of a point source subject to standards established under section 301 or 306 reflect the best technology available for minimizing adverse environmental impact.

In 1977, fifty-eight electric utility companies challenged those regulations, arguing that EPA had failed to comply with the requirements of the Administrative Procedure Act (APA) in promulgating the rule. Specifically, the utilities argued that EPA had neither published the Development Document in the **Federal Register** nor properly incorporated the document into the rule by reference. The United States Court of Appeals for the Fourth Circuit agreed and, without reaching the merits of the regulations themselves, remanded the rule. *Appalachian Power Co.* v. *Train*, 566 F.2d 451 (4th Cir. 1977). EPA later withdrew part 402. 44 FR 32956 (June 7, 1979). The regulation at 40 CFR 401.14, which reiterates the statutory requirement, remains in effect.

Since the Fourth Circuit remanded EPA's section 316(b) regulations in 1977, NPDES permit authorities have made decisions implementing section 316(b) on a case-by-case, site-specific basis. EPA published draft guidance addressing section 316(b) implementation in 1977. See *Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92-500* (U.S. EPA, 1977). This draft guidance described the studies recommended for evaluating the impact of cooling water intake structures on the aquatic environment and recommended a basis for determining the best technology available for minimizing adverse environmental impact. The 1977 section 316(b) draft guidance states, "The environmental-intake interactions in question are highly site-specific and the decision as to best technology available for intake design, location, construction, and capacity must be made on a case-by-case basis." (Section 316(b) Draft Guidance, U.S. EPA, 1977, p. 4). This case-by-case approach was also consistent with the approach described in the 1976 Development Document referenced in the remanded regulation.

The 1977 section 316(b) draft guidance suggested a general process for developing information needed to support section 316(b) decisions and presenting that information to the permitting authority. The process involved the development of a site-specific study of the environmental effects associated with each facility that uses one or more cooling water intake structures, as well as consideration of that study by the permitting authority in determining whether the facility must make any changes for minimizing adverse environmental impact. Where adverse environmental impact is present, the 1977 draft guidance suggested a stepwise approach that considers screening systems, size, location, capacity, and other factors.

Although the draft guidance described the information that should be developed, key factors that should be considered, and a process for supporting section 316(b) determinations, it did not establish uniform technology-based national standards for best technology available for minimizing adverse environmental impact. Rather, the guidance left the decisions on the appropriate location, design, capacity, and construction of cooling water intake structures to the permitting authority. Under this framework, the Director determined whether appropriate studies have been performed, whether a given facility has minimized adverse environmental impact, and what, if any, technologies may be required.

4. Phase I New Facility Rule

On November 9, 2001, EPA took final action on regulations governing cooling water intake structures at new facilities. 66 FR 65255 (December 18, 2001). On December 26, 2002, EPA made minor changes to the Phase I regulations. 67 FR 78947. The final Phase I new facility rule (40 CFR Part 125, Subpart I) establishes requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities that withdraw at least two (2) million gallons per day (MGD) and use at least twenty-five (25) percent of the water they withdraw solely for cooling purposes. In the new facility rule, EPA adopted a two-track approach. Under Track I, for facilities with a design intake flow more than 10 MGD, the intake flow of the cooling water intake structure is restricted, at a minimum, to a level commensurate with that which could be attained by use of a closed-cycle, recirculating cooling system. For facilities with a design intake flow more than 2 MGD, the design through-screen intake velocity is restricted to 0.5 ft/s and the total quantity of intake is restricted to a proportion of the mean annual flow of a freshwater river or stream, or to maintain the natural thermal stratification or turnover patterns (where present) of a lake or reservoir except in cases where the disruption is beneficial, or to a percentage of the tidal excursions of a tidal river or estuary. If certain environmental conditions exist, an applicant with intake capacity greater than 10 MGD must select and implement appropriate design and construction technologies for minimizing impingement mortality and entrainment. (Applicants with 2 to 10 MGD flows are not required to reduce intake flow to a level commensurate with a closed-cycle, recirculating cooling system, but must install technologies for reducing impingement mortality at all locations.) Under Track II, the applicant has the opportunity to demonstrate that impacts to fish and shellfish, including important forage and predator species, within the watershed will be comparable to the reduction in impingement mortality and entrainment it would achieve were it to implement the Track I intake flow and velocity requirements.

With the new facility rule, EPA promulgated national minimum requirements for the design, capacity, and construction of cooling water intake structures at new facilities. EPA believes that the final new facility rule establishes a reasonable framework that creates certainty for permitting of new facilities, while providing significant flexibility to take site-specific factors into account.

5. Proposed Rule for Phase II Existing Facilities

On April 9, 2002, EPA published proposed requirements for cooling water intake structures at Phase II existing facilities to implement section 316(b) of the Clean Water Act. EPA proposed to establish requirements that gave facilities three different compliance options for meeting performance standards that vary based on waterbody type, the percentage of the source waterbody withdrawn, and the facility capacity utilization rate. 67 FR 17122. EPA received numerous comments and data submissions concerning the proposal.

6. Notice of Data Availability

On Wednesday, March 19, 2003, EPA published a Proposed Rule Notice of Data Availability (NODA). 68 FR 13522. This notice presented a summary of the data EPA had received or collected since proposal, an assessment of the relevance of the data to EPA's analysis, revisions to EPA's estimate of the costs and benefits of the proposed rule, new proposed compliance alternatives, and potential modifications to EPA's proposed regulatory approach. As part of the NODA, EPA also reopened the comment period on the complete contents of the proposed rule.

7. Public Participation

EPA has worked extensively with stakeholders from the industry, public interest groups, State agencies, and other Federal agencies in the development of this final rule. These public participation activities have focused on various section 316(b) issues, including issues relevant to development of the Phase I rule and Phase II rule.

EPA conducted outreach to industry groups, environmental groups, and other government entities in the development, testing, refinement, and completion of the section 316(b) survey, which has been used as a source of data for the Phase II rule. The survey is entitled "Information Collection Request, Detailed Industry Questionnaires: Phase II Cooling Water Intake Structures & Watershed Case Study Short Questionnaire," September 3, 1999. In addition, EPA conducted two public meetings on section 316(b) issues. In June of 1998, in Arlington, Virginia, EPA conducted a public meeting focused on a draft regulatory framework for assessing potential adverse environmental impact from impingement and entrainment. 63 FR 27958 (May 21, 1998). In September of 1998, in Alexandria, Virginia, EPA conducted a public meeting focused on technology, cost, and mitigation issues. 63 FR 40683 (July 30, 1998). In addition, in September of 1998, and April of 1999, EPA staff participated in technical workshops sponsored by the Electric Power Research Institute on issues relating to the definition and assessment of adverse environmental impact. EPA staff have participated in other industry conferences, met upon request on numerous occasions with representatives of industry and environmental groups.

In the months leading up to publication of the proposed Phase I rule, EPA conducted a series of stakeholder meetings to review the draft regulatory framework for the proposed rule and invited stakeholders to provide their recommendations for the Agency's consideration. EPA managers have met with the Utility Water Act Group, Edison Electric Institute, representatives from an individual utility, and with representatives from the petroleum refining, pulp and paper, and iron and steel industries. EPA conducted several meetings with environmental groups attended by representatives from 15 organizations. EPA also met with the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA) and, with the assistance of ASIWPCA, conducted a conference call in which representatives from 17 States or interstate organizations participated. After publication of the proposed Phase I rule, EPA continued to meet with stakeholders at their request. Summaries of these meetings are in the docket.

EPA received many comments from industry stakeholders, government agencies, and private citizens on the Phase I proposed rule 65 FR 49059 (August 10, 2000). EPA received additional comments on the Phase I Notice of Data Availability (NODA) 66 FR 28853 (May 25, 2001). These comments informed the development of the Phase II proposal.

In January, 2001, EPA also attended technical workshops organized by the Electric Power Research Institute and the Utilities Water Act Group. These workshops focused on the presentation of key issues associated with different regulatory approaches considered under the Phase I proposed rule and alternatives for addressing section 316(b) requirements.

On May 23, 2001, EPA held a day-long forum to discuss specific issues associated with the development of regulations under section 316(b) of the Clean Water Act. 66 FR 20658 (April 24, 2001). At the meeting, 17 experts from industry, public interest groups, States, and academia reviewed and discussed the Agency's preliminary data on cooling water intake structure technologies that are in place at existing facilities and the costs associated with the use of available technologies for reducing impingement and entrainment. Over 120 people attended the meeting.

In August 21, 2001, EPA staff participated in a technical symposium sponsored by the Electric Power Research Institute in association with the American Fisheries Society on issues relating to the definition and assessment of adverse environmental impact under section 316(b) of the CWA.

During development of the Phase I final rule and Phase II proposed rule, EPA coordinated with the staff from the Nuclear Regulatory Commission (NRC) to ensure that there would not be a conflict with NRC safety requirements. NRC staff reviewed the proposed Phase II rule and did not identify any apparent conflict with nuclear plant safety. NRC licensees would continue to be obligated to meet NRC requirements for design and reliable operation of cooling systems. NRC staff recommended that EPA consider adding language which states that in cases of conflict between an EPA requirement under this rule and an NRC safety requirement, the NRC safety requirement take precedence. EPA added language to address this concern in this final rule.

In a concerted effort to respond to a multitude of questions concerning the data and analyses that EPA developed as part of the Phase II proposal, EPA held a number of conference calls with multiple stakeholders to clarify issues and generally provide additional information. To supplement these verbal discussions, EPA drafted three supporting documents: one that explained the methodology EPA used to calculate entrainment rates; and two others that provided specific examples of how EPA applied this methodology to calculate benefits for the proposed rule. In addition, EPA prepared written responses to all questions submitted by the stakeholders involved in the initial conference calls.

Finally, EPA sponsored a *Symposium on Cooling Water Intake Technologies to Protect Aquatic Organisms,* held on May 6–7, 2003, at the Hilton Crystal City at National Airport in Arlington, Virginia. This symposium brought together professionals from Federal, State, and Tribal regulatory agencies; industry; environmental organizations; engineering consulting firms; science and research organizations; academia; and others concerned with mitigating harm to the aquatic environment by cooling water intake structures. Efficacy and costs of various technologies to mitigate impacts to aquatic organisms from cooling water intake structures, as well as research and other future needs, were discussed.

These coordination efforts and all of the meetings described in this section are documented or summarized in the docket established for this rule.

IV. Environmental Impacts Associated With Cooling Water Intake Structures

With the implementation of today's final rule, EPA intends to minimize the adverse environmental impacts of cooling water intake structures by minimizing the number of aquatic organisms lost as a result of water withdrawals associated with these structures or through restoration measures that compensate for these losses. In the Phase I new facility rule and proposed Phase II existing facility rule, EPA provided an overview of the magnitude and type of environmental impacts associated with cooling water intake structures, including several illustrative examples of documented environmental impacts at existing facilities (see 65 FR 49071–4; 66 FR 65262–5; and 67 FR 17136–40).

For the same reasons set forth in the preamble to the Phase I rule (66 FR 65256, 65291–65297), EPA has determined that there are multiple types of undesirable and unacceptable environmental impacts that may be associated with Phase II existing facilities, depending on conditions at the individual site. These types of impacts include entrainment and impingement; reductions of threatened and endangered species; damage to critical aquatic organisms, including important elements of the food chain; diminishment of a population's compensatory reserve; losses to populations including reductions of indigenous species populations, commercial fisheries stocks, and recreational fisheries; and stresses to overall communities and ecosystems as evidenced by reductions in diversity or other changes in system structure and function. Similarly, based on the analyses and for the same reasons set forth in the preamble to the new facility rule (66 FR 65256, 65291–65297), EPA has selected reductions in impingement and entrainment as a quick, certain, and consistent metric for determining performance at Phase II existing facilities. Further, EPA considered the non-impingement and entrainment environmental impacts for this rule and found them to be acceptable at a national level. This section describes the environmental impacts associated with cooling water withdrawals and why they are of concern to the Agency.

EPA estimates that facilities under the scope of today's final rule withdraw on average more than 214 billion gallons of cooling water a day from waters of the United States.[2] A report by the U.S. Geological Survey estimates that the use of water by the thermoelectric power industry accounted for 47 percent of all combined fresh and saline withdrawals from waters of the United States in 1995.[3] The withdrawal of such large quantities of cooling water in turn has the potential to affect large quantities of aquatic organisms including phytoplankton (tiny, free-floating photosynthetic organisms suspended in the water column), zooplankton (small aquatic animals, including fish eggs and larvae, that consume phytoplankton and other zooplankton), fish, and shellfish. Aquatic organisms drawn into cooling water intake structures are either impinged on components of the cooling water intake structure or entrained in the cooling water system itself.

Impingement takes place when organisms are trapped against intake screens by the force of the water being drawn through the cooling water intake structure. The velocity of the water withdrawal by the cooling water intake structure may prevent proper gill movement, remove fish scales, and cause other physical harm or death of affected organisms through exhaustion, starvation, asphyxiation, and descaling. Death from impingement ("impingement mortality") can occur immediately or subsequently as an individual succumbs to physical damage upon its return to the waterbody.

Entrainment occurs when organisms are drawn through the cooling water intake structure into the cooling system. Organisms that become entrained are typically relatively small, aquatic organisms, including early life stages of fish and shellfish. Many of these small, fragile organisms serve as prey for larger organisms higher on the food chain which are commercially and recreationally desirable species. As entrained organisms pass through a facility's cooling system they may be subject to mechanical, thermal, and at times, chemical stress. Sources of such stress include physical impacts in the pumps and condenser tubing, pressure changes caused by diversion of the cooling water into the plant or by the hydraulic effects of the condensers, sheer stress, thermal shock in the condenser and discharge tunnel, and chemical toxic effects from antifouling agents such as chlorine. Similar to impingement mortality, death from entrainment can occur immediately or subsequently as the individual succumbs to the damage from the stresses encountered as it passed through the cooling water system once it is discharged back into the waterbody.

The environmental impacts attributable to impingement mortality and entrainment at individual facilities include losses of early life stages of fish and shellfish, reductions in forage species, and decreased recreational and commercial landings. EPA estimates that the current number of fish and shellfish, expressed as age 1 equivalents, that are killed from impingement and entrainment from cooling water intake structures at the facilities covered by this Phase II rule is over 3.4 billion annually. Expressing impingement mortality and entrainment losses as age 1 equivalents is an accepted method for converting losses of all life stages into individuals of an equivalent age and provides a standard metric for comparing losses among species, years, and facilities. The largest losses are in the mid-Atlantic, where EPA estimates 1.7 billion age 1 equivalents are lost annually due to impingement and entrainment.[4] Although the number of age 1 equivalent fish killed by impingement and entrainment is very large, precise quantification of the nature and extent of impacts to populations and ecosystems is difficult. Population dynamics and the physical, chemical, and biological processes of ecosystems are extremely complex. While generally accepted as a simple and transparent method for modeling losses, the proportional methodology that EPA uses to estimate impingement and entrainment nationwide has uncertainties that may result in under or over estimating actual impingement and entrainment rates.

Decreased numbers of aquatic organisms can disrupt aquatic food webs and alter species composition and overall levels of biodiversity. For example, a model that examined the effect of large entrainment losses of forage fish, such as bay anchovy, predicted subsequent reductions in predator populations (including commercially and recreationally important species such as striped bass, weakfish, and blue fish) as high as 25%.[5] This is because forage species, which comprise a majority of

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[2] EPA 1999. Detailed Industry Questionnaires: Phase II Cooling Water Intake Structures & Watershed Case Study Short Questionnaire. U.S. Environmental Protection Agency, Office of Wastewater Management, Washington, D.C. OMB Control No. 2040–0213.

[3] Solley, W.B., R.R. Pierce and H.A. Perlman. 1998. Estimated Use of Water in the United States in 1995. U.S. Geological Survey Circular 1200.

[4] For more information, please see Chapter D2: Evaluation of Impingement and Entrainment in the Mid-Atlantic Region in the Section 316(b) Existing Facilities Regional Studies, Part D: Mid-Atlantic.

[5] Summers, J.K. 1989. Simulating the indirect effects of power plant entrainment losses on an estuarine ecosystem. Ecological Modelling, 49: 31–47.

entrainment losses at many facilities, are often a primary food source for predator species.

EPA is also concerned about the potential impacts of cooling water intake structures located in or near habitat areas that support threatened, endangered, or other species of concern (those species that might be in need of conservation actions, but are not currently listed as threatened or endangered under State or Federal law).[6] In the San Francisco Bay-Delta Estuary, California, in the vicinity of the Pittsburg and Contra Costa Power Plants several fish species (*e.g.*, Delta smelt, Sacramento splittail, chinook salmon, and steelhead) are now considered threatened or endangered by State and/or Federal authorities. EPA evaluated facility data on impingement and entrainment rates for these species and estimated that potential losses of special status fish species at the two facilities may average 8,386 age 1 equivalents per year resulting from impingement and 169 age 1 equivalents per year due to entrainment.[7] In another example, EPA is aware that from 1976 to 1994, approximately 3,200 threatened or endangered sea turtles entered enclosed cooling water intake canals at the St. Lucie Nuclear Generating Plant in Florida.[8] The facility developed a capture-and-release program in response to these events. Most of the entrapped turtles were captured and released alive; however, approximately 160 turtles did not survive. An incidental take limit established by NMFS in a 2001 biological opinion for this facility has been set at no more than 1,000 sea turtles captured in the intake, with less than one percent killed or injured as a result of plant operations (only two of those killed or injured may be Kemp's Ridley sea turtles and none may be hawksbill or leatherback sea turtles).[9] Although the extent to which threatened, endangered, and other special status species are taken by cooling water intake structures more generally is yet to be determined, EPA is concerned about potential impacts to such species.

Examples of Environmental Impacts Caused by Cooling Water Intakes

1. Hudson River

The power generation facilities on the Hudson River in New York are some of the most extensively studied in the nation. The fish populations in the Hudson River have also been studied extensively to measure the impacts of these power plants. Studies of entrainment at five Hudson River power plants during the 1980s predicted year-class reductions ranging from six percent to 79 percent, depending on the fish species.[10] A Draft Environmental Impact Statement (DEIS) prepared by industry of entrainment at three Hudson River facilities (Roseton, Bowline, and Indian Point) predicted year-class reductions of up to 20 percent for striped bass, 25 percent for bay anchovy, and 43 percent for Atlantic tomcod.[11] The New York State Department of Environmental Conservation (NYSDEC) concluded that any "compensatory responses to this level of power plant mortality could seriously deplete any resilience or compensatory capacity of the species needed to survive unfavorable environmental conditions."[12] In the DEIS, the facilities argue that their operation has not harmed the local aquatic communities, because all observed population changes are attributable to causes other than the operation of the power plants, such as water chestnut growth, zebra mussel invasion, changes in commercial fishing, increases in salinity and improved water quality in the New York Harbor.

In contrast, the Final Environmental Impact Statement (FEIS) prepared by NYSDEC for these three facilities concludes that impacts are associated with the power plants and notes that these impacts are more like habitat degradation than the "selective cropping" of fish that occurs during regulated fishing because the entire community is impacted rather than specific species higher on the food chain.[13] The multiple facilities on the Hudson River act cumulatively on the entire aquatic community. New York State's 2002 section 316(b) report lists the Hudson River downstream from the Federal dam at Troy, New York, as impacted by cooling water use by power plants due to the loss each year of a substantial percentage of annual fish production. The FEIS estimates, from samples collected between 1981 and 1987, that the average annual entrainment losses from these three facilities includes 16.9 million American shad, 303.4 million striped bass, 409.6 million bay anchovy, 468 million white perch, and 826.2 million river herring.[14] In addition, related studies have found a small long-term decline in both species richness and diversity within the resident fish community. A commenter on the DEIS cited further evidence that Atlantic tomcod, Atlantic sturgeon, bluefish, weakfish, rainbow smelt, white perch and white catfish are showing long-term trends of declining abundance of 5 to 8% per annum.[15] Declines in abundances of several species and changes in species composition have raised concerns about the overall health of the community. The FEIS concluded that additional technology was necessary to minimize the adverse environmental impact from these three once-through systems.[16]

The FEIS further concluded that entrainment at these facilities has diminished the forage base for each species so there is less food available for the survivors. This disruption of the food chain compromises the health of the entire aquatic community. The FEIS used, as a simplified hypothetical example, the loss of an individual bay anchovy that would ordinarily serve as prey for a juvenile striped bass. If this individual bay anchovy is killed via entrainment and disintegrated upon

[6] For more information, please see Chapter A12: Threatened & Endangered Species Analysis Methods in the Regional Studies for the Final Section 316(b) Phase II Existing Facilities Rule.

[7] Impingement and entrainment data were obtained from the 2000 Draft Habitat Conservation Plan for the Pittsburg and Contra Costa facilities. Please see EPA's Regional Studies for the Final Section 316(b) Phase II Existing Facilities Rule for detailed information on EPA's evaluation of impingement and entrainment at these facilities.

[8] Florida Power and Light Company. 1995. Assessment of the impacts at the St. Lucie Nuclear Generating Plant on sea turtle species found in the inshore waters of Florida.

[9] Florida Power and Light Company. 2002. Florida Power & Light Company St. Lucie Plant Annual Environmental Operating Report 2002.

[10] Boreman J. and P. Goodyear. 1988. Estimates of entrainment mortality for striped bass and other fish species inhabiting the Hudson River Estuary. *American Fisheries Society Monograph* 4:152–160.

[11] Consolidated Edison Company of New York. 2000. Draft environmental impact statement for the state pollutant discharge elimination system permits for Bowline Point, Indian Point 2 & 3, and Roseton steam electric generating stations.

[12] New York State Department of Environmental Conservation (NYSDEC). 2000. Internal memorandum provided to the USEPA on NYDEC's position on SPDES permit renewals for Roseton, Bowline Point 1 & 2, and Indian Point 2 & 3 generating stations.

[13] New York State Department of Environmental Conservation (NYSDEC). 2003. Final Environmental Impact Statement: Concerning the Applications to Renew NYSPDES Permits for the Roseton 1 & 2, Bowling 1 & 2 and Indian Point 2 & 3 Steam Electric Generating Stations, Orange, Rockland and Westchester Counties.

[14] Ibid.

[15] Henderson, P.A. and R.M. Seaby. 2000. Technical comments on the Draft Environmental Impact Statement for the State Pollution Discharge Elimination System Permit Renewal for Bowline Point 1 & 2, Indian Point 2 & 3, and Roseton 1 & 2 Steam Generating Stations. Pisces Conservation Ltd.

[16] New York State Department of Environmental Conservation (NYSDEC). 2003. Final Environmental Impact Statement: Concerning the Applications to Renew NYSPDES Permits for the Roseton 1 & 2, Bowline 1 & 2 and Indian Point 2 & 3 Steam Electric Generating Stations, Orange, Rockland and Westchester Counties.

passage through a CWIS, it is no longer available as food to a striped bass, but rather it is only useful as food to lower trophic level organisms, such as detritivores (organisms that feed on dead organic material). Further, the bay anchovy would no longer be available to consume phytoplankton, which upsets the distribution of nutrients in the ecosystem.[17]

The Hudson River, like many waterbodies in the nation, has undergone many changes in the past few decades. These changes, which have affected fish populations either positively or negatively, include improvements to water quality as a result of upgrades to sewage treatment plants, invasions by exotic species such as zebra mussels, chemical contamination by toxins such as PCBs and heavy metals, global climate shifts such as increases in annual mean temperatures and higher frequencies of extreme weather events (*e.g.*, the El Niño-Southern Oscillation), and strict management of individual species stocks such as striped bass.[18] In addition, there are dramatic natural changes in fish populations on an annual basis and in the long term due to natural phenomena because the Hudson River, like many waterbodies, is a dynamic system with many fundamental, fluctuating environmental parameters—such as flow, temperature, salinity, dissolved oxygen, nutrients, and disease—that cause natural variation in fish populations each year.[19] The existence of these interacting variables makes it difficult to determine the exact contribution of impingement and entrainment losses on a population's relative health. Nonetheless, as described later in this section, EPA is concerned about the potential for cumulative impacts resulting from multiple facility intakes that collectively impinge and/or entrain aquatic organisms within a specific waterbody.

2. Mount Hope Bay

Environmental impacts were also studied in another recent permit reissuance for the Brayton Point Station in Somerset, Massachusetts, where EPA is the permitting authority. EPA determined that, among other things, the facility's cooling water system had contributed to the collapse of the fishery and inhibited its recovery despite stricter commercial and recreational fishing limits and improved water quality due to sewage treatment upgrades. The facility currently withdraws nearly one billion gallons of water each day and the average annual losses of aquatic organisms due to impingement and entrainment are estimated in the trillions, including 251 million winter flounder, 375 million windowpane flounder, 3.5 billion tautog and 11.8 billion bay anchovy. A dramatic change in the fish populations in Mount Hope Bay is apparent after 1984 with a decline by more than 87 percent, which coincides with a 45 percent increase in cooling water withdrawal from the bay due to the modification of Unit 4 from a closed-cycle recirculating system to a once-through cooling water system and a similar increase in the facility's thermal discharge.[20 21] The downward trend of finfish abundance in Mount Hope Bay is significantly greater than declines in adjacent Narragansett Bay that is not influenced by the operation of Brayton Point Station.[22] Despite fishing restrictions, fish stocks have not recovered.

3. Southern California Bight

At the San Onofre Nuclear Generating Station (SONGS), in a normal (non-El Niño) year, an estimated 57 tons of fish were killed per year when all units were in operation.[23] The amount lost per year included approximately 350,000 juveniles of white croaker, a popular sport fish; this number represents 33,000 adult equivalents or 3.5 tons of adult fish. In shallow water, densities of queenfish and white croaker decreased 60 percent within one kilometer of SONGS and 35 percent within three kilometers from SONGS as compared to densities prior to facility operations. Densities of local midwater fish decreased 50 to 70 percent within three kilometers of the facility. In contrast, relative abundances of some bottom-dwelling species in the same areas were higher because of the enriched nature of the SONGS discharge, which in turn supported elevated numbers of prey items for bottom-dwelling fish.

4. Missouri River

In contrast to these examples, facilities sited on waterbodies previously impaired by anthropogenic activities such as channelization demonstrate limited entrainment and impingement losses. The Neal Generating Complex facility, located near Sioux City, Iowa, on the Missouri River is coal-fired and utilizes once-through cooling systems. According to a ten-year study conducted from 1972–82, the Missouri River aquatic environment near the Neal complex was previously heavily impacted by channelization and very high flow rates meant to enhance barge traffic and navigation.[24] These anthropogenic changes to the natural river system resulted in significant losses of fish habitat. At this facility, there was found to be little impingement and entrainment by cooling water intakes.

Studies like those described in this section provide only a partial picture of the range of environmental impacts associated with cooling water intake structures. Although numerous studies were conducted to determine the environmental impacts caused by impingement and entrainment at existing facilities, many of them are based on limited data that were collected as long as 25 years ago. EPA's review of available facility impingement and entrainment studies identified a substantial number of serious study design limitations, including data collections for only one to two years or limited to one season and for a subset of the species affected by cooling water intakes; limited taxonomic detail (*i.e.*, many losses not identified to the species level); a general lack of statistical information such as inclusion of variance measures in impingement and entrainment estimates; and the lack of standard methods and metrics for quantifying impingement and entrainment, which limits the potential for evaluating cumulative impacts across multiple facilities. Further, in many cases it is likely that facility operating conditions and/or the state of the waterbody itself has changed since these studies were conducted. Finally, the methods for monitoring impingement and entrainment used in the 1970s and 1980s, when most section 316(b) evaluations were performed, were often inconsistent and incomplete, making quantification of impacts difficult in some cases. Recent advances in environmental assessment techniques

[17] Ibid.

[18] Ibid.

[19] Ibid.

[20] Ibid.

[21] T Gibson, M. 1995 (revised 1996). Comparison of trends in the finfish assemblages of Mt. Hope Bay and Narragansett Bay in relation to operations for the New England Power Brayton Point station. Rhode Island Division of Fish and Wildlife, Marine Fisheries Office.

[22] EPA–New England. 2002. Clean Water Act NPDES Permitting Determinations for Thermal Discharge and Cooling Water Intake from Brayton Point Station in Somerset, MA (NPDES Permit No. MA 0003654). July 22, 2002.

[23] Murdoch, W.W., R.C. Fay, and B.J. Mechalas. 1989. Final Report of the Marine Review Committee to the California Coastal Commission. August 1989, MRC Document No. 89–02.

[24] Tondreau, R., J. Hey and E. Shane. Morningside College. 1982. Missouri River Aquatic Ecology Studies: Ten Year Summary (1972–1982). Prepared for Iowa Public Service Company, Sioux City, Iowa.

provide new and in some cases better tools for monitoring impingement and entrainment and quantifying the current magnitude of the impacts.[25] [26]

EPA is also concerned about the potential for cumulative impacts related to cooling water withdrawal. Cumulative impacts may result from (1) multiple facility intakes impinging and/or entraining aquatic organisms within a specific waterbody, watershed, or along the migratory pathway of specific species; (2) the existence of multiple stressors within a waterbody/watershed, including cooling water intake withdrawals; and (3) long-term occurrences of impingement and/or entrainment losses that may result in the diminishment of the compensatory reserve of a particular fishery stock.

Historically, environmental impacts related to cooling water intake structures have been evaluated on a facility-by-facility basis. These historical evaluations do not consider the potential for a fish or shellfish species to be concomitantly impacted by cooling water intake structures belonging to other facilities that are located within the same waterbody or watershed in which the species resides or along the coastal migratory route of a particular species. The potential cumulative effects of multiple intakes located within a specific waterbody or along a coastal segment are difficult to quantify and are not typically assessed. (One relevant example is provided for the Hudson River; see discussion earlier in this section.) Nonetheless, EPA analyses suggest that almost a quarter of all Phase II existing facilities are located on a waterbody with another Phase II existing facility (DCN 4–4009). Thus, EPA is concerned that although the potential for aquatic species to be affected by cooling water withdrawals from multiple facility intakes is high, this type of cumulative impact is largely unknown and has not adequately been accounted for in evaluating impacts. However, recently the Atlantic States Marine Fisheries Commission (ASMFC) was requested by its member States to investigate the cumulative impacts on commercial fishery stocks, particularly overutilized stocks, attributable to cooling water intakes located in coastal regions of the Atlantic.[27] Specifically, the ASMFC study will evaluate the potential cumulative impacts of multiple intakes on Atlantic menhaden stock [28] which range along most of the U.S. Atlantic coast with a focus on revising existing fishery management models so that they accurately consider and account for fish losses from multiple intake structures. Results from these types of studies, although currently unavailable, will provide significant insight into the degree of impact attributable to intake withdrawals from multiple facilities.

EPA also considered information suggesting that impingement and entrainment, in conjunction with other factors, may be a nontrivial stress on a waterbody. EPA recognizes that cooling water intake structures are not the only source of human-induced stress on aquatic systems. Additional stresses to aquatic systems include, but are not limited to, nutrient, toxics, and sediment loadings; low dissolved oxygen; habitat loss; and stormwater runoff. Although EPA recognizes that a nexus between a particular stressor and adverse environmental impact may be difficult to establish with certainty, EPA believes stressors that cause or contribute to the loss of aquatic organisms and habitat such as those described above, may incrementally impact the viability of aquatic resources. EPA analyses suggest that over 99 percent of all existing facilities with cooling water withdrawal that EPA surveyed in its section 316(b) survey of existing facilities are located within two miles of waters that are identified as impaired by a State or Tribe (see 66 FR 65256, 65297). Thus, the Agency is concerned that to the extent that many of the aquatic organisms subject to the effects of cooling water withdrawals reside in impaired waterbodies, they are potentially more vulnerable to cumulative impacts from an array of physical and chemical anthropogenic stressors.

Finally, EPA believes that an aquatic population's potential compensatory ability—the capacity for a species to increase its survival, growth, or reproduction in response to reductions sustained to its overall population size—may be compromised by impingement and entrainment losses in conjunction with all the other stressors encountered within a population's natural range, as well as impingement and entrainment losses occurring consistently over extended periods of time. As discussed in the Phase I new facility rule (see 66 FR 65294), EPA is concerned that even if there is little evidence that cooling water intakes alone reduce a population's compensatory reserve, the multitude of stressors experienced by a species can potentially adversely affect its ability to recover.[29] Moreover, EPA notes that the opposite effect or "depensation" (decreases in recruitment as stock size declines[30]) may occur if a population's size is reduced beyond a critical threshold. Depensation can lead to further decreases in population abundances that are already seriously depleted and, in some cases, recovery of the population may not be possible even if the stressors are removed. In fact, there is some evidence that depensation may be a factor in some recent fisheries collapses.[31] [32] [33]

Another problem associated with assessing the environmental impact of cooling water intakes is that existing fishery resource baselines may be inaccurate.[34] There is much evidence that the world's fisheries are in general decline,[35] [36] however, many fishery stocks have not been adequately assessed. According to a 2002 study, only 23 percent of U.S. managed fish stocks have been fully assessed and of these, over 40 percent are considered depleted or are being fished beyond sustainable levels.[37] Another study estimated that more than 70 percent of commercial fish stocks are fully

[25] Schmitt, R.J. and C.W. Osenberg. 1996. Detecting Ecological Impacts. Academic Press, San Diego, CA.

[26] EPRI 1999. Catalog of Assessment Methods for Evaluating the Effects of Power Plant Operations on Aquatic Communities. TR–112013, EPRI, Palo Alto, CA.

[27] Personal communication, D. Hart (EPA) and L. Kline (ASMFC), 2001.

[28] Personal communication, D. Hart (EPA) and L. Kline (ASMFC), 2003.

[29] Hutchings, J.A. and R.A. Myers. 1994. What can be learned from the collapse of a renewable resource? Atlantic cod, *Gadus morhus*, of Newfoundland and Labrador. Canadian Journal of Fisheries and Aquatic Sciences 51:2126–2146.

[30] Goodyear, C.P. 1977. Assessing the impact of power plant mortality on the compensatory reserve of fish populations. Pages 186–195 in W. Van Winkle, ed., Proceedings of the Conference on Assessing the Effects of Power Plant Induced Mortality on Fish Populations. Pergamon Press, New York, NY.

[31] Myers, R.A., N.J. Barrowman, J.A. Hutchings, and A.A. Rosenburg. 1995. Population dynamics of exploited fish stocks at low population levels. Science 26:1106–1108.

[32] Hutchings, J.A. and R.A. Myers. 1994. What can be learned from the collapse of a renewable resource? Atlantic cod, *Gadus morhus*, of Newfoundland and Labrador. Canadian Journal of Fisheries and Aquatic Sciences 51:2126–2146.

[33] Liermann, M. and R. Hilborn. 1997. Depensation in fish stocks: A hierarchic Bayesian meta-analysis. Can. J. Fish. Aquatic. Sci. 54:1976–1985.

[34] Watson, R. and D. Pauly. 2001. Systematic distortions in world fisheries catch trends. Nature 414:534–536.

[35] Ibid.

[36] Pew Oceans Commission. 2003. America's Living Oceans: Charting a course for sea change. Summary Report. May 2003. Pew Oceans Commission, Arlington, VA.

[37] U.S. Commission on Ocean Policy. 2002. Developing a National Ocean Policy: Mid-Term Report of the U.S. Commission on Ocean Policy. Washington, DC.

exploited, overfished or collapsed.[38] Another estimated that large predatory fish stocks are only a tenth of what they were 50 years ago.[39] Most studies of fish populations last only a few years, do not encompass the entire life span of the species examined, and do not account for cyclical environmental changes such as ENSO events, and other long term cycles of oceanographic productivity.[40]

Although a clear and detailed picture of the status of all our fishery resources does not exist,[41] it is undisputed that fishermen are struggling to sustain their livelihood despite strict fishery management restrictions which aim to rebuild fish populations. EPA shares the concerns expressed by expert fishery scientists that historical overfishing has increased the sensitivity of aquatic ecosystems to subsequent disturbance, making them more vulnerable to other stressors, including cooling water intake structures.

In conclusion, EPA's mission includes ensuring the sustainability of communities and ecosystems. Thus, EPA must comprehensively evaluate all potential threats to resources and work towards eliminating or reducing identified threats. As discussed in this section, EPA believes that impingement and entrainment losses attributable to cooling water intakes do pose a threat to aquatic organisms and through today's rule is seeking to minimize that threat.

V. Description of the Final Rule

Clean Water Act section 316(b) requires that any standard established pursuant to section 301 or section 306 of the CWA and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. Today's final rule establishes national performance requirements for Phase II existing facilities that ensure such facilities fulfill the mandate of section 316(b).

This rule applies to Phase II existing facilities that use or propose to use a cooling water intake structure to withdraw water for cooling purposes from waters of the United States and that have or are required to have a National Pollutant Discharge Elimination System (NPDES) permit issued under section 402 of the CWA. Phase II existing facilities include only those facilities whose primary activity is to generate and transmit electric power and who have a design intake flow of 50 MGD or greater, and that use at least 25 percent of the water withdrawn exclusively for cooling purposes (see § 125.91). Applicability criteria for this rule are discussed in detail in section II of this preamble.

Under this final rule, EPA has established performance standards for the reduction of impingement mortality and, when appropriate, entrainment (see § 125.94). The performance standards consist of ranges of reductions in impingement mortality and/or entrainment (*e.g.*, reduce impingement mortality by 80 to 95 percent and/or entrainment by 60 to 90 percent). These performance standards reflect the best technology available for minimizing adverse environmental impacts determined on a national categorical basis. The type of performance standard applicable to a particular facility (*i.e.*, reductions in impingement only or impingement and entrainment) is based on several factors, including the facility's location (*i.e.*, source waterbody), rate of use (capacity utilization rate), and the proportion of the waterbody withdrawn. Exhibit V–1 summarizes the performance standards based on waterbody type.

In most cases, EPA believes that these performance standards can be met using design and construction technologies or operational measures. However, under the rule, the performance standards also can be met, in whole or in part, by using restoration measures, following consideration of design and construction technologies or operational measures and provided such measures meet restoration requirements (see § 125.94(c)).

As noted earlier in this section, today's rule generally requires that impingement mortality of all life stages of fish and shellfish must be reduced by 80 to 95 percent from the calculation baseline; and for some facilities, entrainment of all life stages of fish and shellfish must be reduced by 60 to 90 percent from the calculation baseline (see § 125.94(b)).

EXHIBIT V–1.—PERFORMANCE STANDARD REQUIREMENTS

Waterbody type	Capacity utilization rate	Design intake flow	Type of performance standard
Freshwater River or Stream	Less than 15%	N/A[1]	Impingement mortality only.
	Equal to or greater than 15%.	5% or less mean annual flow.	Impingement mortality only.
		Greater than 5% of mean annual flow.	Impingement mortality and entrainment.
Tidal river, Estuary or Ocean	Less than 15%	N/A[1]	Impingement mortality only.
	Equal to or greater than 15%.	N/A	Impingement mortality and entrainment.
Great Lakes	Less than 15%	N/A	Impingement mortality only.
	Equal to or greater than 15%.	N/A	Impingement mortality and entrainment.

[38] Broad, W.J. and A.C. Revkin. 2003. Has the Sea Given Up its Bounty? The New York Times. July 29, 2003.

[39] Myers, R.A. and B. Worm. 2003. Rapid worldwide depletion of predatory fish communities. Nature 423: 280–283.

[40] Jackson, J.B.C., M.X. Kirby, W.H. Berger, K.A. Bjorndal, L.W. Botsford, B.J. Bourque, R.H. Bradbury, R. Cooke, J. Erlandson, J.A. Estes, T.P. Hughes, S. Kidwell, C.B. Lange, H.S. Lenihan, J.M. Pandolfi, C.H. Peterson, R.S. Steneck, M.J. Tegner, and R.R. Warner. 2001. Historical overfishing and the recent collapse of coastal ecosystems. Science 293(5530):629–638.

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EXHIBIT V-1.—PERFORMANCE STANDARD REQUIREMENTS—Continued

Waterbody type	Capacity utilization rate	Design intake flow	Type of performance standard
Lakes or Reservoirs	N/A	Increase in design intake flow must not disrupt thermal stratification except where it does not adversely affect the management of fisheries.	Impingement mortality only.

[1] Determination of appropriate compliance reductions is not applicable.

This final rule identifies five alternatives a Phase II existing facility may use to achieve compliance with the requirements for best technology available for minimizing adverse environmental impacts associated with cooling water intake structures. Four of these are based on meeting the applicable performance standards and the fifth allows the facility to request a site-specific determination of best technology available for minimizing adverse environmental impacts under certain circumstances. EPA has established these compliance alternatives for meeting the performance standards to provide a significant degree of flexibility to Phase II existing facilities, to ensure that the rule requirements are economically practicable, and to provide the ability for Phase II existing facilities to address unique site-specific factors. Application requirements vary based on the compliance alternative selected and, for some facilities, include development of a Comprehensive Demonstration Study. Application requirements are discussed later in this section. The five compliance alternatives are described in the following paragraphs.

Under § 125.94(a)(1)(i) and (ii), a Phase II existing facility may demonstrate to the Director that it has already reduced its flow commensurate with a closed-cycle recirculating system, or that it has already reduced its design intake velocity to 0.5 ft/s or less. If a facility can demonstrate to the Director that it has reduced, or will reduce, flow commensurate with a closed-cycle recirculating system, the facility is deemed to have met the performance standards to reduce impingement mortality and entrainment (see § 125.94 (a)(1)(i)). Those facilities would not be required to submit a Comprehensive Demonstration Study with their NPDES application. If the facility can demonstrate to the Director that is has reduced, or will reduce maximum through-screen design intake velocity to 0.5 ft/s or less, the facility is deemed to have met the performance standards to reduce impingement mortality only. Facilities that meet the velocity requirements would only need to submit application studies related to determining entrainment reduction, if subject to the performance standards for entrainment.

Under § 125.94(a)(2) and (3), a Phase II existing facility may demonstrate to the Director, either that its current cooling water intake structure configuration meets the applicable performance standards, or that it has selected design and construction technologies, operational measures, and/or restoration measures that, in combination with any existing design and construction technologies, operational measures, and/or restoration measures, meet the specified performance standards in § 125.94(b) and/or the requirements in § 125.94(c).

Under § 125.94(a)(4), a Phase II existing facility may demonstrate to the Director that it has installed and is properly operating and maintaining a rule-specified and approved design and construction technology in accordance with § 125.99(a). Submerged cylindrical wedgewire screen technology is a rule-specified design and construction technology that may be used in instances in which a facility's cooling water intake structure is located in a freshwater river or stream and meets other criteria specified at § 125.99(a).

In addition, under this compliance alternative, a facility or other interested person may submit a request to the Director for approval of a different technology. If the Director approves the technology, it may be used by all facilities with similar site conditions under his or her jurisdiction if allowed under the State's administrative procedures. Requests for approval of a technology must be submitted to the Director and include a detailed description of the technology; a list of design criteria for the technology and site characteristics and conditions that each facility must possess in order to ensure that the technology can consistently meet the appropriate impingement mortality and entrainment performance standards in § 125.94(b); and information and data sufficient to demonstrate that all facilities under the jurisdiction of the Director can meet the relevant impingement mortality and entrainment performance standards in § 125.94(b) if the applicable design criteria and site characteristics and conditions are present at the facility. A Director may only approve an alternative technology following public notice and opportunity for comment on the approval of the technology (§ 125.99(b)).

Under § 125.94(a)(5) (i) or (ii), if the Director determines that a facility's costs of compliance would be significantly greater than the costs considered by the Administrator for a like facility to meet the applicable performance standards, or that the costs of compliance would be significantly greater than the benefits of meeting the applicable performance standards at the facility, the Director must make a site-specific determination of best technology available for minimizing adverse environmental impact. Under this alternative, a facility would either compare its projected costs of compliance using a particular technology or technologies to the costs the Agency considered for a like facility in establishing the applicable performance standards, or compare its projected costs of compliance with the projected benefits at its site of meeting the applicable performance standards of today's rule (see section IX.H). If in either case costs are significantly greater, the technology selected by the Director must achieve an efficacy level that comes as close as practicable to the applicable performance standards without resulting in significantly greater costs.

During the first permit term, a facility that chooses compliance alternatives in § 125.94(a)(2), (3), (4), or (5) may request that compliance with the requirements of this rule be determined based on the implementation of a Technology Installation and Operation Plan indicating how the facility will install and ensure the efficacy, to the extent practicable, of design and construction technologies and/or operational measures, and/or a Restoration Plan (§ 125.95(b)(5)). The Technology Installation and Operation Plan must be developed and submitted to the Director in accordance with § 125.95(b)(4)(ii). The Restoration Plan must be developed in accordance with § 125.95(b)(5). During subsequent permit terms, if the facility has been in compliance with the construction, operational, maintenance, monitoring, and adaptive management requirements in its TIOP and/or Restoration Plan during the preceding permit term, the facility may request that compliance during subsequent permit terms be based on its remaining in compliance with its TIOP and/or Restoration Plan, revised in accordance with applicable adaptive management requirements if the applicable performance standards are not being met.

Three sets of data are required to be submitted 180 days prior to expiration of a facility's existing permit by all facilities regardless of compliance alternative selected (see § 122.21(r)(2)(3) and (5)). These are:

- Source Water Physical Data: A narrative description and scaled drawings showing the physical configuration of all source waterbodies used by the facility, including areal dimensions, depths, salinity and temperature regimes, and other documentation that supports your determination of the waterbody type where each cooling water intake structure is located; identification and characterization of the source waterbody's hydrological and geomorphological features, as well as the methods used to conduct any physical studies to determine the intake's area of influence and the results of such studies; and locational maps.
- Cooling Water Intake Structure Data: A narrative description of the configuration of each of its facility's cooling water intake structures and where it is located in the waterbody and in the water column; latitude and longitude in degrees, minutes, and seconds for each of its cooling water intake structures; a narrative description of the operation of each of its cooling water intake structures, including design intake flows, daily hours of operation, number of days of the year in operation, and seasonal changes, if applicable; a flow distribution and water balance diagram that includes all sources of water to the facility, recirculating flows, and discharges; and engineering drawings of the cooling water intake structure.
- Cooling Water System Data: A narrative description of the operation of each cooling water system, its relationship to the cooling water intake structures, proportion of the design intake flow that is used in the system, the number of days of the year the system is in operation, and seasonal changes in the operation of the system, if applicable; and engineering calculations and supporting data to support the narrative description.

In addition to the specified data facilities are require to submit, some facilities are also required to conduct a Comprehensive Demonstration Study. Specific requirements for the Comprehensive Demonstration Study vary based on the compliance alternative selected. Exhibit II summarizes the Comprehensive Demonstration Study requirements for each compliance alternative. Specific details of each Comprehensive Demonstration Study component are provided in section IX of this preamble.

EXHIBIT V–2.—SUMMARY OF COMPREHENSIVE DEMONSTRATION STUDY REQUIREMENTS FOR COMPLIANCE ALTERNATIVES

Compliance alternative (§ 125.94(b))	Comprehensive demonstration study requirements (§ 125.95(b))
1—Demonstrate facility has reduced flow commensurate with closed-cycle recirculating system.	None.
1—Demonstrate facility has reduced design intake velocity to ≤ 0.5 ft/s	No requirements relative to impingement mortality reduction. If subject to entrainment performance standard, the facility must only address entrainment in the applicable components of its Comprehensive Demonstration Study, based on the compliance option selected for entrainment reduction.
2—Demonstrate that existing design and construction technologies, operational measures, and/or restoration measures meet the performance standards.	Proposal for Information Collection. Source Waterbody Flow Information. Impingement Mortality and/or Entrainment Characterization Study (as appropriate). Technology and Compliance Assessment Information —Design and Construction Technology Plan —Technology Installation and Operation Plan Restoration Plan (if appropriate). Verification Monitoring Plan.
3—Demonstrate that facility has selected design and construction technologies, operational measures, and/or restoration measures that will, in combination with any existing design and construction technologies, operational measures, and/or restoration measures, meet the performance standards.	Proposal for Information Collection. Source Waterbody Flow Information. Impingement Mortality and/or Entrainment Characterization Study (as appropriate). Technology and Compliance Assessment Information —Design and Construction Technology Plan —Technology Installation and Operation Plan Restoration Plan (if appropriate). Verification Monitoring Plan.
4—Demonstrate that facility has installed and properly operates and maintains an approved technology.	Technology Installation and Operation Plan. Verification Monitoring Plan.

EXHIBIT V–2.—SUMMARY OF COMPREHENSIVE DEMONSTRATION STUDY REQUIREMENTS FOR COMPLIANCE ALTERNATIVES—Continued

Compliance alternative (§ 125.94(b))	Comprehensive demonstration study requirements (§ 125.95(b))
5—Demonstrate that a site-specific determination of BTA is appropriate	Proposal for Information Collection. Source Waterbody Flow Information. Impingement Mortality and/or Entrainment Characterization Study (as appropriate). Technology Installation and Operation Plan. Restoration Plan (if appropriate). Information to Support Site Specific Determination of BTA including: —Comprehensive Cost Evaluation Study (cost-cost test and cost-benefit test); —Valuation of Monetized Benefits of Reducing IM&E (cost-benefit test only); —Site-Specific Technology Plan (cost-cost test and cost-benefit test); Verification Monitoring Plan.

The requirements in today's final rule are implemented through NPDES permits issued under section 402 of the CWA. Permit applications submitted after the effective date of the rule must fulfill rule requirements. However, facilities whose existing permit expires before [insert four years after date of publication in the FR], may request a schedule for submission of application materials that is as expeditious as practicable but does not exceed [insert three years and 180 days after date of publication in the FR], to provide sufficient time to perform the required information collection requirements. Phase II existing facilities must comply with this final rule when they become subject to an NPDES permit containing these requirements.

Finally, today's rule preserves each State's right to adopt or enforce more stringent requirements (see § 125.90(d)). It also provides that if a State demonstrates to the Administrator that it has adopted alternative regulatory requirements in its NPDES program that will result in environmental performance within a watershed that is comparable to the reductions of impingement mortality and entrainment that would otherwise be achieved under § 125.94, the Administrator must approve such alternative regulatory requirements (§ 125.90(c)).

VI. Summary of Most Significant Revisions to the Proposed Rule

A. Data Updates

Based on comments received, additional information made available, and the results of subsequent analyses, EPA revised a number of assumptions that were used in developing the engineering costs, the information collection costs, the economic analyses, and the benefits analyses. These new assumptions are presented below and were used in the analyses in support of this final rule.

1. Number of Phase II Facilities

Since publishing the NODA, EPA continued to verify design flow information for facilities that had been classified as either Phase II (large, existing power production) or Phase III (smaller, power producing or manufacturing) facilities. This verification resulted in the following changes: One facility that was classified as a Phase II facility at proposal was reclassified as being out of scope of the section 316(b) regulation, as it ceased operating. Four facilities that were classified as Phase III facilities at proposal based on projected design intake flow were reclassified as Phase II facilities. As a result, the overall number of Phase II facilities increased from 540 to 543 facilities.[42] For the final rule, all costs, benefits, and economic analyses are based on the updated set of Phase II facilities.

The reason for the change is that the Agency revised the estimated design intake flows for facilities that responded to the short-technical questionnaire EPA used to collect information for this rule. The Agency has now adopted a more robust set of annual flow data (using all the years of data collected for the final rule, rather than only flows for 1998 as reported at proposal). This change altered the calculated design intake flows for the facilities that provided responses to the short-technical questionnaire that EPA used to collect data. Facilities that provided responses to the detailed questionnaire were unaffected, as the Agency collected maximum design intake flows directly through the detailed questionnaire.

2. Technology Costs

Since publishing the NODA, EPA used new information to revise the capital and operation and maintenance (O&M) costs for several compliance technologies, including those used as the primary basis for the final rule. Overall, the cost updates resulted in the following changes: total capital costs decreased by 5 percent and total operation and maintenance costs decrease by 3 percent. These comparisons are based on the raw costs, adjusted to year-2002 dollars, which have not been discounted or annualized.[43] The revised costing assumptions are discussed in detail in section VI.3.

3. Permitting and Monitoring Costs

Since proposal, EPA made several corrections and revisions to its burden and cost estimates for implementing the information collection requirements of today's rule, based on comments received and additional analysis. The following corrections and revisions were made since proposal:

- EPA corrected the hourly rates for the statistician and biological technician labor categories, which were inadvertently transposed at proposal.
- EPA increased the burdens associated with impingement and entrainment monitoring for the Impingement Mortality and Entrainment Characterization Study.

[42] Note that these numbers are unweighted. [As with many surveys, EPA was able to obtain data from most, but not all of the facilities potentially subject to this rule. To estimate the characteristics for those facilities that were not surveyed, EPA assigned a statistically derived sample weight to those facilities for which data were collected.] On a sample-weighted basis, the number of Phase II facilities increased from 551 to 554. The number of Phase II facilities modeled by the Integrated Planning Model (IPM) increased from 531 to 535.

[43] Based on additional research conducted after NODA publication and prior to issuance of the final rule, EPA changed the projected compliance response for some facilities. These changes, together with the increase in the number of in-scope Phase II facilities, contributed to the change in total compliance costs.

• EPA revised the pilot study costs to assume that only a subset of facilities which are projected to install new technologies will perform pilot studies, and to be proportional to the projected capital costs for installing these new technologies in order to comply with the rule. EPA also developed an alternative national cost estimate using slightly different assumptions with regard to pilot study costs (see section XI).

• EPA adjusted the facility-level costs to account for facilities that were projected to demonstrate compliance through the installation of a wedge-wire screen in a freshwater river under the compliance alternative in 125.94(a)(4).

4. Net Installation Downtime for Non-recirculating Cooling Tower Compliance Technologies

In developing the proposal for this rule, the Agency estimated that technologies other than recirculating cooling towers would not require installation downtime for construction. However, the Agency amended this outlook for the NODA and published revised estimates of net construction downtimes for complying facilities installing a subset of technologies analyzed and developed as candidates for best technology available (BTA). Based on comments received on the NODA, the Agency has conducted further research into the construction downtimes that it used in the NODA for certain technologies. For the final regulation analysis, the Agency has adopted minor revisions to the construction downtimes for certain technologies, with the general effect being an increase in the net construction downtimes for a few technologies that the Agency views as candidates for reducing entrainment. (Net downtime was estimated by subtracting 4 weeks from total downtime, based on an assumption that facilities will schedule construction downtime during a 4 week period of normal downtime unrelated to the rule, for example, for routine maintenance.) As such, the Agency projects that a significant number of facilities expected to comply with the entrainment reduction requirements of the rule will have increased downtime costs compared to the NODA and the proposal analyses. The final costs of this rule reflect these changes, which are further discussed in Section X and the Technical Development Document.

B. Regulatory Approach, Calculation Baseline, and Measuring Compliance

1. Regulatory Approach

EPA has largely adopted the proposed rule with some restructuring and one significant change: an additional compliance alternative, the approved technology option (§ 125.94(a)(4)) which was discussed in detail in the NODA (68 FR 13539). The restructuring of the rule language now makes the reduction of flow commensurate with a closed-cycle recirculating system a separate compliance alternative, such that the rule now includes five compliance alternatives. In addition, EPA has clarified that facilities may comply with the rule requirement in section 125.94 by successfully implementing the construction, operational, maintenance, monitoring, and adaptive management requirements in a Technology Installation and Operation Plan developed in accordance with § 125.95(b)(4)(ii) and/or a Restoration Plan developed in accordance with § 125.95(b)(5). These plans must be designed and adaptively managed to meet the applicable performance standards in § 125.94(b) and (c). The following discussion describes the regulatory approach of the final rule, as developed through the proposed rule and the NODA.

EPA proposed requirements for the location, design, construction, and capacity of cooling water intakes based on the waterbody type and the volume of water withdrawn by a facility (67 FR 17122). EPA grouped waterbodies into five categories, as in the Phase I regulation—freshwater rivers and streams, lakes and reservoirs, Great Lakes, estuaries and tidal rivers, and oceans. In general, the more sensitive or biologically productive the waterbody, the more stringent were the requirements proposed. The proposed requirements also varied based on the percentage of the source waterbody withdrawn and the capacity utilization rate.

Under the proposed rule, a facility could choose one of three compliance options: (1) Demonstrate that the facility currently meets the specified performance standards, (2) select and implement design and construction technologies, operational measures, or restoration measures that will, in combination with any existing design and construction technologies, operational measures, or restoration measures, meet the specified performance standards, and/or (3) demonstrate that the facility qualifies for a site-specific determination of best technology available, because its costs of compliance are significantly greater than those considered by EPA during the development of the proposed rule or the facility's costs of compliance would be significantly greater than the benefits of compliance with the proposed performance standards at the facility. A facility could also use restoration measures in addition to or in lieu of design and construction technologies and/or operational measures to achieve compliance under any of the compliance options.

In the NODA, EPA sought comment on a proposed fourth compliance option (68 FR 13522, 1359–41). In response to comments expressing concern that the proposed Comprehensive Demonstration Study requirements (at § 125.95(b)) would impose a significant burden on permit applicants, EPA examined an additional, more streamlined compliance option under which a facility could implement certain specified technologies that have been predetermined by EPA or the permitting authority to be highly likely to meet applicable performance standards, in exchange for not having to perform most of the elements of the proposed Comprehensive Demonstration Study.

Two variations were offered in the NODA: (1) EPA would evaluate the effectiveness of specific technologies in achieving an 80 to 95 percent reduction in impingement mortality and a 60 to 90 percent reduction in entrainment and then specify applicability criteria to ensure that the technology would meet the performance standards at facilities satisfying the criteria, or (2) EPA would establish the criteria and a process for States to pre-approve intake structure control technologies as likely to meet the performance standards. For facilities located on freshwater rivers and streams and meeting specified criteria, wedgewire screens would be expected to meet the proposed performance standards. EPA also recognized that these two variations are not mutually exclusive and either or both could be adopted in the final rule.

To a large extent, EPA is adopting the regulatory framework put forth in the proposed rule and supplemented by the NODA. To the three compliance alternatives originally proposed, EPA has added an approved technology alternative discussed in the NODA and included reduction of flow commensurate with closed-cycle cooling as a distinct alternative.

2. Calculation Baseline

Also, in response to comments that the proposed definition for the calculation baseline was overly vague, EPA published in the NODA a series of additional considerations regarding the calculation baseline and a new definition of it taking these considerations into account (68 FR 13522, 13580–81). The specifications are as follows and the new definition is in today's final rule at § 125.93.

• Baseline cooling water intake structure is located at, and the screen face is parallel to, the shoreline or another depth if this would result in higher baseline impingement mortality and entrainment than the surface. EPA believes it is appropriate to allow credit in reducing impingement mortality from screen configurations that employ angling of the screen face and currents to guide organisms away from the structure before they are impinged.

• Baseline cooling water intake structure opening is located at or near the surface of the source waterbody. EPA believes it is appropriate to allow credit in reducing impingement mortality or entrainment due to placement of the opening in the water column.

• Baseline cooling water intake structure has a traveling screen with the standard 3/8 inch mesh size commonly used to keep condensers free from debris. This allows a more consistent estimation of the organisms that are considered "entrainable" vs. "impingeable" by specifying a standard mesh size that can be related to the size of the organism that may potentially come in contact with the cooling water intake structure.

• Baseline practices, procedures, and structural configurations are those that the facility would maintain in the absence of any structural or operational controls implemented in whole or in part for the purpose of reducing impingement mortality and entrainment. This recognizes and provides credit for any structural or operational controls, including flow or velocity reductions, a facility had adopted that reduce impingement mortality or entrainment.

EPA also requested comment on allowing an "as built" approach under which facilities could choose to use the existing level of impingement mortality and entrainment as the calculation baseline if they did not wish to take credit for the previously adopted measures. This could significantly simplify the monitoring and calculations necessary to determine the baseline.

In the NODA, EPA also discussed an approach to compliance under which facilities would have an "optimization period" during which they would not be required to meet performance standards but, rather, would install, operate and maintain the selected control technologies to minimize impingement mortality and entrainment. EPA suggested several possible durations for this optimization period, and also requested comment on not specifying the duration, but instead leaving it up to the Director. 68 FR 13586 (March 19, 2003).

For the final rule, EPA adopted the NODA definition of calculation baseline with some modifications. More specifically, EPA clarified the calculation baseline to include consideration of intake depth other than at or near the surface in determining the baseline. EPA also adopted the "as built" approach for the calculation baseline, which allows facilities to use current levels of impingement mortality and entrainment as the calculation baseline if the facility is configured similarly to the criteria set up for the calculation baseline.

Finally, EPA clarified how compliance with the requirements in § 125.94 should be determined. In particular, the final rule provides that compliance during the first permit term (and subsequent permit terms if specified conditions are met) may be determined based on compliance with the construction, operational, maintenance, monitoring, and adaptive management requirements in an approved Technology Installation and Operation Plan and/ or an approved Restoration Plan, that has been developed in accordance with specified requirements to meet the applicable performance standards.

3. Measuring Compliance

EPA has clarified how compliance will be measured. At proposal, EPA received comment from the industry that there were uncertainties associated with how compliance with the proposed requirements, particularly the numeric impingement mortality and entrainment performance standards, would be determined. Under the proposed rule and NODA, determining compliance, while obviously dependent on the compliance alternative selected, would, in general, require the development of waterbody characterization data, including key criteria (species, parameters, etc.) to be measured and monitored; a determination of baseline environmental impacts; implementation of cooling water intake technologies (assuming the facility does not already meet applicable performance standards and pursues this alternative); monitoring the selected criteria; and an evaluation of compliance with the applicable numeric impingement mortality and/or entrainment permit standard. The industry stakeholders were concerned that using the performance standard to set enforceable performance requirements would require facilities to collect and analyze greater amounts of data than EPA projected to be able to account for the variability inherent in biological and efficacy data needed to support compliance determinations in spite of overall good technology performance. These stakeholders stated that setting enforceable performance standards would lead to greater administrative burdens and delays when determining numeric standards and monitoring requirements to determine compliance. They were also concerned that establishing numeric standards would stifle innovation because of fears that a technology would not perform as anticipated. These stakeholders suggested that the performance standards in the rule serve as a consistent basis for setting permit conditions and for identifying technologies; installing, operating, and maintaining the chosen technology; performing compliance monitoring; and refining or adjusting operation, maintenance, or other factors in light of initial monitoring.

Today's rule allows facilities to develop and implement a Technology Installation and Operation Plan that would, when used, serve as the primary mechanism upon which compliance with the performance standard requirements of this rule is determined. EPA has established this compliance mechanism because it will ensure that Phase II existing facilities will continually be required to achieve a level of performance that constitutes, for them, best technology available for minimizing adverse environmental impact. For facilities that choose to comply with applicable requirements in whole or in part through the use of restoration measures, the Restoration Plan would serve a similar function. The Restoration Plan is discussed in detail in section IX.

An existing facility that chooses to use a Technology Installation and Operation Plan must (1) select design and construction technologies, operational measures, and/or restoration measures that will meet the performance standards, and (2) prepare a Technology Installation and Operation Plan documenting what, how and when it will install, operate, maintain, monitor, assess, and adaptively manage the design and construction technologies and operational measures to meet the performance standards, including operational parameters and inspection schedules, etc. Each facility using a Technology Installation Operation Plan must specify key parameters regarding monitoring (*e.g.*, parameters to be monitored, location, and frequency), optimization activities and schedules for undertaking them, ways of assessing efficacy (including adaptive management plan for revising design and construction technologies or operational measures) that ensure that such technologies and measures are effectively implemented, and revised as needed to meet performance standards. This plan must be reviewed and approved by the Director and evaluated for sufficiency and/or revised at each permit term to ensure that the facility is moving expeditiously toward attainment of the applicable performance standards. Once approved, each Phase II existing facility must implement the plan according to its terms. Compliance with the final rule's performance standards during the permit term will be assessed based on the terms of the plan. If a facility does not comply with the plan, the Director has discretion to implement the performance standards or requirements through specifying numeric impingement mortality and entrainment requirements or technology prescription (for the site-specific alternative) in the permit. In addition, a facility that is unable to meet the applicable performance standards using the Technology Installation and Operation Plan approach may request in a subsequent permit that the Director make a site-specific determination of best technology available in accordance with § 125.94(a)(5).

Under these provisions, compliance is determined in terms of whether the facility is implementing, in accordance with the Technology Installation and Operation Plan schedule, the technologies, measures and practices determined by the Director to be the best technologies available for minimizing adverse environmental impact for that facility. The Section 316(b) requirements for the facility are expressed non-numerically, which is analogous to the use of best management practices under other provisions of the CWA. See, *e.g.*, sections 402(a) and 402(p). While EPA has been able to calculate ranges for national performance standards based on model technologies, EPA has insufficient data to determine—as it routinely can do in the context of effluent limitations guidelines and standards—that use of those model technologies will consistently result in achievement of those standards.

The record persuades EPA that there is uncertainty associated with the application and long-term efficacy of these technologies at all facilities under the multitude of different site-specific factors and conditions under which these technologies might have to perform. In addition, even at a single site, there is substantial year-to-year variability in species abundance and composition, as well as other natural and anthropogenic factors, that may affect the performance of a particular technology installed at the facility and it is unclear how this would affect the efficacy of the technology. The Technology Installation and Operation Plan provisions are intended to account for this. For example, meeting numerical reduction standards may not be possible at some sites either because hydrological conditions are not conducive to technological effectiveness, or due to species sensitivity. A Technology Installation and Operation Plan allows a facility, working with the Director, to identify, install, and adaptively manage technologies suited to its particular site conditions. In addition, measuring impingement mortality and entrainment reduction is difficult and would require a substantial amount of multi-year biological data and analysis is burdensome for the facility to develop, is often well beyond the type of information EPA can expect State Directors to be able to develop when monitoring compliance. A Technology Installation and Operation Plan simplifies enforcement: if a facility fails to meet the schedules and other terms of its plan, it is violating its section 316(b) requirements; there is no need to engage in extensive debate about the meaning of complex biological data. This does not mean that biological monitoring and assessment of success in meeting applicable performance standards is not important. If fact, it is critical to the compliance approach adopted in the rule in that it informs facilities and permit authorities when adaptive management, including revisions to the Technology Installation and Operation Plan, are needed to meet the performance standards.

The Technology Installation and Operation Plan provisions also reflect that there is uncertainty about how long it would take a facility to adaptively manage the technology and determine the appropriate operating conditions for the technology to meet the applicable performance requirements. Data and comments available to EPA suggest that it is common for existing facilities to adjust technologies over time in order to achieve optimum performance and, therefore, an adaptive management approach as specified under a plan is appropriate. See documentation at DCN# 1-3019-BE, 4-1830, and 6-5001. EPA understands that adaptive management is going to be necessary for a number of facilities because there are relatively few rigorous evaluations of efficacy under different site and operating conditions. The available studies may also be limited in the numbers and types of species that they have evaluated and they may not show the long term demonstrated effectiveness (and/or consistency of effectiveness) of the technology with the added uncertainties associated with the variability of natural biological systems. By requiring facilities to employ adaptive management principles, EPA assures that the facility will be implementing, on an ongoing basis, the best array of technologies available to them.

As noted above, the Technology Installation and Operation Plan provisions also simplify implementation because they identify the specific compliance requirements needed to meet the performance standard ranges and reduce some of the burden associated with measuring and enforcing compliance with these ranges for both existing facilities and Directors. Directors and facilities may find use of a Technology Installation and Operation Plan preferable because it is less feasible to develop and accurately evaluate biological monitoring data over a relatively short period, as would be required by measuring compliance against a numeric performance standard. Rather, the plan provisions allow implementation to be adaptive, and allow for data development and assessment to proceed in a manner that is appropriate for the facility, technology, and waterbody characteristics.

EPA has the legal authority to express section 316(b) requirements in terms of design criteria, in addition to or in place of enforceable numeric performance standards. EPA employed a design criterion approach in the Phase I rule, when EPA was able to identify a single nationally available and economically practicable technology for the category of new facilities as a whole, in that case closed-cycle recirculating cooling technology. In this rule, EPA was not able to identify a uniform set of technologies that would be available and economically practicable for all existing facilities, but EPA was able to articulate a uniform nationally applicable principle in the form of the performance standards in § 125.94(b), by which such technologies could be identified by the Director and implemented through the use of a Technology Installation and Operation Plan designed to achieve them. While the technology solution was different in Phase I and Phase II, the legal principle is the same. In addition, EPA has the legal authority to identify section 316(b) requirements as an evolving set of technologies, rather than a single technology array fixed in time. Section 316(b) requires that any technology selected under that section must be the best available to the facility. This term encompasses consideration of effectiveness, costs, non-water quality environmental impacts, feasibility issues and a host of other considerations relevant to existing facilities. See section 304(b)(2)(B). The record indicates that for some facilities, the question of what are *available* technologies and, among those, what is the *best* technology, may change over time. A Technology Installation and Operation Plan is intended to assure that at all times a facility is implementing a technology—or a technology plan—that reflects the best of all technologies consistent with uniform guiding principles in the form of performance standards available to them in light of their site-specific circumstances.

Finally, EPA notes that the way in which performance standards guide technology selection and implementation varies slightly among the five compliance options. For facilities complying with § 125.94(a)(1), the technologies identified are so effective that EPA is confident that any facility employing them will meet the performance standards, so a Technology Installation and Operation Plan and performance monitoring are not required. Because these technologies are not available to all Phase II existing facilities, however, EPA has provided alternative compliance options. For facilities complying in accordance with § 125.94(a)(2), (3), or (4), compliance is generally achieved by implementation of a Technology Installation and Operation Plan designed to meet applicable performance standards. Finally, for facilities that comply in accordance with § 125.94(a)(5) for whom even compliance in accordance with § 125.94(a)(2), (3), or (4) is not available because of significantly higher costs, compliance is achieved by implementation of a Technology Installation and Operation Plan that achieves an efficacy as close as practicable to the applicable performance standards.

4. Site-Specific Requirements

a. Costs Significantly Greater Than Costs Considered by the Administrator

In today's final rule, a facility that demonstrates to the Director that the costs of compliance with the performance standards and/or restoration requirements would be significantly greater than the costs considered by the Administrator for a similar facility, will be given a site-specific determination of best technology available for minimizing adverse environmental impact. The standards of the rule have not changed since proposal, with the exception of one clarification: in the final rule, the alternative site-specific requirements established by the Director must achieve an efficacy that is as close as practicable to the performance standards and/or restoration requirements specified in § 125.94(b) and (c). This was not specified in the proposed rule language. In addition, today's final rule also explains how a facility should calculate costs considered by the Administrator for a similar facility, for comparison with the costs of compliance for the facility. EPA details these steps in § 125.94(a)(5)(i)(A)–(F).

In the proposed rule, submittal requirements for facilities requesting a variance based upon a cost-cost test were identical to those for facilities requesting a variance based on a cost-benefit test. Thus, a facility requesting a site-specific determination based on a cost-cost comparison had to submit three studies: the Cost Evaluation Study, the Valuation of Monetized Benefits of Reducing Impingement and Entrainment, and the Site-Specific Technology Plan. In the final rule, by contrast, a facility must submit only the Cost Evaluation Study and the Site-Specific Technology Plan.

Under the Comprehensive Cost Evaluation Study detailed at proposal, a facility must submit detailed engineering cost estimates to document the costs of implementing the technologies and/or operational measures in the facility's Design and Construction Plan. In the final rule, the facility must provide, in addition to the engineering cost estimates, a demonstration that the costs significantly exceed the benefits of complying with the applicable performance standards. EPA did not make significant changes to the requirements under the Site-Specific Technology Plan.

In summary, the major changes in the cost-cost analysis are as follows:

- In the final rule, EPA has specified how a facility must "calculate costs considered by the Administrator" for comparison with the facility's estimate of the costs of compliance with the final rule,
- Elimination of the requirement to submit a Valuation of Monetized Benefits of Reducing Impingement and Entrainment, and
- Addition of the requirement to demonstrate that the costs significantly exceed the costs considered by the Administrator for a similar facility, under the Cost Evaluation Study.

b. Costs Significantly Greater Than Benefits

In today's final rule, a facility that demonstrates to the Director that the costs of compliance with the performance standards and/or restoration requirements would be significantly greater than the benefits will be given a site-specific determination of best technology available for minimizing adverse environmental impact. The standards of the rule have not changed since proposal, with the exception of one clarification: in the final rule, the alternative site-specific requirements established by the Director must achieve an efficacy that is as close as practicable to the performance standards and/or restoration requirements specified in § 125.94(b) and (c). This was not specified in the proposed rule language.

In the final rule, as in the proposal, a facility requesting a site-specific determination based on a cost-benefit comparison must submit three studies: the Cost Evaluation Study, the Benefits Valuation Study (referred to in proposal as Valuation of Monetized Benefits of Reducing Impingement and Entrainment), and the Site-Specific Technology Plan. The final rule has both added and clarified requirements for the first two components relative to the proposal, but has provided no substantive changes in the requirements for the Site-Specific Technology Plan.

Under the Comprehensive Cost Evaluation Study detailed at proposal, a facility must submit detailed engineering cost estimates to document the costs of implementing the technologies and/or operational measures in the facility's Design and Construction Plan. In the final rule, the facility must provide, in addition to the engineering cost estimates, a demonstration that the costs significantly exceed the benefits of complying with the applicable performance standards.

Additional clarifications are found in the Benefits Valuation Study. In the proposed rule, a facility was required to submit (1) a description of the methodology used to estimate the benefits' value, (2) the basis for assumptions and quantitative estimates, and (3) an uncertainty analysis. In the final rule, EPA has retained the three submittal requirements. Under the first component, EPA has specified the categories of potential valuation estimates in the final rule, namely commercial, recreational and ecological benefits. EPA has added that a facility should include non-use benefits if applicable. To the second component, EPA has added that the basis may include a determination of entrainment survival if the Director approved such a study. Requirements for the uncertainty analysis remain unchanged from proposal. In the final rule, EPA has added that a facility will be required to submit peer review of the items submitted (upon the Director's request) and a narrative description of non-monetized benefits that would result at the site if the facility was to meet applicable performance standards.

In summary, the major changes in the cost-benefit analysis are as follows:

- Facilities will be required to achieve an efficacy that is "as close as practicable" to performance standards and/ or restoration requirements,
- Facilities will need to specifically demonstrate that costs are significantly greater than the benefits of compliance, and
- Facilities will have additional requirements under the Benefits Valuation Study.

VII. Basis for the Final Regulation

A. Why Is EPA Establishing a Multiple Compliance Alternative Approach for Determining Best Technology Available for Minimizing Adverse Environmental Impact?

Today's final rule authorizes a Phase II existing facility to choose one of five alternatives for establishing the best technology available for minimizing adverse environmental impacts at the facility. A facility may (1) demonstrate that it has reduced or will reduce its cooling water intake flow commensurate with a closed-cycle, recirculating system, and or that it has reduced, or will reduce, the maximum through-screen design intake velocity to 0.5 ft/ s or less; (2) demonstrate that its existing design and construction technologies, operational measures, and/or restoration measures meet the applicable performance standards and restoration requirements; (3) demonstrate that it has selected design and construction technologies, operational measures, and/or restoration measures that will, in combination with any existing design and construction technologies, operational measures, and/or restoration measures, meet the applicable performance standards and restoration requirements; (4) demonstrate that it will install or has installed and properly operates and maintains an approved design and construction technology; or (5) demonstrate that it has selected, installed, and is properly operating and maintaining, or will install and properly operate and maintain, design and construction technologies, operational measures, and/or restoration measures that the Director has determined to be the best technology available for the facility based on application of a specified cost-to-cost test or a cost-to-benefit test. The basis for each of the five compliance alternatives is explained in section VII.C. of this preamble.

The rule establishes performance standards for the reduction of impingement mortality and entrainment. EPA established these performance standards in part based on a variety of technologies, but the rule does not mandate the use of any specific technology. These performance standards vary by waterbody type (*i.e.*, freshwater river/stream, estuary/tidal river, ocean, Great Lake, or lake/ reservoir) and the capacity utilization rate of the facility. They may be met in whole or in part using restoration measures after demonstrating, among other things, that the facility has evaluated the use of design and construction technologies and operational measures at the site. The basis for the performance standards is explained in section VII.B. of this preamble and the basis for the restoration requirements is explained at section VII.F. of this preamble. For a more detailed description of the rule, see sections V and IX of this preamble. These requirements reflect the best technology available for minimizing adverse environmental impact from cooling water intake structures.

EPA adopted this regulatory scheme because it provides a high degree of flexibility for existing facilities to select the most effective and efficient approach and technologies for minimizing adverse environmental impact associated with their cooling water intake structures. This approach also reflects EPA's judgment that, given the wide range of various factors that affect the environmental impact posed by Phase II existing facilities, different technologies or different combinations of technologies can be used and optimized to achieve the performance standards.

B. Why and How Did EPA Establish the Performance Standards at These Levels?

1. Overview of Performance Standards

The final rule establishes two types of performance standards, one that addresses impingement mortality and one that addresses entrainment. EPA used impingement mortality and entrainment as a metric for performance because these are primary and distinct types of harmful impacts associated with the use of cooling water intake structures (*see also* section IV). Both the impingement mortality and the entrainment performance standards apply to facilities demonstrating compliance under alternatives two, three, and four, described above (§ 125.94(a)(2), (3), and (4)). In addition, the Director's site-specific alternative requirements must be as close as practicable to the applicable performance standards under § 125.94. Performance standards for entrainment do not apply to facilities with low utilization capacity, those with a design intake flow of five percent or less of the mean annual flow of a freshwater river or stream, and those that withdraw cooling water from a lake (other than one of the Great Lakes) or reservoir because such facilities have a low propensity for causing significant entrainment impacts due to limited facility operation, low intake flow, or general waterbody characteristics. The impingement mortality performance standard requires a Phase II existing facility that complies under § 125.94(a)(2), (3), and (4) to reduce impingement mortality of all life stages of fish and shellfish by 80 to 95 percent from the calculation baseline.

Both an entrainment performance standard and an impingement mortality standard apply to facilities with a capacity utilization rate of 15 percent or greater and that withdraw cooling water from a tidal river, estuary, ocean, one of the Great Lakes, as well as facilities that use cooling water from a freshwater river or stream and the design intake flow of the cooling water intake structure is greater than five percent of the mean annual flow because EPA believes that these facilities cause more significant entrainment impacts. The entrainment standard, where applicable, requires a Phase II facility to reduce entrainment of all life stages of fish and shellfish by 60 to 90 percent from the calculation baseline.

2. Basis for Performance Standards

Overall, the performance standards that reflect best technology available under today's final rule are not based on a single technology but, rather, are based on consideration of a range of technologies that EPA has determined to be commercially available for the industries affected as a whole and have acceptable non-water quality environmental impacts, except for some potential regional energy (reliability) impacts that will be minimized to the extent possible through flexible compliance options. Because the requirements implementing section 316(b) are applied in a variety of settings and to Phase II existing facilities of different types and sizes, no single technology is most effective at all existing facilities, and a range of available technologies has been used to derive the performance standards.

EPA developed the performance standards for impingement mortality reduction based on an analysis of the efficacy of the following technologies: (1) Design and construction technologies such as fine and wide-mesh wedgewire screens, as well as aquatic filter barrier systems, that can reduce mortality from impingement by up to 99 percent or greater compared with conventional once-through systems; (2) barrier nets that may achieve reductions of 80 to 90 percent; and (3) modified screens and fish return systems, fish diversion systems, and fine mesh traveling screens and fish return systems that have achieved reductions in impingement mortality ranging from 60 to 90 percent as compared to conventional once-through systems.

Available performance data for entrainment reduction are not as comprehensive as impingement data. However, aquatic filter barrier systems, fine mesh wedgewire screens, and fine mesh traveling screens with fish return systems have been shown to achieve 80 to 90 percent or greater reduction in entrainment compared with conventional once-through systems. EPA notes that screening to prevent organism entrainment may cause impingement of those organisms instead.

3. Discussion of Key Aspects of Performance Standards

The performance standards at § 125.94(b)(1),(2), and (3) are based on the type of waterbody in which the intake structure is located, the volume of water withdrawn by a facility, and the facility capacity utilization rate. Under the final rule, EPA has grouped waterbodies into five categories: (1) Freshwater rivers or streams, (2) lakes or reservoirs, (3) Great Lakes, (4) tidal rivers and estuaries, and (5) oceans. 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.

The reproductive strategies of tidal river and estuarine species, together with other physical and biological characteristics of those waters, make them more susceptible than other waterbodies to impacts from cooling water intake structures (66 FR 288857–288859; 68 FR 17140). In contrast, many aquatic organisms found in non-tidal freshwater rivers and streams are less susceptible to entrainment due to their demersal (bottom-dwelling) nature and the fact that they do not typically have planktonic (free-floating) egg and larval stages (66 FR 28857; 68 FR 17140). Comments on the proposed Phase II existing facility rule also acknowledge that waterbody type is an important factor in assessing the impacts of cooling water intake structures, although some commenters preferred a site-specific approach, and others maintained that all waters deserve the most rigorous technology. A number of States supported EPA's proposed approach.

Absent entrainment control technologies, entrainment at a particular site is generally proportional to intake flow at that site. As discussed above, EPA believes it is reasonable to vary performance standards by the potential for adverse environmental impact in a waterbody type. EPA is limiting the requirement for entrainment controls in fresh waters to those facilities that withdraw the largest proportion of water from freshwater rivers or streams because they have the potential to impinge and entrain larger numbers of fish and shellfish and therefore have a greater potential to cause adverse environmental impact. EPA is not requiring entrainment reductions in freshwater rivers or streams where facilities withdraw 5 percent or less of the source water annual mean flow because such facilities generally have a low propensity for causing significant entrainment impacts due to the low proportion of intake flow in combination with the characteristics of the waterbody.

There are additional performance standards for facilities withdrawing from a lake (other than one of the Great Lakes) or a reservoir. If such a facility proposes to increase the design intake flow of the cooling water intake structure, the increase in total design intake flow must not disrupt the natural thermal stratification or turnover pattern of the source water except in cases where the disruption does not adversely affect the management of fisheries § 125.94(b)(3)(iii)). The natural thermal stratification or turnover pattern of a lake is a key characteristic that is potentially affected by the intake flow (which can alter temperature and/or mixing of cold and warm water layers) and location of cooling water intake structures within such waterbodies. Cooling water intake structures withdrawing from the Great Lakes are required to reduce fish and shellfish impingement mortality by 80 to 95 percent and to reduce entrainment by 60 to 90 percent. As described in the Phase I proposed rule (65 FR 49086) and NODA (66 FR 28858), EPA believes that the Great Lakes are a unique system that should be protected to a greater extent than other lakes and reservoirs. Similar to oceans, large lakes such as the Great Lakes can possess estuarine-like environments in the lower reaches of tributary streams. For example, within the U.S., a total of 1,370 distinct coastal wetlands fringe the Great Lakes and the channels that connect the lakes. (2–016A Herdendorf, C.E. Great Lakes estuaries. Estuaries, 13(4): 493–503. 1990, pg. 493). The Agency is therefore specifying entrainment controls as well as impingement mortality controls for the Great Lakes. EPA has not applied the entrainment performance standard to lakes other than the Great Lakes because, in general, these waterbodies contain aquatic organisms that tend to be less impacted by entrainment than organisms in estuaries or fresh water rivers or streams.

The performance standards for facilities with cooling water intake structures located in a tidal river or estuary and with a capacity utilization rate of 15 percent or greater are to reduce impingement mortality by 80 to 95 percent and entrainment by 60 to 90 percent for fish and shellfish. As discussed previously, EPA believes estuaries and tidal rivers are more susceptible than other waterbodies to adverse impacts from impingement and entrainment.

The performance standards for facilities with cooling water intake structures located in an ocean are to reduce impingement mortality by 80 to 95 percent and entrainment by 60 to 90 percent for fish and shellfish. EPA is establishing requirements for facilities withdrawing from oceans that are similar to those for tidal rivers and estuaries because the coastal zone of oceans (from which coastal cooling water intake structures withdraw water) are highly productive areas for fish and shellfish. (*See* the Phase I proposed rule (65 FR 45060) and documents in the record for the Phase I new facility rule (Docket # W–00–03) such as 2–013A through O, 2–019A–R11, 2–019A–R12, 2–019A–R33, 2–019A–R44, 2–020A, 3–0059). EPA is also concerned about the extent to which fishery stocks that rely upon tidal rivers, estuaries and oceans for habitat are overutilized and seeks to minimize the impact that cooling water intake structures may have on these species or forage species on which these fishery stocks may depend. Recent data demonstrate that approximately 78% of the fish stocks managed by the National Oceanic and Atmospheric Administration's National Marine Fishery Service (NMFS) are fully exploited, overfished, or collapsed (America's Living Oceans: Charting a Course for Sea Change, Pew Oceans Commission, June 4, 2003). (*See also* documents 2–019A–R11, 2–019A–R12, 2–019A–R33, 2–019A–R44, 2–020A, 2–024A through O, and 3–0059 through 3–0063 in the record of the Final New Facility Rule (66 FR 65256), Docket # W–00–03).

In accordance with the Phase II rule, facilities that operate with a capacity utilization rate of less than 15 percent are subject to the performance standard for impingement mortality only. EPA is not requiring, in today's rule, that these facilities control entrainment. EPA has several reasons for this. First, EPA has determined that entrainment control technology is not economically practicable in view of the reduced operating levels of these facilities. These facilities also tend to operate most often in mid-winter or late summer, which are times of peak energy demand but periods of generally low abundance of entrainable life stages of fish and shellfish. Finally, the total volume of water withdrawn by these facilities is significantly lower than for facilities operating at or near peak capacity, and as noted above, entrainment at a site is generally proportional to flow, absent entrainment controls. Consequently, EPA determined that it was neither necessary nor cost-effective for these facilities to reduce entrainment where the total volume of water withdrawn and the number of organisms that would be protected from entrainment is likely to be small. EPA is also allowing facilities with multiple, distinct cooling water intakes that are exclusively dedicated to different generating units to determine capacity utilization and applicable performance standards separately for each intake for the same reasons.

As in the Phase I rule, EPA is setting performance standards for minimizing adverse environmental impact based on a relatively easy to measure and certain metric—reduction of impingement mortality and entrainment. Although adverse environmental impact associated with cooling water intake structures can extend beyond impingement and entrainment, EPA has chosen this approach because impingement and entrainment are primary, harmful environmental effects that can be reduced through the use of specific technologies. In addition, where other impacts at the population, community, and ecosystem levels exist, these will also be reduced by reducing impingement and mortality. Using impingement mortality and entrainment as a metric provides certainty about performance standards and streamlines, and thus speeds, the issuance of permits.

EPA is expressing the performance standard in the form of ranges rather than a single performance benchmark because of the uncertainty inherent in predicting the efficacy of any one of these technologies, or a combination of these technologies, across the spectrum of facilities subject to today's rule. The lower end of the range is being established as the percent reduction that EPA, based on the available efficacy data, expects all facilities could eventually achieve if they were to implement and optimize available design and construction technologies and operational measures on which the performance standards are based. (*See* Chapter 4, "Efficacy of Cooling Water Intake Structure Technologies," of the Phase II Existing Facility Technical Development Document, EPA–821–R–04–007, February 2004. Also, *see* EPA's 316(b) technology efficacy database, DCN 6–5000.) The lower end of the range also reflects, in part, higher mortality rates at sites where there may be more fragile species that may not have a high survival rate after coming in contact with fish protection technologies at the cooling water intake structure (*e.g.*, fine mesh screens). The higher end of the range is a percent reduction that available data show many facilities can and have achieved with the available technologies upon which the performance standards are based.

In specifying a range, EPA anticipates that facilities will select the most cost-effective technologies or operational measures to achieve the performance level (within the stated range) based on conditions found at their site, and that Directors will review the facility's application to ensure that appropriate alternatives were considered. Proper selection, operation, and maintenance of these technologies would serve to increase potential efficiencies of the technologies. EPA also expects that some facilities may be able to meet these performance requirements by selecting and implementing a suite (*i.e.*, more than one) of technologies and operational measures and/or, as discussed in this section, by undertaking restoration measures.

Several additional factors support EPA's expectation that the impingement mortality and entrainment reduction reflected in the performance standards can eventually be achieved by all facilities using the design and construction technologies and measures on which the standards were based. First, a significant portion of the available performance data reviewed is from the 1970s and 1980s (when section 316(b) was initially implemented) and does not reflect recent developments, innovations (*e.g.*, aquatic filter barrier systems, sound barriers), or experience using these technologies. These data, developed during early implementation of the CWA, do not fully reflect today's improved understanding of both how the various control technologies work and the various factors that reflect what constitutes and how to measure healthy aquatic conditions. Second, these conventional barrier and return system technologies have not been optimized on a widespread level to date, as would be encouraged by this rule. Available information indicates that facilities that use these cooling water intake structure technologies often achieve better results from the technologies through adjusting which technologies are applied and how they are used. Such optimization, which also benefits from the advances in understanding noted above, would be promoted under this rule as facilities work to achieve the performance standards. Third, EPA believes that some facilities could achieve further reductions (estimated at 15–30 percent) in impingement mortality and entrainment by providing for seasonal flow restrictions, variable speed pumps, systems conversions to closed-cycle, recirculating systems, and other operational measures and innovative flow reduction alternatives. Such operational measures could be used to supplement design and construction technologies where necessary to meet the performance standards. Facilities also could benefit from combining inexpensive technologies as a "suite." For additional discussion, see chapter 4 in the Phase II Existing Facility Technical Development Document.

The calculation baseline used to determine compliance with performance standards is defined in § 125.93 as an estimate of impingement mortality and entrainment that would occur at a site assuming (1) the cooling water system had been designed as a once-through system; (2) the opening of the cooling water intake structure is located at, and the face of the standard 3/8-inch mesh traveling screen is oriented parallel to, the shoreline near the surface of the source waterbody; and (3) the baseline practices and procedures are those that the facility would maintain in the absence of any operational controls, including flow or velocity reductions, implemented in whole or in part for the purposes of reducing impingement mortality and entrainment. In addition, the facility may choose to use the current level of impingement mortality and entrainment as the calculation baseline. EPA's definition also clarifies the range of available information sources for the baseline. The calculation baseline may be estimated using: historical impingement mortality and entrainment data from the facility or from another facility with comparable design, operational, and environmental conditions; current biological data collected in the waterbody in the vicinity of the facility's cooling water intake structure; or current impingement mortality and entrainment data collected at the facility. Further, a facility may request that the calculation baseline be modified to be based on a location of the opening of the cooling water intake structure at a depth other than at or near the surface if it can demonstrate to the Director that the other depth would correspond to a higher baseline level of impingement mortality and/or entrainment. EPA decided to use this definition because it represents the most common default conditions the Agency could identify to give facilities credit for design and construction technologies, operational measures, and/or restoration measures that they have already implemented to minimize adverse environmental impact, while providing a clear and relatively simple definition. Based on comments received on the Phase II NODA, this calculation baseline definition includes additional criteria that EPA has added to provide clarity to the analysis. (Proposed changes to the calculation baseline were discussed in the Phase II NODA, see 68 FR 13580). In many cases, existing technologies at the site show some reduction in impingement and entrainment when compared to this baseline. In such cases, impingement mortality and entrainment reductions (relative to the calculated baseline) achieved by these existing technologies should be counted toward compliance with the performance standards. In addition, operational measures such as operation of traveling screens, employment of more efficient return systems, and even locational choices should be credited for any corresponding reduction in impingement mortality and entrainment. See section IX of this preamble for a discussion of how the calculation baseline is used to compare facility performance with the rule's performance standards.

C. What Is the Basis for the Five Compliance Alternatives That EPA Selected for Establishing Best Technology Available?

1. Meeting Performance Standards Through Reducing Intake Flow Commensurate With a Closed Cycle Recirculating System or Reduced Design Intake Velocity

Under § 125.94(a)(1)(i), any facility that reduces its flow to a level commensurate with a closed-cycle, recirculating cooling system meets the performance standards in today's rule because such a reduction in flow is deemed to satisfy any applicable impingement mortality and entrainment performance standards for all waterbodies. Facilities that select this compliance alternative either through the use of closed-cycle recirculating system technology at the plant, or by retrofitting their facility, will not be required to further demonstrate that they meet the applicable performance standards. Similarly, under 125.94(a)(1)(ii), any facility that reduces its design intake velocity to 0.5 ft/s or less is deemed to have met the performance standards for impingement mortality and is not required to demonstrate further that it meets the performance standards for impingement mortality.

Available data described in Chapter 3 of the Phase II Existing Facility Technical Development Document suggest that closed-cycle, recirculating cooling systems (*e.g.*, cooling towers or ponds) can reduce mortality from impingement by up to 98 percent and entrainment by up to 98 percent when compared with conventional once-through systems.[44] Although closed-cycle, recirculating cooling is not one of the technologies on which the performance standards are based, use of a closed-cycle, recirculating cooling system would always achieve the performance standards and therefore, facilities that reduce their flow commensurate with closed-cycle, recirculating cooling systems are deemed to have met performance standards. The rule, at § 124.94(a)(1)(i), thus establishes a compliance alternative based on the use of a closed-cycle, recirculating cooling system. While EPA based the requirements of the new facility rule on the performance standards of closed-cycle recirculating systems, EPA has determined that this technology is not economically practicable for many existing Phase II facilities. EPA is nonetheless aware that some existing facilities have installed this highly effective technology and has thus provided a streamlined alternative for such facilities.

Additionally, EPA established a compliance alternative that allows facilities to reduce intake velocity to meet the impingement mortality performance standards. As EPA discussed in the proposed rule at 67 FR 17151 and Phase I final rule at 66 FR 65274, intake velocity is one of the key factors that can affect the impingement of fish and other aquatic biota, since in the immediate area of the intake it exerts a direct physical force against which fish and other organisms must act to avoid impingement and entrainment. As discussed in that notice, EPA compiled data from three swim speed studies (University of Washington study, Turnpenny, and EPRI) and these data indicated that a 0.5 ft/s velocity would protect at least 96 percent of the tested fish. As further discussed, EPA also identified federal documents (Boreman, DCN 1–5003–PR; Bell (1990); and National Marine Fisheries Service (NMFS), (1997)), an early swim speed and endurance study performed by Sonnichsen *et al.* (1973), and fish screen velocity criteria that are consistent with this approach.

[44] Reducing the cooling water intake structure's capacity is one of the most effective means of reducing entrainment (and impingement). For the traditional steam electric utility industry, facilities located in freshwater areas that have closed-cycle recirculating cooling water systems can, depending on the quality of the make-up water, reduce water use by 96 to 98 percent from the amount they would use if they had once-through cooling water systems. Steam electric generating facilities that have closed-cycle, recirculating cooling systems using salt water can reduce water usage by 70 to 96 percent when make-up and blowdown flows are minimized. The lower range of water usage would be expected where State water quality standards limit chloride to a maximum increase of 10 percent over background and therefore require a 1.1 cycle of concentration. The higher range should be attainable where cycles of concentration up to 2.0 are used for the design.

2. Meeting Performance Standards Through the Use of Design and Construction Technologies, Operational Measures, and/or Restoration Measures

Under the second and third compliance alternatives (§ 125.94(a)(2) and (3)), a facility may either demonstrate to the Director that the facility's existing design and construction technologies, operational measures, and/or restoration measures already meet the minimum performance standards specified under § 125.94(b) and (c), or that it has selected design and construction technologies, operational measures, and/or restoration measures or some combination thereof that will meet these performance standards.

Available data indicate that, when considered as a suite of technologies, barrier and fish handling technologies are available on a national basis for use by Phase II existing facilities. These technologies exist and are in use at various Phase II facilities and, thus, EPA considers them collectively technologically achievable. In addition, 50 percent of the potentially regulated facilities that do not already have closed-cycle cooling systems have some other technology in place that reduces impingement or entrainment. In turn, a large subset of these facilities (33 percent) also have fish handling or return systems that reduce the mortality of impinged organisms. The fact that these technologies are collectively available means that one or more technologies within the suite is available to each Phase II facility.

EPA finds that the design and construction technologies necessary to meet the requirements are commercially available and economically practicable for existing facilities, because facilities can and have installed many of these technologies years after a facility began operation. Typically, additional design and construction technologies such as fine mesh screens, wedgewire screens, fish handling and return systems, and aquatic filter fabric barrier systems can be installed during a scheduled outage (operational shutdown). Referenced below are examples of facilities that installed these technologies after they initially started operating.

Lovett Generating Station. A 495 MW facility (gas-fired steam), Lovett is located in Tomkins Cove, New York, along the Hudson River. The facility first began operations in 1949 and has three generating units with once-through cooling systems. In 1994, Lovett began the testing of an aquatic filter barrier system to reduce entrainment, with a permanent system being installed the following year. Improvements and additions were made to the system in 1997, 1998, and 1999, with some adjustments being accepted as improvements of this vendor's technology for all subsequent installations at other locations.

Big Bend Power Station. Situated on Tampa Bay, Big Bend is a 1998 MW (coal-fired steam) facility with four generating units. The facility first began operations in 1970 and added generating units in 1973, 1976, and 1985. Big Bend supplies cooling water to its once-through cooling water systems via two intake structures. When the facility added Unit 4 in 1985, regulators required the facility to install additional intake technologies. A fish handling and return system, as well as a fine-mesh traveling screen (used only during months with potentially high entrainment rates), were installed on the intake structure serving both the new Unit 4 and the existing Unit 3.

Salem Generating Station. A 2381 MW facility (nuclear), Salem is located on the Delaware River in Lower Alloways Creek Township, New Jersey. The facility has two generating units, both of which use once-through cooling and began operations in 1977. In 1995, the facility installed modified Ristroph screens and a low-pressure spray wash with a fish return system. The facility also redesigned the fish return troughs to reduce fish trauma.

Chalk Point Generating Station. Located on the Patuxent River in Prince George's County, Maryland, Chalk Point has a capacity of 2647 MW (oil-fired steam). The facility has four generating units and uses a combination of once-through and closed-cycle, recirculating cooling systems (two once-through systems serving two generating units and one recirculating system with a tower serving the other two generating units). In 1983, the facility installed a barrier net, followed by a second net in 1985, giving the facility a coarse mesh (1.25″) outer net and a fine mesh (.75″) inner net. The barrier nets are anchored to a series of pilings at the mouth of the intake canal that supplies the cooling water to the facility and serve to reduce both entrainment and the volume of trash taken in at the facility.

3. Meeting Performance Standards Through Use of an Approved Design and Construction Technology

Under the fourth compliance alternative, a facility can demonstrate that it meets specified conditions and that it has installed and properly operates and maintains a pre-approved technology. EPA is approving one technology at this time: submerged cylindrical wedgewire screen technology to treat the total cooling water intake flow. There are five conditions that must be met in order to use this technology to comply with the rule: (1) The cooling water intake structure is located in a freshwater river or stream; (2) the cooling water intake structure is situated such that sufficient ambient counter currents exist to promote cleaning of the screen face; (3) the through screen design intake velocity is 0.5 ft/s or less; (4) the slot size is appropriate for the size of eggs, larvae, and juveniles of any fish and shellfish to be protected at the site; and (5) the entire main condenser cooling water flow is directed through the technology (small flows totaling less than two MGD for auxiliary plant cooling uses are excluded). Directors are explicitly authorized in § 125.99 to pre-approve other technologies for use at facilities with other specified characteristics within their respective jurisdiction after providing the public with a notice and an opportunity to comment on the request for approval of the technology. The Director's authority to pre-approve other technologies is not limited to technologies for use by facilities located on freshwater rivers and streams.

EPA has adopted this compliance alternative in response to comments that suggested that EPA provide an additional, more streamlined compliance option under which a facility could implement certain specified technologies that are deemed highly protective in exchange for reducing the scope of the Comprehensive Demonstration Study. (*See* 68 FR 13522, 13539; March 19, 2003). EPA evaluated the effectiveness of specific technologies using the impingement mortality and entrainment reduction performance standards as assessment criteria. The technology selected for the approved technology option has a demonstrated ability to reduce impingement mortality by 80 to 95 percent for fish and shellfish and, if required, reduce entrainment by 60 to 90 percent for any stages of fish and shellfish at facilities that meet the conditions specified in section 125.99(a). Thus, the technology has a demonstrated ability to meet the most stringent performance standards that would apply to any facility situated on a freshwater river or stream. (*See* DCN 1–3075, 1–5069, 1–5070, 3–0002, and 4–4002B. *Also see*, DCN 6–5000 and Chapter 3 of the Technical Development Document.) Because cylindrical wedgewire screens are believed to be effective when deployed under the specified conditions and properly maintained, facilities that select this compliance option are provided substantially streamlined requirements for completing the Comprehensive Demonstration Study. However, facilities selecting this option are still required to prepare a Technology Installation and Operation Plan to monitor the effectiveness of the technology at their site in meeting the performance standards.

4. Site-Specific Determination of Best Technology Available To Minimize Adverse Environmental Impact

A facility may comply with the rule by seeking a site-specific demonstration of the best technology available to minimize adverse environmental impact by demonstrating, to the Director's satisfaction, that its cost of complying with the applicable performance standards would be significantly greater than the costs considered by EPA for a like facility when establishing such performance standards, or that its costs would be significantly greater than the benefits of complying with such performance standards at the facility. (*See* sections 125.94(a)(5)(i) and (ii)). If a facility satisfies one of the two cost tests in § 125.94(a)(5), then the Director must establish site-specific alternative requirements based on design and construction technologies, operational measures, and/or restoration measures that achieve an efficacy that is, in the judgment of the Director, as close as practicable to the applicable performance standards without resulting in costs that are significantly greater than either the costs considered by the Administrator in establishing the applicable performance standards, or the benefits at the facility.

In establishing the performance standards in 125.94(b) and the compliance alternatives in sections 125.94(a)(1)–(4), EPA considered several factors, including efficacy, availability, ease of implementation, indirect effects, the costs that EPA expects all existing facilities to incur (national costs) and the benefits if all existing facilities meet the performance standards (national benefits). This provision for alternative requirements is included in the rule to give facilities flexibility to demonstrate that the best technology available to minimize adverse environmental impact at their particular sites may be less stringent than would otherwise be achieved if the facility selected one of the compliance alternatives in sections 125.94(a)(1)–(4). (For a discussion of EPA's legal authority to authorize compliance with alternative requirements based on this cost-cost comparison, *see* Section VIII. I.).

a. Basis of the Cost-Cost Test

For a number of related reasons, EPA chose to use a comparison of a facility's actual costs to the costs EPA estimated that facility would incur to meet the national performance standards (a "cost-cost test") as a basis for obtaining a site-specific determination of best technology available. EPA's record for this rule shows that, for the category of existing facilities as a whole, today's rule is technically achievable and economically practicable. Although EPA collected more information for this rulemaking than is typical for an effluent limitation guideline rulemaking, detailed information on some factors important to the effectiveness and costs of the technologies, such as debris loading and the presence of navigational channels within the waterbody at which cooling water intakes are sited, was not requested. Moreover, the information EPA used to develop its costs was in some cases limited by the fact that, while EPA sent surveys to all facilities covered under today's rule, only 42% were sent detailed questionnaires. The remaining 58% only received a short technical questionnaire which requested minimal characterization information. Also, EPA may not have elicited information regarding characteristics of a particular facility that, if known would have either significantly changed EPA's national cost estimates or demonstrated that none of the technologies on which the categorical requirements are based are economically achievable by the facility. Similarly, existing facilities have less flexibility than new facilities in selecting the location of their intakes and technologies for minimizing adverse environmental impact, and therefore it may be difficult for some facilities to avoid costs much higher than those EPA considered when establishing the performance standards. The cost-cost site-specific alternative ensures that the overall rule remains economically practicable for facilities subject to today's rule. In short, for certain facilities EPA may not have anticipated some site-specific costs or the costs for retrofit may exceed those EPA considered. Despite EPA's best effort, such costs are difficult to estimate in a national rule. Because of the wide range of available technologies considered and a number of site-specific factors that may significantly affect the cost and practicability of installing particular technologies at particular sites, the site-specific uncertainty in the cost estimates is higher than for an effluent limitations guidelines rulemaking. Thus, EPA may not have anticipated all site-specific costs that a facility could incur. In addition, existing facilities have less flexibility than new facilities in selecting the location of their intakes and technologies for minimizing adverse environmental impact and, therefore, it may be difficult for some facilities to avoid costs much higher than those EPA considered when establishing the performance standards in the rule. For all of these reasons, EPA believes that the cost-cost site-specific compliance alternative is necessary to ensure that the rule is economically practicable for existing Phase II facilities. In order to ensure that this alternative provides only the minimum relaxation of performance standards that is needed to make the rule economically practicable, § 125.94(a)(5)(i) requires that the site-specific requirements achieve an efficacy that is as close as practicable to the applicable performance standards without resulting in costs that are significantly greater than those considered by the Administrator for a like facility when establishing the performance standards.

b. Basis of the Cost-Benefit Test

EPA decided to use a comparison of a facility's costs to the benefits of meeting the performance standards at the facility (a "cost-benefit test") as another basis for obtaining a site-specific determination of BTA to minimize adverse environmental impact. Section 316(b) authorizes consideration of the environmental benefit to be gained by requiring that the location, design, construction, and capacity of cooling water intake structures reflect the best economically practicable technology available for the purpose of minimizing adverse environmental impact. Accordingly, in determining that the technologies on which EPA based the compliance alternatives and performance standards are the best technologies available for existing facilities to minimize adverse environmental impact, EPA considered the national cost of those technologies in comparison to the national benefits—*i.e.*, the reduction in impingement and entrainment that EPA estimated would occur nationally if all existing facilities selected one of the compliance options in sections 125.94(a)(1)–(4). While EPA believes that there is considerable value in promulgating national performance standards under section 316(b) based on what EPA determines, on a national basis, to be the best technology available to minimize adverse environmental impacts, EPA also recognizes that, at times, determining what is necessary to minimize adverse environmental impacts can necessitate a site-specific inquiry. EPA's comparison of national costs to national benefits may not be applicable to a specific site due to variations in (1) the performance of intake technologies and (2) characteristics of the waterbody in which the intake(s) are sited, including the resident aquatic biota. For example, there may be some facilities where the absolute numbers of fish and shellfish impinged and entrained is so minimal that the cost to achieve the required percentage reductions would be significantly greater than the benefits of achieving the required reductions at that particular site. More specifically, because of the location of the intake, the characteristics of a particular waterbody, or the behavioral patterns of the fish or shellfish in that particular waterbody, there may be little or no impingement mortality or entrainment occurring at the site (see Neal Generating Complex facility example provided in section IV of this preamble). For such a facility, the cost of reducing an already small amount of impingement mortality and entrainment by 80 to 95 percent and 60 to 90 percent, respectively, may be significantly greater than the benefits. In short, it may not be cost-effective and, therefore may be economically impracticable for a facility to achieve percentage reductions when attempting to save a small number of fish or shellfish. Thus, in a waterbody that is already degraded, very few aquatic organisms may be subject to impingement or entrainment, and the costs of retrofitting an existing cooling water intake structure may be significantly greater than the benefits of doing so. By requiring best technology available to minimize adverse environmental impact, section 316(b) invites a consideration of both technology and of environmental conditions, including the potential for adverse impacts, in the receiving waterbody. EPA believes it is a reasonable interpretation of the statute to allow the Director to consider the results of meeting the performance standards in terms of reducing environmental impacts (*i.e.*, the benefits) in cases where the costs of installing the technology are significantly greater than the reduction in environmental impacts would warrant. As with the cost-cost site-specific provision, EPA also wants to ensure that any relaxation of the performance standards be the minimum necessary to ensure that the costs are not significantly greater than the benefits. Section 125.94(a)(5)(i) thus provides that alternative site-specific requirements must achieve an efficacy that is as close as practicable to the applicable performance standards without resulting in costs that are significantly greater than the benefits of meeting the performance standards at the facility.

D. How Has EPA Assessed Economic Practicability?

The legislative history of section 316(b) indicates that the term "best technology available" should be interpreted as "best technology available commercially at an economically practicable cost."[45] This position reflects congressional concern that the application of best technology available should not impose an impracticable and unbearable economic burden. Thus, EPA has conducted extensive analyses of the economic impacts of this final rule, using an integrated energy market model (the IPM[45]). For a complete discussion of this analysis, please refer to section XI.B.1 of this preamble or Chapter B3 of the Economic and Benefits Analysis (EBA) in support of this final rule (DCN 6–0002).

EPA believes that the requirements of this rule reflect the best technology available at an economically practicable cost. EPA examined the effects of the rule's compliance costs on capacity, generation, variable production costs, prices, net income, and other measures, both at the market and facility levels. In addition, the other economic analyses conducted by EPA showed that the costs for this rule are economically practicable.

However, EPA believes that a consideration of the relationship of costs to environmental benefits is an important component of economic practicability. As discussed in section VIII.C of the proposed Phase I rule (65 FR 49094) EPA has long recognized that there should be some reasonable relationship between the cost of cooling water intake structure control technology and the environmental benefits associated with its use. As the preamble to the 1976 final rule implementing section 316(b) stated, neither the statute nor the legislative history requires a formal or informal cost-benefit assessment (41 FR 17387; April 26, 1976).

[45] *See* 118 CONG. REC 33,762 (1972), reprinted in 1 Legislative History of the Water Pollution Control Act Amendments of 1972, at 264 (1973) (Statement of Representative Don H. Clausen).

E. What Were the Major Options Considered for the Final Rule and Why Did EPA Reject Them?

EPA considered a number of options for determining the best technology available to minimize adverse environmental impact at Phase II existing facilities and assessed these options based on overall efficacy, availability, economic practicability, including economic impact and the relationship of costs with benefits, and non-water quality environmental impacts, including energy impacts. Under the options EPA considered, facilities would be allowed to implement restoration measures to meet the performance standards. Similarly, any options considered also would allow facilities to request alternative, less stringent, requirements if the Director had determined that data specific to the facility indicated that compliance with the relevant requirement would result in compliance costs significantly greater than those EPA considered in establishing the applicable requirement, or compliance costs significantly greater than the benefits of complying with the applicable performance standards. The alternative requirements would be no less stringent than justified by the significantly greater cost or the significant adverse impacts on local air quality or local energy markets. EPA also considered several site-specific approaches to establishing best technology available. These include the site-specific sample rule discussed at 67 FR 17159, an alternative based on EPA's 1977 Draft Guidance, and alternatives suggested by the Utility Water Act Group (UWAG) and Public Service Electric and Gas Company (PSEG), respectively (*see* 67 FR 17162). EPA's reasons for not adopting these site specific alternatives are discussed in section VII.E.5 of this preamble. The five major technology options EPA considered but did not select for the final rule are discussed in greater detail in the next section. Finally, the costs and benefits presented below are those developed at proposal because these estimates are most useful for purposes of comparison. Subsequent analyses, such as those presented in the NODA, have resulted in higher cost estimates in general, but did not alter the relative ranking of these options as EPA made determinations regarding the final rule. Rather, these analyses indicated that the costs for options that would have required more extensive retrofitting efforts than the final rule are even higher relative to the costs of the final rule than they were estimated to be at proposal.

1. Intake Capacity Commensurate With Closed-Cycle, Recirculating Cooling System for All Facilities

EPA considered a regulatory option that would have required Phase II existing facilities with a design intake flow 50 MGD or more to reduce the total design intake flow to a level, at a minimum, commensurate with that which can be attained by a closed-cycle recirculating cooling system using minimized make-up and blowdown flows. In addition, facilities in specified circumstances (*e.g.*, located where additional protection is needed due to concerns regarding threatened, endangered, or protected species or habitat; or regarding migratory, sport or commercial species of concern) would have had to select and implement additional design and construction technologies to minimize impingement mortality and entrainment. This option would not have distinguished between facilities on the basis of the waterbody type from which they withdraw cooling water. Rather, it would have required that the same stringent controls be the nationally applicable minimum for all waterbody types. This is the basic regulatory approach EPA adopted for new facilities at 40 CFR 125.80.

EPA did not select a regulatory scheme based on the use of closed-cycle, recirculating cooling systems at existing facilities based on its generally high costs (due to conversions), the fact that other technologies approach the performance of this option, concerns for energy impacts due to retrofitting existing facilities, and other considerations. Although closed-cycle, recirculating cooling water systems serve as the basis for requirements applied to Phase I new facilities, for Phase II existing facilities, a national requirement to retrofit existing systems is not the most cost-effective approach and at many existing facilities, retrofits may be impossible or not economically practicable. EPA estimates that the total capital costs for individual high-flow plants (*i.e.*, greater than 2 billion gallons per day) to convert to wet towers generally ranged from $130 to $200 million, with annual operating costs in the range of $4 to $20 million (*see* TDD; DCN 6–0004). For purposes of general comparison, EPA estimated that capital and installation costs for cooling towers under the Phase I rule would range from approximately $170,000 to $12.6 million per plant (annualized), depending on flow. At proposal, EPA estimated that the total social cost of compliance for this option for Phase II existing facilities would be approximately $3.5 billion per year.

It is significant to note, however, that EPA's estimates did not fully incorporate costs associated with acquiring land needed for cooling towers and, therefore, these estimates may not fully reflect the costs of the option. For example, based on a survey conducted by one industry commenter, EPA learned that 31 out of 56 plants surveyed said that they would need to acquire additional property to accommodate cooling towers, if required by today's rule. EPA recognizes that this could be a significant cost. EPA also recognizes that there may be impediments, irrespective of costs, to acquiring land for cooling towers. Land upon which to construct cooling towers may be difficult or impossible to obtain, especially in urban areas; some facilities might even turn to displacement of wetlands as a solution. The Agency did not include these potential costs in its analysis for the NODA or proposal. In contrast to new facilities, which can take into account the Phase I requirements when choosing where to situate their structures (including cooling towers), existing facilities have far less flexibility and incur far greater costs. EPA believes that this is a special problem for existing facilities that is relevant to determining whether, as a national categorical matter, closed-cycle cooling is the best technology available for existing facilities for minimizing adverse environmental impacts associated with cooling water intake structures. EPA received retrofit cost estimates from a number of commenters that indicate that such costs could be at least twice those projected by EPA.

Another issue concerns the energy impacts of cooling towers. EPA examined the information it received after publication of the proposed rule and NODA, and agrees that the energy penalty associated with cooling towers, together with other factors, indicates that this technology is not the best technology available for existing facilities for minimizing adverse environmental impacts associated with cooling water intake structures. In reaching this conclusion, EPA relied on energy penalty information provided by the U.S. Department of Energy. EPA worked closely with the U.S. Department of Energy in preparing today's rule because of their expertise in power plant operations and engineering. The U.S. Department of Energy pointed out to EPA that existing fossil-fuel facilities converting from once-through cooling water systems to wet-cooling towers would produce 2.4 percent to 4.0 percent less electricity even while burning the same amount of coal. For at least one nuclear power plant, which provides 78% of the electricity consumed by the State of Vermont, the energy penalty associated with converting to cooling towers was estimated to be 5.3 percent. Expressed differently, DOE estimated that nationally, on average 20 additional 400-MW plants might have to be built to replace the generating capacity lost by replacing once-through cooling systems with wet cooling towers if such towers were required by all Phase II facilities.

This energy penalty leads to other negative consequences. Because this deficit is predicted to occur during the summer months (when energy demand is highest), the net effect would be more consumption of fossil fuel, which in turn increases the emission of sulfur dioxide, NO_X, particulate matter, mercury and carbon dioxide. Increasing fuel consumption at existing coal power plants yields the largest increase in air emissions because existing systems are less efficient at producing power (and therefore burn more coal) and because they generally have less air pollution control equipment in place. EPA believes that it is reasonable to consider these non-water quality environmental impacts and the additional costs associated with controlling these increased emissions in making today's decision. EPA further believes that it is authorized to do so because of the links between § 316(b) and sections 301 and 306, which require EPA to consider both the energy impacts and the air pollution impacts of technologies when identifying technologies in the effluent guidelines context. *See* CWA section 304(b)(2)(B) (cross-referenced in § 301); CWA section 306(b)(1)(B) (new source performance standards).

Some commenters also assert that EPA underestimated the down time that the facility would experience as it converts to cooling towers. This, again, is not an impact that would be experienced by new facilities. EPA agrees that such down time can be significant. Indeed, one of the four retrofit case studies EPA developed indicated a down time of 10 months, and EPA believes it is reasonable to infer that many other facilities would experience the same loss.

EPA also agrees with the commenters who assert that the empirical data base of four retrofit cases to which EPA compared cooling tower retrofit costs and engineering characteristics is not representative of the broader population of facilities and could be too narrow a set from which to develop national costs that would be applicable to a wide range of facilities. Of the four retrofits EPA studied, two were in a single state (South Carolina), none were located along a coast, and only one generated more than 500 MW of electricity. EPA also recognizes that all of these conversions were performed before 1992. While it is true that the vast majority of the new, greenfield utility and non-utility combined cycle plants built in the past 20 years have wet cooling towers, EPA believes that it is significant that so few existing facilities retrofitted to the technology during the same period. The rarity of this technology as a retrofit further indicates that it is not economically practicable for the vast majority of existing facilities.

EPA also considered several additional points made by commenters in rejecting this option. Some commenters asserted that certain facilities with closed-cycle, recirculating cooling systems often need to address the impacts of cooling tower plumes, and subsequent fog and icing in metropolitan areas, and noise abatement. Commenters also asserted that the costs of retrofitting and operating such systems at facilities which do not now have them is disproportionate to the potential benefits derived, particularly given the similarity in the level of protection provided under this option (all facilities required to reduce flow commensurate with a closed-cycle, recirculating system) and the final rule. Finally, they stated that the need for flexibility in a rule pertaining to existing facilities is critical to allow facility owners a range of options to meet the fish protection requirements. EPA does not agree that in all cases the costs of retrofitting a closed-cycle cooling water system is disproportionate to the benefits derived. Nevertheless, EPA recognizes that these concerns have merit for many facilities and that the validity and extent of such concerns often must be assessed on a case-by-case basis.

Each of these factors has a cost and an economic impact that EPA believes is appropriate to consider when evaluating whether cooling towers are the best technology available for existing facilities for minimizing adverse environmental impacts associated with cooling water intake structures. The capital costs estimated by EPA at proposal are already very high; when costs reflecting reasonable changes to EPA's assumptions are added to them, the total capital cost investment and associated economic impact is simply too high at this time for EPA to be able to justify selecting cooling towers as a required technology for all existing Phase II facilities.

EPA further compared the efficacy of closed-cycle, recirculating cooling systems with that estimated for design and construction technologies. Although not identical, the ranges of impingement and entrainment reduction are similar under both options, such that the reductions estimated for the design and construction technologies, particularly when optimized, approach those estimated for closed-cycle, recirculating cooling systems. Therefore, the use of design and construction technologies as the basis for this rule is supported since they can approach closed-cycle, recirculating systems at less cost with fewer implementation problems. EPA considered this similarity in efficacy, along with the economic practicability and availability of each type of technology, in determining that a closed-cycle, recirculating cooling system is not the required technology for all Phase II existing facilities.

2. Intake Capacity Commensurate With Closed-Cycle, Recirculating Cooling Systems Based on Waterbody Type

EPA also considered an alternate technology-based option in which closed-cycle, recirculating cooling systems would have been required for all facilities on certain waterbody types. Under this option, EPA would have grouped waterbodies into the same five categories as in today's rule: (1) Freshwater rivers or streams, (2) lakes or reservoirs, (3) Great Lakes, (4) tidal rivers or estuaries; and (5) oceans. Because oceans, estuaries and tidal rivers contain essential habitat and nursery areas for the vast majority of commercial and recreational important species of shell and finfish, including many species that are subject to intensive fishing pressures, these waterbody types would have required more stringent controls based on the performance of closed-cycle, recirculating cooling systems. EPA discussed the susceptibility of these waters in a Notice of Data Availability (NODA) for the Phase I rule (66 FR 28853, May 25, 2001) and invited comment on documents that may support its judgment that these waters are particularly susceptible to adverse impacts from cooling water intake structures. In addition, the NODA presented information regarding the low susceptibility of non-tidal freshwater rivers and streams to impacts from entrainment from cooling water intake structures.

Under this alternative option, facilities that operate at less than 15 percent capacity utilization would, as in today's final rule, only be required to have impingement control technology. Facilities that have a closed-cycle, recirculating cooling system would have required additional design and construction technologies to increase the survival rate of impinged biota or to further reduce the amount of entrained biota if the intake structure was located within an ocean, tidal river, or estuary where there are fishery resources of concern to permitting authorities or fishery managers.

Facilities with cooling water intake structures located in a freshwater (including rivers and streams, the Great Lakes and other lakes) would have had the same requirements as under today's final rule. If a facility for which closed-cycle recirculating technology was required chose to comply with alternative requirements, then the facility would have had to demonstrate that alternative technologies would reduce impingement and entrainment to levels comparable to those that would be achieved with a closed-loop recirculating system (90% reduction). If such a facility chose to supplement its alternative technologies with restoration measures, it would have had to demonstrate the same or substantially similar level of protection. (For additional discussion see the Phase I final rule 66 FR 65256, at 65315 columns 1 and 2.)

At proposal, EPA estimated that there would be 109[46] facilities located on oceans, estuaries, or tidal rivers that do not have a closed-cycle, recirculating cooling system and would need to reduce intake flow to a level commensurate with that which can be attained by a closed-cycle, recirculating cooling system or upgrade design and construction technology (*e.g.*, screens) in order to meet performance standards for reducing impingement mortality and entrainment.

Although EPA estimated the costs of this option to be less expensive at the national level than an option based on closed-cycle, recirculating cooling systems everywhere, EPA did not select this option based on total social costs estimates of greater than $1 billion per year and its lack of cost-effectiveness, as well as on concerns regarding potential energy impacts. Facilities located on oceans, estuaries, and tidal rivers would incur high capital and operating and maintenance costs for conversions of their cooling water systems. Furthermore, since impacted facilities would be concentrated in coastal regions, EPA is concerned that there is

[46] Sample-weighted.

the potential for short term energy impacts and supply disruptions in these areas if multiple facilities retrofit concurrently or over a relatively short time-frame, as would be required by these regulations.

3. Intake Capacity Commensurate With Closed-Cycle, Recirculating Cooling System Based on Waterbody Type and Proportion of Waterbody Flow

EPA also considered a variation on the above approach that would have required only facilities withdrawing very large amounts of water from an estuary, tidal river, or ocean to reduce their intake capacity to a level commensurate with that which can be attained by a closed-cycle, recirculating cooling system. For example, for facilities with cooling water intake structures located in a tidal river or estuary, if the intake flow is greater than 1 percent of the source water tidal excursion, then the facility would have had to meet standards for reducing impingement mortality and entrainment based on the performance of wet cooling towers. These facilities would instead have had the choice of reducing cooling water intake flow to a level commensurate with wet cooling towers or of using alternative technologies to meet reduction standards based on the performance of wet cooling towers. If a facility on a tidal river or estuary had intake flow equal to or less than 1 percent of the source water tidal excursion, the facility would have only had to meet the same impingement and entrainment performance standards as in the final Phase II rule. These standards were developed based on the performance of technologies such as fine mesh screens and traveling screens with well-designed and operating fish return systems. The more stringent, closed-cycle, recirculating cooling system-based requirements would have also applied to a facility that has a cooling water intake structure located in an ocean with an intake flow greater than 500 MGD.

This option also would impose much higher costs on a subset of facilities than the final rule. Based on an analysis of data collected through the detailed industry questionnaire and the short technical questionnaire, at proposal, EPA estimated there were potentially 109 Phase II existing facilities located on estuaries, tidal rivers, or oceans which would incur capital costs under this option. Of these 109 facilities, EPA estimated that 51 would exceed the applicable flow threshold and be required to meet performance standards for reducing impingement mortality and entrainment based on a reduction in intake flow to a level commensurate with that which can be attained by a closed-cycle recirculating system. Of the 58[47] facilities estimated to fall below the applicable flow threshold, 10 facilities already meet these performance standards and would not require any additional controls, whereas 48[48] facilities would require entrainment or impingement controls, or both. Because this option would only require cooling tower-based performance standards for facilities located on tidal rivers, estuaries or oceans where they withdraw saline or brackish waters, EPA does not believe that this option would raise any significant water quantity issues.

At proposal, EPA estimated the total social cost of compliance for the waterbody/capacity-based option to be approximately $0.97 billion per year. EPA did not select this option because it was not determined to be the most cost-effective approach on a national basis. While the national costs of this option are slightly lower than those of requiring wet cooling towers-based performance standard for all facilities located on oceans, estuaries and tidal rivers, the cost for facilities to meet these standards are still substantial. Although EPA would provide an opportunity to seek alternative requirements to address locally significant air quality or energy impacts, EPA does not believe a framework such as this provides sufficient flexibility to ensure effective implementation and to minimize non-water quality (including energy) impacts. In addition, as noted above for the other cooling tower based options that EPA rejected, facilities can achieve almost the same level of impingement mortality and entrainment reductions using the technologies on which this final rule is based as they can using cooling towers, but at substantially lower cost.

4. Impingement Mortality and Entrainment Controls Everywhere

At proposal, EPA evaluated an option that required impingement mortality and entrainment controls for all facilities. This option did not allow for the development of best technology available on a site-specific basis. This alternative based requirements on the percent of source water withdrawn and, like today's final rule, also restricted disruption of the natural thermal stratification of lakes or reservoirs. It also imposed entrainment performance requirements on Phase II existing facilities located on freshwater rivers or streams, and lakes or reservoirs where EPA has determined in today's final rule that such controls are not necessary. Finally, under this alternative, restoration could be used, but only as a supplement to the use of design and construction technologies or operational measures.

This option established clear performance-based requirements that were based on the use of available technologies to reduce adverse environmental impact. Such an alternative would be consistent with the focus on use of best technology required under section 316(b). However, as indicated above, this option lacks the flexibility of the final rule in applying the necessary and appropriate available technology and therefore would be less effective in addressing the specific cooling water intake structure impacts posed by Phase II facilities in their various environmental settings.

At proposal, total social cost of compliance for this option was estimated at approximately $300 million per year. EPA did not select this option because other options were more cost-effective, in part because this option requires entrainment controls in freshwater rivers, streams, and lakes. The benefits of the final rule are almost the same as those for this option but a lower cost (since lakes and reservoirs, and for design intake flows below 5% in freshwater rivers and streams are the least likely to provide significant benefits).

5. Site-Specific Options as Best Technology Available To Minimize Adverse Environmental Impact

In the proposed rule EPA also considered several site-specific approaches to establishing best technology available. These include the site-specific sample rule discussed at 67 FR 17159, an alternative based on EPA's 1977 Draft Guidance (67 FR 17161), and alternatives suggested by UWAG and PSEG, respectively (*see* 67 FR 17162).

EPA did not adopt any of these site-specific regulatory options for several reasons. None of these site-specific approaches would have established national performance standards for best technology available to minimize adverse environmental impact. EPA believes that such national performance standards promote the consistent application of the best technology available to minimize adverse environmental impact. In addition, based on contact with States (*see* Phase I NODA, 66 FR 28865, Phase II proposal 67 FR 17152–3) and anecdotal

[47] Not sample-weighted.

[48] Not sample-weighted.

information[49] EPA believes that each of these site-specific options would have resulted in higher administrative burdens being imposed on applicants and permit writers relative to the final rule. As EPA has discussed in the preamble to the proposal (*see* 67 FR 17167), these administrative burdens can be associated with the need to determine in each case whether adverse impacts are occurring, the nature and level of any such impacts, and which design and construction technologies constitute the best technology available to minimize adverse environmental impacts, including a consideration of costs and benefits. Further, all of the proposed site-specific options increase the likelihood that each significant cooling water intake permitting issue would become a point of contention between the applicant and permit writer, which EPA's experience indicates slows the permitting process, makes it more resource intensive, and makes it more costly. Finally, because the final rule provides facilities with the option of selecting from five compliance alternatives, including a site-specific compliance alternative, the final rule provides facilities with flexibility comparable to that of a site-specific rule. The site-specific alternative in the final rule provides clear standards for eligibility (the cost-cost and cost-benefit tests), and clear standards on which to base the alternative requirements that they achieve an efficacy as close as practicable to the national performance standards without exceeding the cost-test or benefits-test thresholds. EPA believes that structuring a site-specific compliance alternative in this way will significantly reduce the potential areas of disagreement between permit writer and applicant that are inherent in the other site-specific approaches that it rejected, while still providing facilities with appropriate flexibility. Through the multiple compliance alternatives specified in this rule, EPA has sought to balance the statutory requirements of section 316(b) and the need for reasonable limits on the administrative burden imposed on both applicants and permit writers against the need for existing facilities to have flexibility in implementing the requirements.

6. Flow Reduction Commensurate With the Level Achieved by Dry Cooling Systems Based on Waterbody Type

EPA conducted a full analysis for the Phase I rule and concluded that dry cooling was not an economically practicable option for new facilities on a national basis. Dry cooling systems use either a natural or a mechanical air draft to transfer heat from condenser tubes to air. In conventional closed-cycle recirculating wet cooling towers, cooling water that has been used to cool the condensers is pumped to the top of a recirculating cooling tower; as the heated water falls, it cools through an evaporative process and warm, moist air rises out of the tower, often creating a vapor plume. Hybrid wet-dry cooling towers employ both a wet section and dry section and reduce or eliminate the visible plumes associated with wet cooling towers.

For the Phase I rule, EPA evaluated zero or nearly zero intake flow regulatory alternatives, based on the use of dry cooling systems. EPA determined that the annual compliance cost to industry for this option would be at least $490 million. EPA based the costs on 121 new facilities having to install dry cooling. For the Phase II proposal, EPA estimated that total social costs for dry cooling based on waterbody type were $2.1 billion per year (or roughly double the costs for wet towers). Thus, this option would be more expensive than dry cooling for new facilities. The cost for Phase II existing facilities to install dry cooling would be significantly higher than the cost for new facilities to do so due to the complexities of retrofitting both the dry cooling equipment and components of the cooling system. At proposal, EPA estimated that 550 Phase II existing facilities would be subject to Phase II regulation. The cost would be significantly higher because existing facilities have less flexibility, thus incurring higher compliance costs (capital and operating) than new facilities. For example, existing facilities might need to upgrade or modify existing turbines, condensers, and/or cooling water conduit systems, which typically imposes greater costs than use of the same technology at a new facility. In addition, retrofitting a dry cooling tower at an existing facility would require shutdown periods during which the facility would lose both production and revenues, and decrease the thermal efficiency of an electric generating facility.

The disparity in costs and operating efficiency of dry cooling systems compared with wet cooling systems is considerable when viewed on a nationwide or regional basis. For example, under a uniform national requirement based on dry cooling, facilities in the southern regions of the United States would be at an unfair competitive disadvantage compared to those in cooler northern climates because dry cooling systems operate more efficiently in colder climates. Even under a regional subcategorization strategy for facilities in cool climatic regions of the United States, adoption of a minimum requirement based on dry cooling would likely impose unfair competitive restrictions for steam electric power generating facilities because of the elevated capital and operating costs associated with dry cooling. Adoption of requirements based on dry cooling for a subcategory of facilities under a particular capacity would pose similar competitive disadvantages for those facilities.

As explained in the preamble to the proposal, EPA does not consider performance standards based on dry cooling a reasonable option for a national requirement, nor for subcategorization under this rule, because the technology of dry cooling carries costs that would potentially cause significant closures for Phase II existing facilities. Dry cooling technology would also have a significant detrimental effect on electricity production by reducing the energy efficiency of steam turbines. Unlike a new facility that can use direct dry cooling, an existing facility that retrofits for dry cooling would most likely use indirect dry cooling which is much less efficient than direct dry cooling. In contrast to direct dry cooling, indirect dry cooling does not operate as an air-cooled condenser. In other words, the steam is not condensed within the structure of the dry cooling tower, but instead indirectly through a heat exchanger. Therefore, the indirect dry cooling system would need to overcome additional heat resistance in the shell of the condenser compared to the direct dry cooling system. Ultimately, the inefficiency (*i.e.*, energy penalty) of indirect dry cooling systems will exceed those of direct dry cooling systems in all cases.

Although the dry cooling option is extremely effective at reducing impingement and entrainment, it is not economically practicable for existing facilities and would cause additional adverse environmental impacts and serious energy impacts. Although dry cooling technology uses extremely low-

[49] For example, a site-specific determination for Brayton Point, Rhode Island, has required resources for greater than two full time equivalents (FTEs) over three years for permitting and support staff, as well as approximately $400,000 in contractor costs to address technical issues and applicant experts. Similarly, development of a permit for Salem has required resources for greater than two full time equivalents (FTEs) over three years for permitting and support staff, as well as approximately $340,000 in contractor costs to address technical issues and applicant experts.

level or no cooling water intake, thereby reducing impingement and entrainment of organisms to extremely low levels, section 316(b) does not require that adverse environmental impact be completely eliminated, but that it be minimized using the best technology available. (DOE energy penalty study; DCN 4–2512). EPA does not believe that dry cooling technology is "available" to most Phase II existing facilities.

Although EPA has rejected dry and wet cooling tower technologies as a national minimum requirement, EPA does not intend to restrict the use of these technologies or to dispute that they may be the appropriate cooling technology for some facilities. For example, facilities that are repowering and replacing the entire infrastructure of the facility may find that dry cooling is an acceptable technology in some cases. This technology may be especially appropriate in situations where access to cooling water is limited. Wet cooling tower technology may be suitable where adverse effects of cooling water intakes are severe and where screening systems are impractical, or where thermal discharge impacts pose serious environmental problems. Under Clean Water Act section 510, a State may choose to impose more stringent standards than required by Federal regulations. States may continue to use this authority to require facilities to use dry or wet cooling systems.

F. What Is the Role of Restoration and Trading Under Today's Final Rule?

1. What Is the Role of Restoration?

EPA is providing facilities with the option to use restoration for compliance alternatives § 125.94(a)(2), (3), and (5) where the performance of the restoration measures (the production and increase of fish and shellfish in the facility's waterbody or watershed, including maintenance of community structure and function), is substantially similar to that which would have been achieved if the facility reduced impingement mortality and entrainment through the use of design and construction technologies and/or operational measures, to meet the applicable performance standards. (For a complete discussion of the legal analysis supporting restoration, see section VIII of this preamble.) The role of restoration under this rule is to provide additional flexibility to facilities in complying with the rule by eliminating or significantly offsetting the adverse environmental impact caused by the operation of a cooling water intake structure. Restoration measures that increase fish and shellfish in an impacted waterbody or watershed and result in performance substantially similar to that which would otherwise be achieved through reductions in impingement mortality and entrainment further the goal of minimizing adverse environmental impact while offering additional flexibility to both permitting authorities and facilities. Restoration measures may include such activities as removal of barriers to fish migration, reclamation of degraded aquatic organism habitat, or stocking of aquatic organisms. These are still technologies, within the meaning of that term as used in section 316(b) and as such are an appropriate means for meeting technology based performance standards. They are not analogous to water quality based effluent limitations on pollutant discharges because they are not designed to meet water quality standards or dependent on the condition of the receiving waterbody. Rather, they provide an additional means to meet the same performance standards that guide the selection of design and construction technologies and operational measures.

Restoration measures have been used at existing facilities as one of many tools to implement section 316(b) on a case-by-case, best professional judgment basis to compensate for the death and injury of fish and other aquatic organisms caused by the cooling water intake structure. Under today's rule, a Phase II existing facility may utilize restoration either in lieu of or as a supplement to design and construction technologies and/or operational measures. For example, a facility may demonstrate to the Director that velocity controls are the most feasible technology choice for the facility but that, when used on their own, the velocity controls are insufficient to meet the applicable performance standards at § 125.94(b). The facility may then, in conjunction with the use of velocity controls, implement restoration measures to increase the fish and shellfish productivity of the waterbody in order to meet the performance standards at § 125.94(b). Another facility might demonstrate to the Director that restoration measures alone achieve the greatest compliance with the performance standards. A facility may alternatively request a site-specific determination of best technology available under § 125.94(a)(5) and use restoration measures to meet the alternate requirements.

Facilities that propose to use restoration measures must demonstrate to the Director that they evaluated the use of design and construction technologies and operational measures and determined that the use of restoration measures is appropriate because meeting the applicable performance standards or requirements through the use of other technologies is less feasible, less cost-effective, or less environmentally desirable than meeting the standards in whole or in part through the use of restoration measures. Facilities must also demonstrate that the restoration measures they plan to implement, alone, or in combination with design and construction technologies and/or operational measures, will produce ecological benefits (production of fish and shellfish) at a level that is substantially similar to the level that would be achieved through compliance with the applicable impingement mortality and/or entrainment performance standards under § 125.94(b), or alternative site-specific requirements under § 125.94(a)(5). *In other words*, restoration measures must replace the fish and shellfish lost to impingement mortality and entrainment, either as a substitute or as a supplement to reducing impingement mortality and entrainment through design and control technologies and/or operational measures. While the species makeup of the replacement fish and shellfish may not be exactly the same as that of the impingement mortality and entrainment losses, the Director must make a determination that the net effect is to produce a level of fish and shellfish in the waterbody that is "substantially similar" to that which would result from meeting the performance standards through design and construction technologies and/or operational measures alone. The final rule requires that a facility use an adaptive management method for implementing restoration measures because the performance of restoration projects must be regularly monitored and potentially adjusted to ensure the projects achieve their objectives (see 67 FR 17146–17148 and 68 FR 13542).

The final rule also requires that restoration projects which replace the lost fish and shellfish with a different species mix ("out of kind" restoration) be based on a watershed approach to restoration planning. The boundaries of a "watershed" should be guided by the cataloging unit of the "Hydrologic Unit Map of the United States" (USGS, 1980), although it may be appropriate to use another watershed or waterbody classification system developed at the state or local level if such a system compares favorably in level of detail. For example, in coastal systems that support migratory fish, a coastal waterbody that transects a number of watersheds may be the most appropriate unit for planning restoration.

2. What Is the Role of Trading in Today's Rule?

In § 125.90(c), today's final rule provides that if a State demonstrates to the Administrator that it has adopted alternative regulatory requirements in its NPDES program that will result in environmental performance within a watershed that is comparable to the reductions of impingement mortality and entrainment that would otherwise be achieved under § 125.94, the Administrator must approve such alternative requirements. A trading program could be a part of these alternative regulatory requirements.

At proposal, EPA sought comment on the potential role of trading in the context of the section 316(b) Phase II rulemaking and possible approaches for developing a trading program. Trading under other EPA programs has been shown to provide opportunities for regulatory compliance at reduced costs. The EPA Office of Water's Water Quality Trading Policy, published in January 2003 [DCN 6–5002], fully supports trading nutrients and sediment and adopts a case-by case approach to evaluating proposals to trade other pollutants.

Trading in the context of section 316(b) raises many complex issues, for example, how to establish appropriate units of trade and how to measure these units effectively given the dynamic nature of the populations of aquatic organisms subject to impingement mortality and entrainment. Should a State choose to propose a trading program under § 125.90(c), EPA will evaluate the State's proposal on a case-by-case basis to ensure the program complies with the regulatory requirement—that it will result in environmental performance within a watershed that is comparable to the reductions of impingement mortality and entrainment that would otherwise be achieved under the requirements established at § 125.94. Some commenters suggested that EPA adopt a trading program that would allow trading between aquatic organisms and pollutant discharges. EPA is concerned that such a program would introduce comparability and implementation challenges that would be difficult to overcome and therefore, EPA does not expect that such a program would work within the framework of today's final rule. In addition, EPA does not believe that it is possible at this time to quantify with adequate certainty the potential effects on ecosystem function, community structure, biodiversity, and genetic diversity of such trades, especially when threatened and/or endangered species are present. Based on the current state of the science in aquatic community ecology and ecological risk assessment, States wishing to develop trading programs within the context of 316(b) would be best off focusing on programs based on metrics of comparability between fish and shellfish gains and losses among trading facilities, rather than the much more complex metrics that would be necessary for comparability among fish and shellfish losses on the one hand, and pollutant reductions on the other.

VIII. Summary of Major Comments and Responses to the Proposed Rule and Notice of Data Availability (NODA)

A. Scope and Applicability

1. Phase II Existing Facility Definition

Numerous commenters supported limiting the scope of the Phase II rule to existing facilities that generate and transmit electric power, or generate and sell such power to another entity for transmission, but suggested that EPA has not sufficiently limited the rule to only these facilities. Commenters noted that the proposed definition of "Phase II existing facility" does not adequately exempt existing manufacturing facilities that may occasionally transfer power off-site during peak load events. Some commenters suggested that EPA clarify the Phase II rule to specify that it does not apply to facilities whose primary business is not power generation. Some suggested limiting applicability to specified SIC codes (*e.g.*, provided that the rule only applies to facilities in SIC 4911). Examples of facilities identified by commenters that they believe should be excluded from Phase II include manufacturers that produce electricity by co-generation, power generating units that predominantly support a manufacturer, *e.g.*, iron and steel, but also export some power, and facilities that generate power for internal use.

Commenters requested that EPA further clarify when repowering is subject to existing facility requirements. For example, some commenters viewed as inconsistent the fact that the addition of a generating unit at an existing single unit site could increase intake flows by 100% and meet the existing facility definition, while a replacement facility that increases intake flows by a much lesser amount (*e.g.*, 25%) would not meet the existing facility definition. These commenters suggested that EPA consider a facility as an existing facility unless changes to the facility result in new environmental impacts.

In § 125.91(a)(3) of today's rule, an existing facility is subject to this rule if its primary activity is either to generate and transmit electric power, or to generate electric power that it sells to another entity for transmission. This provision was included in the rule in response to comments such as those described previously in this section. EPA believes that this criterion—the primary activity being the generation of electric power—sufficiently clarifies and limits the scope of this rule to existing facilities whose primary business is power generation. As discussed in Section II of this preamble, the final rule does not apply to existing manufacturing facilities, including manufacturing facilities that generate power for their own use and transmit any surplus power, or sell it for transmission, provided the primary activity of the facility is not electric power generation. For example, in the case of a facility that operates its own power generating units and such units predominantly support that facility's manufacturing operation, its primary activity remains manufacturing, even if the facility exports some power. Whether a facility's primary activity is to generate electric power will need to be determined on a case-by-case basis. Section II also makes clear that a manufacturing facility is not covered by this final rule just because it is co-located with another Phase II facility.

EPA considered specifying SIC or NAIC codes to clarify the scope of the rule beyond that proposed in § 125.91(a)(3), but did not do so because it believes the changes in the final rule are sufficient to address many issues raised in comments and because of concerns that SIC and NAIC codes may change over time, which could unintentionally alter the scope of the rule.

With regard to repowering, section II of today's notice discusses the scope of the final rule and specifically discusses the repowering issue. Section II also addresses other Phase I versus Phase II classification issues.

2. Thresholds

Some commenters supported use of the 50 MGD design intake flow threshold and the 25 percent cooling water use criteria in § 125.91(a)(2) and (4), respectively. Some suggested that facilities agreeing to limit their actual intake to less than 50 MGD should be excluded from the rule's requirements or be allowed to request an exemption. Other commenters maintained that permitted or actual flows should be used rather than design flows. Some commenters asked that EPA clarify that, when applicable, the lesser design value of an intake facility and conveyance structure versus the design volume of intake pumps should be used to determine the 50 MGD threshold for applicability. Alternatively, others asserted that EPA should provide guidance that a facility's design intake flow is not necessarily the flow associated with that of the intake pumps.

Several commenters stated that emergency cooling water and emergency service water intakes should be exempt from the 50 MGD design intake flow threshold. These commenters recommended that EPA distinguish between primary cooling water intakes and emergency service water intakes, for example, at nuclear facilities. They reasoned that emergency service water systems, which can have a large design capacity (*i.e.*, design capacity greater than 50 MGD), generally use an intake that normally operates a nominal amount of time to ensure that the system is in working order. Such back-up systems are required for safety, but under normal conditions do not increase the operational capacity of the facility. Thus, these commenters maintain that rarely used emergency service water should not count towards 50 MGD.

With regard to the criterion that a Phase II existing facility must use at least 25 percent of the water it withdraws exclusively for cooling, some commenters indicated that proposed § 125.91(d), which describes how to measure whether 25 percent of water withdrawn is used for cooling, was ambiguous. Commenters asserted that EPA should not require monthly determinations of applicability of the Phase II rule. One commenter suggested that EPA should assess the 25 percent cooling water use on an annual basis calculated once during permit renewal, since such an approach would provide a high degree of certainty.

As discussed in the proposed rule (67 FR 17129–17130), EPA chose the design intake flow 50 MGD threshold to focus on the largest existing power generating facilities, which the Agency believes are those with the greatest potential to cause or contribute to adverse environmental impact. EPA estimates that the 50 MGD threshold would subject approximately 543 of 902 (60 percent) of existing power generating facilities to this rule and would address 90 percent of the total flow withdrawn by existing steam electric power generating facilities. The 25 percent threshold ensures that nearly all cooling water and the most significant facilities using cooling water intake structures are addressed by these requirements. EPA notes that Phase II existing facilities, which are limited to facilities whose primary activity is power generation, typically use far more than 25 percent of the water they withdraw for cooling. Yet, as in the new facility rule, cooling water that is used in a manufacturing process either before or after it is used for cooling would not count towards calculating the percentage of a facility's intake flow that is used for cooling purposes.

EPA has retained in the final rule the 50 MGD threshold based on design intake flow, rather than actual flow, for several reasons. Design intake flow is a fixed value based on the design of the facility's operating system and the capacity of the circulating and other water intake pumps employed at the facility. This approach provides clarity—the design intake flow does not change, except in those limited circumstances when a facility undergoes major modifications or expansion, whereas actual flows can vary significantly over sometimes short periods of time. EPA believes that an uncertain regulatory status is undesirable because it impedes both compliance by the permittee and regulatory oversight, as well as achievement of the overall environmental objectives. Further, using actual flow may result in the NPDES permit being more intrusive to facility operation than necessary since facility flow would be a permit condition and adjustments to flow would have to be permissible under such conditions and applicable NPDES procedures. It also would require additional monitoring to confirm a facility's status, which imposes additional costs and information collection burdens, and it would require additional compliance monitoring and inspection methods and evaluation criteria, focusing on operational aspects of a facility.

With regard to intake versus pump capacity, EPA notes that under § 125.93 of the final rule, design intake flow means the value assigned (during the cooling water intake structure design) to the total volume of water withdrawn from a source waterbody over a specific time period. Because numerous aspects of a cooling water intake or system can limit a facility's intake flow, and because flow is a critical factor that affects the impacts posed by each facility's cooling water intake structures, EPA has determined that it is more appropriate for the final rule to focus on a facility's total designed volume of water withdrawn over a period of time, rather than to condition applicability of the rule on more specific parameters, such as intake capacity or pump design, which individually do not fully determine total design intake flow.

The final rule does not explicitly exclude emergency cooling water and emergency service water intakes from consideration in determining which facilities are in-scope. Although EPA does not have detailed data on emergency cooling water and emergency intakes, based on other available data EPA does not believe that including consideration of emergency intakes within this rule significantly alters the scope of the rule. EPA's survey of all existing electric utilities and non-utilities indicated that 84 percent of surveyed facilities have an average flow that equals or exceeds 50 MGD. These facilities would by necessity have a design intake flow that also equals or exceeds 50 MGD. Moreover, EPA assumes that this average flow data represent normal operating conditions and does not include emergency cooling water use. Consequently, EPA believes that relatively few facilities are potentially affected by this issue.

Finally, § 125.91(a)(4), which describes how a facility must determine whether it meets the 25 percent cooling water use criterion has been changed in the final rule and provides that the percent of cooling water used be measured on an average annual basis. EPA believes this approach is more appropriate than making this determination on an average monthly basis, primarily because the annual average is an easier measurement to make. Furthermore, because all Phase II existing facilities generate power, most of the water will be used for cooling, rendering monthly evaluation of this value unnecessary. The final rule does not specify how often the facility must measure flow for this annual average. The facility is encouraged to consult the Permit Director to determine what level of data collection is needed.

B. Environmental Impact Associated With Cooling Water Intake Structures

Many comments addressed adverse environmental impact, questioning the definition and quantification of adverse environmental impacts. Several suggested defining adverse environmental impact exclusively at the population, community, or ecosystem levels, and believe that numbers of impinged and entrained organisms should not be a measure of adverse environmental impact. Some commenters argued that, if a facility can prove it does not cause adverse environmental impact at the population level, then it should be exempt from section 316(b) regulations. Commenters cited numerous studies to illustrate whether cooling water intake structures cause adverse environmental impacts and claimed that where abundance or biomass falls, it was usually the result of some other stressor (overfishing, pollution, etc). These commenters asserted that populations are able to thrive despite high rates of impingement and entrainment because of density-dependence and compensation.

Numerous other commenters disagreed with limiting the definition of adverse environmental impact to the population, community or ecosystem levels, and contended that any measure of impingement and entrainment constitutes adverse environmental impact. They asserted that power plants contribute to fish kills directly by impingement and entrainment, and indirectly by habitat loss. These commenters maintained that the results of population or ecosystem studies are highly subjective, and have no place in determining BTA, as once such impact levels are reached, recovery is often impossible. Regardless of the severity of adverse environmental impact, these commenters argued that section 316(b) requires minimization of adverse environmental impact. They maintained that cooling water intake structures contribute to fishery collapse and vast reductions in fish biomass and abundance that are measurable at the species level. These commenters suggested that actual national impacts due to cooling water intake structures are vastly underestimated due to poor data collection methodologies utilized when the majority of the studies were performed and because studies performed on impinged and entrained organisms overlooked the vast majority of affected species.

In today's final rule, EPA has elected not to define adverse environmental impact. EPA believes that it is reasonable to interpret adverse environmental impact as the loss of aquatic organisms due to impingement and entrainment. For a further discussion of this issue, see Section IV above.

With regard to the relationship between intake flow and adverse environmental impact, some commenters asserted that the relationship of impingement and entrainment to flow is such that catch rates increase non-linearly (exponentially) in relation to the volume of water withdrawn, with entrainment rates being more strongly correlated to flow than impingement. Environmental commenters advocated for flow reduction technologies, such as retrofitting closed-cycle cooling technologies, as the most direct means of reducing fish kills from power plant intakes; they assert that reducing intake by up to 98 to 99 percent would result in a similarly high reduction of impinged and entrained organisms. Other commenters insisted that there is no statistically significant relationship between catch rate and flow, and the mathematical models that evaluate this relationship are inaccurate.

EPA believes the record contains ample evidence to support the proposition that entrainment is related to flow (see DCN 2–013L–R15 and 2–013J) while impingement is related to a combination of flow, intake velocity and fish swim speed (see DCN 2–029). Larger withdrawals of water may result in commensurately greater levels of entrainment. Entrainment impacts of cooling water intake structures are closely linked to the amount of water passing through the intake structure because the eggs and larvae of some aquatic species are free-floating and may be drawn with the flow of cooling water into an intake structure. Swim speeds of affected species as well as intake velocity must be taken into account to predict rates of impingement in relation to flow in order to account for the ability of juvenile and adult lifestages of species to avoid impingement. Due to this relationship, EPA agrees that reducing intake by installing flow reduction technologies will result in a similarly high reduction of impinged and entrained organisms, but EPA believes that other technologies that do not necessarily reduce flow but that do reduce the number of aquatic organisms impinged and entrained will also minimize adverse environmental impact associated with cooling water intake structures. As such, today's rule provides for flexibility in meeting the performance standards.

C. Performance Standards

The performance standards promulgated today are expressed as reductions of impingement and entrainment measured against a calculation baseline. The purpose of a calculation baseline is to properly credit facilities that have installed control technologies prior to the promulgation of the rule. EPA received numerous comments on the performance standards and the calculation baseline.

1. Appropriate Standards

Many commenters discussed the appropriateness of the performance standards. While many commenters acknowledged that the performance range may be attained at some facilities (using certain technologies and in appropriate conditions), several commenters stated that the technical justification for the performance standards was insufficient and may be biased towards higher performing examples of each technology. Many commenters submitted that some technologies will perform at some sites, but that no technology will meet the standards at all sites. Another commenter supported the concept of the performance standards, as long as sufficient flexibility was retained through the use of restoration measures and cost tests. Some commenters suggested allowing permit writers the flexibility to create site-specific performance standards.

EPA has selected performance standards to facilitate a more streamlined permitting process, and to provide consistent national standards. EPA has chosen to express the targets by reference to a percentage reduction in impingement and entrainment because, as discussed above, these losses can easily be traced to cooling water intake structures. Therefore, this is a convenient indicator of the efficacy of controls in reducing environmental impact. As discussed in more detail below, it is also a useful basis against which to consider the efficacy of restoration technologies, which focus on the replacement of fish and shellfish as an alternative means of minimizing adverse environmental impact of intake structures.

Additional documentation has been collected and reviewed by EPA to further support the percent reductions contained in the performance standards. EPA has added this information to the Technology Efficacy database (DCN 6–5000), which EPA has expanded to allow users to query and compare basic data on technology performance and applicability. EPA recognizes that some may disagree with basing the performance standards on the wide range of data available in the database. While many documents do show a level of success in reducing impingement mortality or entrainment, other studies have shown the deployed technology to be unsuccessful or at best inconclusive. EPA does not view the varying degrees of success with regards to a specific technology as indicative that the performance standards cannot be met, but rather as evidence that some technologies work in some applications but not in others.

It is for this reason that performance standards, rather than prescriptive technologies, were chosen. By opting for performance standards instead of requiring the deployment of specified technologies, EPA maintains a desired flexibility in the implementation of the rule, thus allowing a facility to select measures that are appropriate to the site conditions and facility configuration. EPA believes that there are technologies available (including restoration measures) that can be used to meet the performance standards at the majority of facilities subject to the final Phase II rule. EPA believes that it will likely be the exceptional case where no technology or suite of technologies will be able to achieve the performance standards. This is not to say, however, that the technologies are always economically practicable to implement; there may be situations where the costs are not justified and it is for those situations that EPA has provided for site-specific determinations of best available technology for minimizing adverse environmental impact.

2. Application of the Performance Standards

Commenters generally noted that the application of the performance standards would be very difficult, for a number of site-specific reasons. Several commenters noted that the performance standards are not sufficiently defined to make a full evaluation of their applicability. For example, EPA has not defined the performance standards as being measured using all species or selected species, or by counting individuals versus measuring biomass. Some commenters noted that each of the methods discussed by EPA could have merit at a given facility, and that flexibility would be needed to evaluate compliance at a variety of intake configurations. Another commenter further noted that it is inappropriate for EPA to state that the performance standards are achievable when the standards are undefined. One commenter suggested that EPA has not shown that the performance standards can be met at a reasonable cost. Other commenters stated that reductions may be achievable for only some species of life stages and that this approach may not account for natural fluctuations in population. These commenters claim that implementing a uniform, nationwide performance standard would be exceedingly complex and subject to site-specific factors that could significantly affect the performance of the control technology. Several commenters noted that, for these reasons, EPA should strongly consider a site-specific approach to implement 316(b), including a risk assessment-based approach as suggested by one commenter.

A number of commenters stated that the performance standards would be best implemented as a set of goals or as a best management practice. These commenters contended that in view of the wide variety of environmental conditions at facilities, including natural fluctuations in populations, compliance with a national performance standard will be difficult. They claimed that by using the standards as a goal instead of a condition in the permit, a facility can have greater certainty as to its compliance status. Similarly, several commenters suggested that the permit contain conditions requiring proper technology selection, installation, maintenance, and adjustments instead of requiring compliance with the performance standards.

Commenters were divided over the concept of a range for the performance standards. Some commenters supported the range, arguing that a facility can achieve some reduction within the range and still be compliant, and others were opposed, claiming that a range of performance promotes uncertainty in determining compliance. Some commenters also noted that, by giving a facility a range of performance, EPA is encouraging performance in the lower end of the range and therefore not meeting the definition of "best technology available."

Several commenters noted that consideration of entrainment mortality is important to correctly determine compliance. One commenter also noted that natural events will affect compliance, such as moribund fish being swept into an intake or heavy debris loads following a storm.

As in the Phase I rule, EPA is setting performance standards for minimizing adverse environmental impact based on a conceptually simple and certain metric-reduction of impingement mortality and entrainment. EPA recognizes however, that there are challenges associated with measuring such reduction due to fluctuations in waterbody conditions (species abundance, composition, etc.) over time. While it is relatively straightforward to measure impingement mortality and entrainment reductions relative to past levels, it is more difficult to determine reductions relative to what would have occurred in the absence of control technologies if waterbody conditions change after the technologies are installed. Data provided with the proposed rule (DCN 4–0003) indicate that there is substantial variability over time in the numbers and species mix of impinged and entrained organisms at any given facility. While changes in operational practices and sampling methods account for some of this variability, the data indicate that there may be substantial natural variability in waterbody conditions as well. This natural variability and the changes to species composition over time may affect the ability of these technologies to perform consistently at a certain level. This is one reason why EPA has provided a compliance determination alternative under which facilities comply with the construction, operational, maintenance, monitoring, and adaptive management requirements of a Technology Installation and Operation Plan (or Restoration Plan) designed to meet the performance standards, rather than having to demonstrate quantitatively that they are consistently meeting them, which may be difficult in the face of natural variability. Under this approach, if monitoring data suggest that performance standards are not being met despite full compliance with the terms of the Technology Installation and Operations Plan or the Restoration Plan, the Plan will need to be adjusted to improve performance.

EPA has provided examples of facilities in different areas of the country sited on different waterbody types that are currently meeting or exceeding the performance standards promulgated today. The ability of these facilities to attain similar performance standards suggests that while site-specific factors can influence the performance of a given technology, it is the exceptional situation where no design or construction technology is capable of meeting the performance standards. EPA opted for performance ranges instead of specific compliance thresholds to allow both the permittee and the permitting authority a certain degree of flexibility in meeting the obligations under the final Phase II rule. EPA does not believe that performance ranges promote uncertainty. Instead, EPA has selected performance ranges out of the recognition that precise results may not be able to be replicated in different waterbody types in different areas of the country. EPA disagrees with the comment that it has not shown that the performance standards can be met at a reasonable cost. The cost and economic impact analysis for the final rule supports EPA's determination that the final rule, including the performance standards, are economically practicable at a national level. In addition, the final rule includes a site-specific compliance alternative to address any potential situation where meeting the performance standards, when evaluated on a facility-specific basis, would result in costs that are significantly greater than the costs considered by EPA. for a like facility in establishing the standards, or that are significantly greater than the benefits of compliance with the applicable performance standards at the facility. Thus, the final rule ensures that the costs of the rule are economically practicable to the extent required by section 316(b).

In developing the final rule, EPA identified and examined a broad range of cooling water intake structure technologies and determined, at a national level, that these technologies support the final performance standards. EPA notes that, although the performance standards address all life stages of fish and shellfish, the Director has significant discretion as to how the performance standards are applied in the permit. For example, the Director may determine that all species must be considered or that only representative species are to be considered. With regard to natural fluctuations in fish and shellfish populations, and the Technology Installation and Operation Plan compliance scheme discussed above addresses the concern that natural fluctuations could impact the level of impingement mortality and entrainment at a given facility over time. Further, the Director is given considerable discretion to determine, based on the facility's Comprehensive Demonstration Study, the appropriate averaging period and precise metric for determining impingement mortality and entrainment reductions. Generally, averaging over longer time periods (*i.e.*, a full five year permit term) can substantially reduce the impact of natural variability on the determination of whether the performance standards are being met.

3. Requirements by Waterbody Type

As stated in section C. 2, different performance standards would apply for facilities located upon different waterbody types. Comments were received both in support of and against basing performance standards in part on waterbody type. Some commenters did not support the withdrawal threshold of 5 percent of the mean annual flow for facilities on freshwater rivers, as the organisms at an intake may not be subject to entrainment or may not be evenly distributed. Some State commenters supported the withdrawal threshold for freshwater rivers, and another suggested correlating the intake flow requirements with the total flow of the waterbody to better protect smaller flow rivers. One State commenter generally opposed all of the proposed thresholds on freshwater rivers as being arbitrary and stated that the regulations would be more effective by considering the impacts to the population within the waterbody. For lakes and reservoirs, one commenter opposed the requirement to not disturb the thermal stratification of the waterbody, stating that the requirement has not been defined in sufficient detail, that EPA has presented no evidence that the disruption is always detrimental, or presented any discussion of technologies that might mitigate any thermal disturbances. Some commenters did not support additional controls on the Great Lakes, stating that the Lakes are not unique and do not require greater protection. Another State commenter suggested that additional requirements be implemented for any impaired waterbody.

EPA considers location to be an important factor in addressing adverse environmental impact and one expressly included in the language of section 316(b). When cooling water is withdrawn from sensitive biological areas, there is a heightened potential for adverse environmental impact, since these areas typically have higher concentrations of impingeable and entrainable aquatic organisms. Therefore, the final rule includes performance standards that vary, in part, by waterbody type. For example, estuaries and tidal rivers have a higher potential for adverse impact because they contain essential habitat and nursery areas for a majority of commercial and recreational species of fish and shellfish. Therefore, EPA believes that these areas warrant a higher level of control that includes both impingement and entrainment controls.

EPA also included performance standards for other waterbody types. Facilities withdrawing greater than 5% of the mean annual flow from freshwater rivers and streams will have additional requirements. As described in the Phase I proposed rule (65 FR 49060) and the Phase II NODA (66 FR 28853), the withdrawal threshold is based on the concept that absent any other controls, withdrawal of a unit volume of water from a waterbody will result in the entrainment of an equivalent unit of aquatic life (such as eggs and larval organisms) suspended in that volume of the water column. Thus, facilities withdrawing greater than 5% of the mean annual flow from freshwater rivers and streams may entrain equal proportions of aquatic organisms. Freshwater rivers and streams are somewhat less susceptible to entrainment than certain other categories of waterbodies and, therefore, the final rule limits the requirement for entrainment control in fresh waters to those facilities that withdraw the largest proportion of water from freshwater rivers or streams. EPA has promulgated special requirements for facilities withdrawing from lakes and reservoirs. Facilities tend to withdraw from the deeper portions of lakes and reservoirs, as these areas hold the coolest water. The rule specifies that the intake flows must not disturb the natural stratification (thermoclines) in the waterbody, as this may disrupt the composition of dissolved oxygen and adversely affect aquatic species. While such disruption is often detrimental, this additional performance standard does not apply where the disruption does not adversely affect the management of fisheries. Intake location, the volume of water withdrawn, and other design technologies can be used to address this requirement. Facilities located on the Great Lakes are also subject to additional requirements because these waterbodies have areas of high productivity and sensitive habitat and in this respect have an ecological significance akin to estuaries.

4. Approved Design and Construction Technology Option

In response to comments on the burden to facilities and permit writers, EPA is including in the final rule an approved design and construction technology option (previously referred to as a "streamlined technology option" or "pre-approved technology option") for facilities in certain locations. Under this option, a facility installing a specified technology would be subject to reduced application requirements, including a reduced Comprehensive Demonstration Study. In addition, the final rule sets forth criteria that State Directors may use to identify and approve additional technologies.

Nearly all commenters supported the concept of an approved design and construction technology option as a positive step in facilitating implementation of section 316(b). Several commenters added that this option should not preclude the use of cost tests, restoration measures or the use of other approaches. One commenter opposed the approved design and construction technology option, arguing that the selection of only one or two technologies oversimplifies the complexity of waterbodies, and that the approach would not be sufficiently protective.

Some commenters agreed that the wedgewire screen should be an effective technology in certain situations and noted that EPA should specify screen slot openings in the approved design and construction technology option. One of the commenters stated that research on the wedgewire screen suggests that the technology should easily meet the impingement requirements, but that further research may be necessary to confirm the effectiveness for entrainment reductions with varying slot openings.

Some commenters offered suggestions for additional changes to the option, such as developing scientifically sound, peer-reviewed criteria for evaluating pre-approved technologies, identifying the technologies in technical guidance documents as opposed to the regulation, and continuing to allow restoration measures. Some commenters also suggested specifying that any monitoring performed would be informational in nature and not affect the facility's compliance status, or that facilities only be required to "substantially meet" the stated goals. Other commenters suggested expanding the scope of the approved design and construction technology option to include prescribed operational or restoration measures or preapproved technologies for intakes located on man-made cooling reservoirs.

A facility that chooses to comply under the pre-approved technology option should not, in addition, need to employ restoration measures. The intent of the pre-approved technology compliance alternative is to provide a means to reduce the application and information collection requirements for facilities that are able to meet performance standards through a technology that is proven to meet performance standards for impingement mortality and entrainment in most cases. A facility that chooses to comply by meeting the conditions specified at § 125.99(a), therefore, should be able to achieve the performance standards for both impingement mortality and entrainment. Facilities that propose an alternative technology for consideration as a pre-approved technology under § 125.99(b) are encouraged by EPA to propose technologies to the Director for approval that are capable of meeting performance standards for both impingement mortality and entrainment with a high degree of confidence. However, a situation could arise where a pre-approved technology only meets performance standards for impingement mortality or entrainment. In such cases, facilities that choose to comply using an approved design and construction technology that only met a subset of applicable performance standards could either employ other (1) design and construction technologies, operational measures and/or restoration measures or (2) request a site-specific requirements for the remaining performance standards based on either the cost-cost or cost-benefit test.

Some commenters stated that EPA should specify the wedgewire screen slot opening size. EPA disagrees that it should specify a uniform screen slot opening size for all facilities that choose the approved design and construction technology alternative. The rule states in § 125.99(a)(1)(iv) that the screen slot size must be appropriate for the size of eggs, larvae, and juveniles of all fish and shellfish to be protected from entrainment at the site. Because the species to be protected differ among locations, the slot sizes will need to be tailored to the sizes of the various assemblages of species at each site. EPA therefore has determined that the Director should determine the appropriate design criteria, such as wedgewire screen slot opening size, on a case-by-case basis. Since no impingement mortality and entrainment Characterization Study is required under this streamlined option, EPA expects that this determination would be based on available information regarding species and life-stage composition of organisms within the receiving waterbodies. Facilities may wish to assemble available data and propose a screen slot opening size for the Director's consideration.

Some commenters stated that EPA should develop peer-reviewed criteria for evaluating pre-approved technologies other than the wedgewire screen technology described in § 125.99(a). EPA disagrees that it needs to develop specific criteria for evaluating pre-approved technologies. EPA believes that the Director is best equipped to determine the most appropriate technologies for approval in their jurisdictions, since these Directors are most familiar with the site-conditions and intake configurations of the facilities within their jurisdictions, and have physical access to the facilities. Under § 125.99, EPA has set forth a broad framework outlining the types of information that the permitting authority would need to evaluate specific technologies, including design criteria of the proposed technology, site characteristics and conditions necessary to ensure that the technology will meet the performance standards, and data to demonstrate that the facilities in the Director's jurisdiction with the proposed technology and site conditions will be able to meet the performance standards in § 125.94(b). EPA believes that the Directors will be able to evaluate the data and make determinations as to whether the proposed technologies are suitable for use as approved design and construction technologies in their jurisdictions. However, EPA is requiring that the Director take public comment on such determinations prior to finalizing them.

In answer to comments that EPA should not require facilities choosing the approved design and construction compliance alternative to demonstrate through monitoring that they meet the applicable performance standards, EPA disagrees. EPA believes that verification monitoring is very important because, while the pre-approved technologies are designed to meet the performance standards in most cases, the actual efficacy of any technology will be affected by site-specific circumstances and conditions, as well as proper operation and maintenance of the technology. For this reason, EPA believes that it is necessary and appropriate for these facilities to prepare a Technology Installation and Operation Plan that describes how they will operate and maintain the technology and assess success in meeting the performance standards, as well as adaptive management steps they will take if the technology does not perform as expected. They must also propose a Verification Monitoring Plan to describe the monitoring they will perform to support their performance assessment. EPA notes that facilities that select the approved technology alternative have significantly reduced application and information collection requirements relative to facilities that comply under other alternatives.

One commenter stated that the approved design and construction technology alternative will not be sufficiently protective given the complexity of waterbodies. While EPA does not agree with this comment, EPA recognizes that the efficacy of a given technology will be affected by site-specific conditions, such as biological and chemical factors in the waterbody. Because the efficacy of the technology will be affected by such site-specific conditions, EPA has required all facilities that choose to comply using the approved design and construction technology compliance alternative to submit a Technology Installation and Operation Plan and a Verification Monitoring Plan, and to determine if they are meeting the applicable performance standards through monitoring, and adjust their operations accordingly if they are not. EPA believes, based upon extensive research, that the majority of facilities with the appropriate site conditions, and that have installed and properly operated and maintained submerged cylindrical wedgewire screen technology, should be capable of meeting the performance standards set forth in § 125.94(b). For facilities that fail to meet performance standards through the approved design and technology alternative, the Director may amend the facility's permit to require the use of additional design and construction technologies, operational measures, and/or restoration measures, in order to meet the performance standards, or if appropriate, issue a site-specific determination of BTA.

5. Capacity Utilization Threshold

In the proposed rule, EPA introduced reduced requirements for facilities that are typically not operating year-round and would therefore bear a proportionately higher cost to comply with the rule. EPA proposed that facilities that operate less than 15% of the time (also known as peaking facilities) would only be subject to impingement reductions, regardless of the waterbody type upon which the facility is located.

Generally, commenters supported the concept of reduced requirements for peaking facilities. However, commenters stated that EPA must further refine the definition of peaking facilities and in many cases suggested that EPA adopt the United States Department of Energy's definition of capacity utilization. Aspects of EPA's definition on which commenters requested clarification included how to measure the capacity rate (per intake, per facility, per generating unit, etc.), the time frame for determining historic utilization rates, and the definition of "available" with respect to how to calculate the capacity utilization rate. One commenter further suggested that EPA allow an expanded definition (*i.e.*, a higher capacity utilization rate) for facilities that typically operate in periods of low abundance of entrainable organisms. One commenter further requested that the reduced requirements for peaking facilities be extended to account for future operations at the plant as well. Another commenter expressed concern over the definition of the threshold, as the operational time for the facility could still coincide with periods of high abundances of organisms and therefore still result in significant entrainment. One commenter opposed the threshold, stating it could encourage facilities to reduce electricity production in order to have less stringent requirements and therefore impact energy production, prices, and energy supply nationwide.

State commenters generally supported the concept, but were divided as to the threshold utilization rate; some States preferred a lower threshold and one mentioned that it would prefer a higher threshold. One State did not support the reduced requirements for peaking facilities, noting that the time frame in which the facility operates may be more important than the volume withdrawn. Another State suggested that restoration or mitigation also be required of peaking facilities.

EPA has identified peaking facilities in the final Phase II rule as those facilities that operate at an overall capacity of less than 15 percent. EPA believes that facilities operating below 15% should be subject to less stringent compliance requirements relative to a typical base load facility. The threshold of 15% is based on these facilities' reduced operating levels, low potential for entrainment impacts, and consideration of economic practicability (*see*, 67 FR 17141). To address commenter concerns, EPA has modified the capacity utilization definition to say that the capacity utilization rate applies only to that portion of the facility that generates electricity for transmission or sale using a thermal cycle employing the steam water system as the thermodynamic medium. The Agency has amended the definition of the capacity utilization rate threshold to remove the term "available" from the definition, as requested by comments. Further, the Agency has allowed for calculation of the capacity utilization rate on an intake basis, when the intake is exclusively dedicated to a subset of the plant's generating units, and for determination of the capacity utilization rate based on a binding commitment of future operation below the threshold.

Peaking facilities are typically older, less efficient generating units. Because the cost of operation is higher, peaking facilities are generally employed when generating demand is greatest and economic conditions justify their use. Such usage is typically a fraction of the unit's overall generating capacity and represents significantly less cooling water used when compared to the design intake capacity. This would appear to obviate the need for entrainment controls for the facility.

Most peaking facilities are employed during the highest electrical demand period, typically mid-winter or mid-summer. It is generally accepted that while these seasons can sometimes be associated with a higher abundance of aquatic organisms or spawning events, mid-winter and mid-summer are not typically considered to be critical periods for aquatic communities. Given these operating conditions, generally entrainment controls would appear to be an unnecessary cost for these facilities because the losses, while they occur, would have minimal adverse environmental impact.

D. Site-Specific Approach

Past implementation of section 316(b) often followed the draft guidance document published in 1977, which promoted a largely site-specific approach. In this rulemaking, EPA is establishing national performance standards for best technology available for minimizing adverse environmental impacts in connection with cooling water intake structures. Many comments were received regarding a site-specific approach to implementation.

1. Approach

Many commenters favored a site-specific approach in place of national performance standards. Many of the commenters cited a need for flexibility to comply with the regulations, and stated that only a site-specific approach can represent the best framework for addressing site-specific environmental impacts in a cost-effective manner. Commenters also favored an approach that resembles current practices for implementation of 316(b), in which site-specific determinations are made without reference to national performance standards.

Some commenters did not support the concept of a site-specific rule. One commenter stated that it does not fulfill a national standard and allows a more lenient application for some facilities. Another commenter added that a site-specific approach favors industry, as the resources of the regulators and interested public groups to respond to information-intensive site-specific determinations are limited. Some States also expressed concern over a site-specific approach, as it could be less stringent than the present approach, as well as more burdensome. Some other States expressed support for site-specific approaches.

In the final rule, EPA has established national performance requirements for the reduction of impingement mortality and entrainment that reflect best technology available to minimize adverse environmental impact for Phase II existing facilities, and has authorized five different compliance alternatives to achieve those standards, including a site-specific alternative. Thus, the Agency has provided both clear national standards of environmental protection and sufficient flexibility to allow for the selection of cost-efficient approaches to compliance and permit administration. In addition, under certain compliance alternatives, Phase II existing facilities can use restoration measures, either in lieu of, or in combination with technologies and/or operational measures, when design and construction and/or operational measures alone are less feasible, less cost-effective or less environmentally desirable. This provides additional flexibility to permittees and permitting agencies. Finally, as discussed in Section VII of this preamble, EPA does not agree that all aspects of certain site-specific approaches effectively fulfill the requirements of section 316(b).

2. Existing Programs and Determinations

Several commenters stated that there is already a successful 30-year history of implementing section 316(b). Some commenters noted that many States currently implement 316(b) using a site-specific approach and that these programs should be allowed to continue, including any restoration or enhancement programs the States have established. Others stated that existing BTA determinations (conducted using a site-specific approach) should remain valid.

EPA acknowledges that some States' existing programs and determinations have been successful in reducing adverse environmental impacts to waters of the United States associated with cooling water intake structures. EPA disagrees, however, that all existing BTA determinations should remain valid. Some historical BTA decisions may be based on physical, chemical or biological conditions that are no longer relevant at the site, or reflect BTA technology that is outdated and would not meet the performance standards set forth in today's final rule. However, the final rule provides for EPA approval of alternative State program requirements where such State NPDES requirements will result in environmental performance within a watershed that is comparable to the reductions of impingement mortality and entrainment that would otherwise be achieved under § 125.94. (*see* § 125.90(c)). Thus, this rule provides a reasonable degree of flexibility for States to implement existing effective programs. In § 125.94(e), States are also allowed to establish more stringent BTA requirements if necessary to comply with State, tribal, or other federal law.

E. Implementation

1. Calculation Baseline

Numerous commenters indicated that they were unclear as to how to calculate the baseline conditions for impingement mortality and entrainment. Some commenters suggested that the calculation baseline should reflect unrestricted operation at full design capacity year-round to avoid continually changing the baseline, since maintenance and operational schedules change over time. Another commenter added that the baseline definition must specify that data be based upon maximum operation of a given facility, to avoid allowing a facility to withdraw more water than it has been permitted for (based on an averaged flow). Other commenters claimed that the use of a calculation baseline was problematic due to the difficulties of extrapolation between localities and waterbody types. One commenter asserted that the calculation baseline should reflect current local environmental conditions, not historical or hypothetical future conditions and should specify the level of operation that would be maintained in the absence of operational controls implemented for reducing impingement and entrainment.

Many commenters supported an "As Built" alternative approach where a facility would calculate entrainment reduction based on historical measurements before installation of new technology or sampling immediately in front of the new technology and enumerating the organisms of a size that will pass through a standard 3/8-inch screen. Several commenters agreed that the use of historical data would aid in estimating the calculation baseline while others cautioned against the use of historical data that may not be relevant to the current conditions. One commenter disagreed with EPA's statement that the baseline could be estimated by evaluating existing data from a nearby facility; the commenter asserted that site-specific factors determine whether an organism will interact with a cooling water intake structure and/or survive the interaction. Overall, most commenters recommended that EPA allow the Director broad discretion and flexibility in evaluating the calculation baseline due to varying site conditions.

The calculation baseline provides a standard intake configuration by which facilities can determine relative reductions in impingement and entrainment. EPA acknowledges the numerous comments on the proposed definition and has refined the definition to provide more clarity in implementing this concept. For example, the definition in the proposed rule incorporated a shoreline intake structure. In the final rule, the definition has been clarified to specify a 3/8-inch mesh traveling screen at a shoreline intake structure. Based on available data that indicate this is a common intake structure configuration at Phase II existing facilities, EPA designated a 3/8-inch screen as the standard mesh size against which reductions will be calculated. Similarly, the assumption of no impingement or entrainment controls in the definition in the proposed rule has been clarified to describe an intake where the baseline operations do not take into include any procedures or technologies to reduce impingement or entrainment. EPA recognizes that some facilities may have control technologies in place that already reduce impingement or entrainment; the final calculation baseline would allow credit for such reductions. Additionally, EPA further clarified the definition to include the potential data sources that may be used in defining the calculation baseline, such as historical data, data collected at nearby locations, or data collected at the facility. EPA is authorizing the use of existing biological data in determining the calculation baseline to minimize the impacts to facilities, provided that the data are representative of current facility and/or waterbody conditions (as applicable) and were collected using appropriate quality control procedures.

EPA has further clarified the definition to provide that the calculation baseline may be based on an intake structure located at a depth other than a surface intake if the facility can demonstrate that the standard definition (*i.e.*, a shoreline surface intake) would correspond to a higher baseline level of impingement mortality and/or entrainment.

EPA chose not to incorporate operating capacity into the calculation baseline, as the definition is not dependent upon intake flow volumes. EPA has chosen to adopt the "as built" approach: as stated in § 125.93, a facility may choose to use the current level of impingement mortality and entrainment as the calculation baseline.

EPA recognizes that this definition cannot address the variety of intake configurations and other conditions at all facilities and therefore cannot define the calculation baseline in all settings. However, EPA believes that the calculation baseline in the final rule is clear and straightforward to implement, and allows for proactive facilities (*i.e.*, those with control technologies, operational procedures, or restoration measures already in place) to take credit for existing measures.

2. How Will Attainment of the Standards Be Measured?

At the time of the NODA, EPA was evaluating several approaches for measuring success in meeting performance standards. EPA therefore requested comments on whether performance should be measured based on an assessment of the impacts to all fish and shellfish species ("all-species approach") or to fish and shellfish from only a subset of species determined to be representative of all the species that have the potential to be impinged or entrained ("representative species approach"). These comments are addressed under section 2. a below. Several terms to describe the representative species approach have been used historically. To avoid confusion among the terms "representative indicator species," "representative important species," and "critical aquatic organisms," EPA is adopting the term "representative species" for the purpose of simplicity in this section. EPA also requested comment as to whether enumeration of organisms or biomass should be used as the metric for measuring success in meeting the performance standards. These comments are addressed in section 2. b below. With regard to counting absolute numbers of organisms, EPA also requested comment on the option of counting undifferentiated organisms (*i.e.*, counting without specifying taxonomic identification).

After attempting to select optimal approaches for both the scope and metric to use in determining attainment of the performance standards, EPA has determined site-specific factors such as biological assemblage at the site, intake location, and waterbody type must be factored into decisions regarding how to evaluate attainment. EPA has therefore decided that, in its Verification Monitoring Plan (125.95(b)(7)), the facility must propose, among other things, the parameters to be monitored for determining attainment. The Director will be best suited to review and approve proposed parameters for each facility on a case-by-case basis.

a. Scope of Evaluation: All-Species Consideration vs. Representative Species

Several commenters supported the use of a representative species evaluation, as opposed to the all-species evaluation, as the most practical approach in many cases. Another commenter stated that even with the representative species approach, factors other than simply numeric reduction in impingement mortality and entrainment must be considered when determining attainment. On the other hand, one commenter stated that an "all species" approach could make compliance demonstrations simpler and somewhat less expensive so long as the taxonomic identity of collected organisms is not required. The commenter noted that this would not be appropriate, however, in cases where taxonomic identification is needed, such as where eggs and larval stages are converted to age-1 equivalents.

As part of the representative species inquiry, EPA also requested comment on whether 10 to 15 species might be an appropriate number of representative species to protect all species and ecosystem functions at a facility. One commenter responded, stating that 15 was too large a number. This commenter suggested that a demonstration should focus on the four or five species and add to the list only if there was another species of special concern.

In response to the commenter who suggested that EPA should evaluate factors other than reduction in numbers of organisms impinged or entrained, EPA has selected several means by which to determine compliance with section 316(b) requirements. For facilities that choose to demonstrate compliance with the performance standards, the metric that will be used to evaluate compliance with the performance standards is the facility's reduction of impingement mortality and entrainment through the installation of design and control technologies and/or operational measures. For these facilities, compliance may then be measured against a facility's calculation baseline, which the facility estimates and submits with its permit application package. The calculation baseline is defined at § 125.93. For facilities that choose to use compliance with the terms of a Technology Installation and Operation Plan or Restoration Plan to determine compliance, the degree of success in meeting performance standards is still an important criteria for determining if adaptive management is needed, but it would not be the basis for determining compliance. For facilities that choose to use restoration measures, attainment of performance standards will be based upon whether the production of fish and shellfish from the restoration measures is substantially similar to the level of fish and shellfish the facility would achieve by meeting the applicable impingement and/or entrainment requirements. If a facility has been approved for a site-specific determination of best technology available, the Director will establish alternate requirements accordingly. EPA expects that a variety of factors will be considered in determining the appropriate compliance option for a facility, such as waterbody type, intake location, percentage withdrawal of mean annual flow of rivers or streams, capacity to upset thermal stratification in lakes, a facility's calculation baseline, and the appropriateness of existing or proposed protective technologies or measures.

EPA agrees that a single approach may not be optimal in all cases. The Agency has therefore not prescribed the methods (including a metric) for assessing success in meeting performance standards in today's final rule. Rather, the Director must determine whether a clearly defined all-species approach or representative species approach is appropriate on a case-by case basis, based upon the information and proposed methods presented by the facility. The Director may choose to require evaluation of all species or of certain representative species.

In response to comments regarding EPA's suggested number of representative species, the facility will propose the number of species to monitor, as well as decisions regarding species and life stages to monitor, for review and approval by the Director as part of Verification Monitoring Plan (125.95(b)(7)), Technology Installation and Operation Plan (125.95(b)(4)(ii)), and, if applicable, the Restoration Plan required at 125.95(b)(5). As such, in cases where the representative species approach is applied, the Director may approve the number of representative species proposed by the facility, based upon the specifics of the waterbody from which the facility is withdrawing, the percentage volume of water withdrawn relative to the freshwater river or stream (as applicable), and other factors.

b. Metric: Absolute Counts vs. Biomass

EPA requested comment as to whether species impinged or entrained may be measured by counting the total number of individual fish and shellfish, or by weighing the total wet or dry biomass of the organisms. In response to the use of absolute counts of organisms or biomass (weight) for determining compliance, commenters offered a variety of views. Regarding the use of biomass as a metric, one commenter expressed that measuring either biomass or total undifferentiated numbers of species would be appropriate for cases where restoration was the chosen option, since restoration will never result in one-for-one species compensation. Several commenters pointed out a disadvantage of counting numbers of organisms: early life stages will dominate the numbers and thereby dominate the compliance determination, even though most of them would have suffered large natural mortality losses even without entrainment. To correct for this, a few commenters suggested identifying the organisms and converting them to an equivalent unit to ensure that each life stage is appropriately weighed. Specifically, one commenter suggested converting to equivalent juveniles, when measuring organisms by biomass, to correct for the fact that the count will be dominated by later larval stages even though the number of these organisms per unit weight will be small compared to eggs and larvae. This commenter continued that this approach would be useful for forage species, since biomass is an appropriate measure of the organisms that serve as a food source for commercial and recreational species.

EPA received many comments regarding the need for flexibility in determining the appropriate metric to use to determine attainment of performance standards. Several commenters asserted that the rule should allow flexibility in the approach and the choice of metric should factor in whether one is assessing impingement mortality, entrainment or both; species and life stages affected, and compliance option.

EPA has decided to give the Director the authority to review and approve methods of determining compliance proposed by the facility as part of the Verification Monitoring Plan. (125.95(b)(7)), Technology Installation and Operation Plan (125.95(b)(4)(ii)), and, if applicable, the Restoration Plan required at 125.95(b)(5). Thus, the facility will propose, and the Director will review and approve, species and life stages of concern. The Director may choose to require evaluation of all species or of certain indicator species; or the Director may elect to verify attainment of performance standards using biomass as a metric. EPA believes that as each situation will be somewhat unique, it should be left to the facility to propose and the Director approve the appropriate unit, biomass or actual counts.

c. Other Means of Determining Attainment of Performance Standards

Several commenters also suggested that EPA should allow for the use of existing data for measuring attainment in lieu of requiring existing facilities to collect and develop new data. Commenters also suggested that if a facility currently implements the best technology available to minimize adverse environmental impact, it should be found in compliance even if the newly promulgated performance standards are not being met. Other commenters expressed that a facility should be considered in compliance even during occurrences of unavoidable episodic impingement and entrainment events. These commenters stated that in such unusual circumstances, the facility should be provided with an exemption from any regulatory actions.

EPA agrees with commenters that under certain circumstances, facilities' historical data may be sufficient to verify that they are meeting performance standards, as long as the historical data is reflective of current operation of the facility and of current biological conditions at the site. For example, under compliance alternative 2, a facility may use historical data to demonstrate that existing design and construction technologies, operational or restoration measures, meet the performance standards. EPA also believes that some historical data may be appropriate for determining the calculation baseline and for characterizing the nature of impingement and entrainment at the site, and therefore has given the Director the discretion to determine whether historical data are applicable to current conditions (see 125.95(b)(1)(ii), 125.95(b)(2)(i), and 125.95(b)(3)(iii)). In addition, a facility that proves, using existing data, that it has reduced its intake capacity commensurate with closed-cycle recirculating systems would be considered to be in compliance, and therefore would not be required to meet the performance standards for either impingement mortality or entrainment.

After the first permit term, facilities may submit a request for reduced information collection activities to their Director. Facilities that are able to demonstrate that conditions at their facility and in the waterbody from which their facility withdraws surface water are substantially unchanged since their previous permit application will qualify for reduced requirements (§ 125.95(a)(3)). In all these cases, historical data are used and required to measure success in meeting performance standards. However, facilities required to submit a Verification Monitoring Plan must still submit verification monitoring data for at least two years following implementation of technologies and/or operational measures.

Other commenters argued that a facility that is implementing permit conditions reflecting a historical determination of the best technology available should be considered in compliance with today's final rule even if the facility is not meeting performance standards. EPA disagrees that a historical determination of the best technology available is appropriate for complying with the requirements set forth by today's rule. Many historical determinations of the best technology available are less protective of aquatic organisms and ecosystems than the standards set by today's rule, and would undermine the national performance standards that EPA has determined reflect the current best technology available for minimizing adverse environmental impact. Furthermore, biological, chemical and physical conditions at the facilities may have changed since the earlier determinations were made, and the best technology available determinations may no longer apply. Many of the historical best technology available determinations are twenty years old or older and may not correspond with current waterbody or operating conditions.

The question whether a facility should be considered in compliance even during occurrences of unavoidable episodic impingement and entrainment events is left to the Director. At the Director's discretion, facilities that are generally in compliance, but that experience an unusual peak of impingement mortality and/or entrainment, may be considered to still be in compliance on the basis of past good performance. Moreover, the inclusion of a compliance determination alternative based on a Technology Installation and Operations Plan in the final rule also addresses these episodic issues.

d. Monitoring

One commenter stated that monitoring frequencies should be established to address the inherent variability in the rates in impingement and entrainment over the seasons of the year. Monthly or biweekly monitoring is probably appropriate in many cases. The same commenter stated that standard statistical procedures could be followed to establish sample sizes needed to establish appropriate levels of precision in the estimates (*e.g.*, 95% confidence intervals within 15–25% of the mean). In contrast, another commenter pointed out that weekly sampling would be necessary to determine compliance, as had been necessary for the Salem facility. Another commenter suggested that the most cost-effective way of conducting studies would be over the periods of peak abundance.

Some commenters stated that facilities should be allowed to cease monitoring following achievement of the performance standards. Some suggested that facilities meeting performance standards through a closed-cycle cooling system should be exempt from monitoring. Another commenter disagreed with the two-year monitoring requirement altogether.

EPA has determined that a uniform averaging period would not be appropriate; rather, the Director will be best suited to make all such determinations by evaluating these and other factors for each facility on a case-by-case basis. The Director will be able to make determinations regarding averaging periods based upon site-specific factors, such as biological assemblage at the site, annual and diel fluctuations in concentration and populations present, and the selected compliance alternative. EPA disagrees that a facility should cease monitoring once performance standards are achieved, as site-specific conditions at any facility are bound to change with time, affecting a facility's ability to achieve performance standards. EPA agrees that facilities meeting performance standards through flow reductions commensurate with closed-cycle cooling should be exempt from monitoring (see § 125.94(a)(1)(i)). Finally, EPA believes that the two-year monitoring requirement is appropriate so that any site-specific variability in impingement and entrainment rates can be detected.

e. Timing

Some States favored flexibility in implementation including delaying the effective date for permits to be renewed soon after the rule is finalized. Some commenters suggested that the requirements of the rule must be timed so that facilities are not forced into a period of noncompliance because of the time needed to determine, design, and install new intake technology.

One commenter expressed that implementation schedules are too strict. Along the same vein, another commenter suggested that EPA should build flexibility into the implementation schedule so that facilities are not forced into periods of noncompliance.

Commenters generally wanted to see flexibility in the averaging periods (time increments for determining success in meeting the percent reduction or production specified by the performance standards and restoration requirements in § 125.94,) and a way to tailor the sampling schedules to the needs of the site. These commenters indicated that the monitoring should be frequent enough to provide useful information, but not so intensive as to make the program unnecessarily costly or time-consuming. Furthermore, several recommended that a compliance schedule be written into the permits, to allow facilities to install and test new equipment. Several commenters agreed that different facilities might require different amounts of time, as dictated by where they are in the cycle and what their circumstances are.

EPA has provided for time to comply with permitting requirements. A facility whose permit expires more than four years after the date of publication of this final rule must submit the required information 180 days before the expiration of their permit. A facility whose permit expires within four years of the date of publication of this final rule may request that the Permit Director establish a schedule for submission of the permit application. Such submission should be as expeditiously as practicable, but no later than three and one-half years from the date of publication of this final rule. It is expected that the time that facilities need to comply with permitting requirements will be variable, ranging from one year for those not needing to do an impingement mortality and entrainment study to over three years for those needing to collect more than one years worth of impingement and entrainment data.

EPA has also provided that facilities may opt to comply with the Technology Installation and Operations Plan compliance scheme that allows facilities who properly implement the Technology Installation and Operations Plan (or Restoration Plan, as applicable) to be considered in compliance with the requirements of § 125.94. As indicated above, the final rule provides the Director the flexibility to establish an appropriate averaging period to meet the particular situation present in the waterbody within which the facility is located.

3. Entrainment Survival

EPA invited comment on whether to allow Phase II existing facilities to incorporate estimates of entrainment survival when determining compliance with the applicable performance standards. Commenters responded with numerous comments regarding survival with respect to the performance standards as well as comments regarding EPA's assumption of zero percent entrainment survival (100 percent mortality) in the benefits assessment for today's rule.

Some commenters opposing the zero percent survival assumption argued that in the event a facility can demonstrate entrainment survival, it should be awarded credits towards meeting performance standards. EPA disagrees. Today's final rule sets performance standards for reducing entrainment rather than reducing entrainment mortality. EPA chose this approach because EPA does not have sufficient data to establish performance standards based on entrainment survival for the technologies used as the basis for today's rule. If EPA had incorporated entrainment survival into any of its conclusions regarding the appropriate performance standards, then the actual performance standard would most likely have been higher.

Many commenters argued that in many cases organisms survive entrainment and the zero percent survival assumption was too conservative. Some commenters suggested that EPA was biased in its approach to entrainment survival. For example, one commenter stated that EPA was biased as a result of relying heavily on old entrainment survival literature.

Based on its review of all entrainment survival studies available to the Agency, EPA believes that its assumption of zero percent survival in the benefits assessment is justified. The primary issue with regard to the studies EPA reviewed is whether the results can support a defensible estimate of survival substantially different from the value zero percent survival assumed by EPA. The review of the studies has shown that while organisms are alive in some of the discharge samples, the proportion of the organisms that are alive in the samples is highly variable and unpredictable on a national basis. In addition, some studies contain various sources of potential bias that may cause the estimated survival rates to be higher than the actual survival rates. For these reasons, EPA believes the current state of knowledge does not support reliable predictions of entrainment survival that would provide a defensible estimate for entrainment survival above zero at a national level. However, today's final rule does allow facilities to use the results of a well-constructed, sites-specific entrainment survival study, approved by the Director, in their benefits assessments when seeking site-specific entrainment requirements. The permitting authority must review and accept the study before the results may be incorporated into the benefits assessments. In cases where there is uncertainty in the survival rates, permitting authorities may want to specify that benefits be presented as a range that reflects this uncertainty.

4. Comprehensive Demonstration Study (CDS)

a. Requirements and Burden

The majority of commenters expressed two concerns regarding the CDS: (1) it was too burdensome and costly, and the volume of information required was too overwhelming, and (2) several components required clarification. These commenters generally suggested that the costs of such a study were underestimated, and many indicated that the cost estimates for completing the CDS contained misleading or incorrect information. Commenters indicated that the information required for completing the CDS was similar to the data that would be needed for implementing a purely site-specific approach and was therefore overly burdensome. Commenters suggested that EPA require a more simplified demonstration study or waive the requirement for facilities that select one of the approved technologies. Some commenters suggested, in general, that costs could be greatly reduced by streamlining this process, for example, by exempting facilities from certain components based on (1) facilities that have proven that they are not harming the aquatic community, and (2) facilities for which there exists relevant historical data.

Several States anticipated that the majority of their facilities were likely to choose the site-specific compliance alternative, and indicated that a rule that requires cost/benefit analyses for many decisions would be difficult to administer and require significant resources to implement. They claimed that the site-specific performance standards compliance option would impose a substantial review burden and would require specialized expertise. Some States questioned whether existing permitting staff resources over the first 5 years will be sufficient to review material and develop permit requirements.

Many commenters suggested that EPA could lower costs by streamlining the CDS, exempting facilities that are not causing adverse environmental impact or have historical data, and waiving the monitoring components for facilities that have installed approved technologies.

EPA believes that many efficiencies have been added to the rule since the proposal and the NODA to address concerns that the CDS is too burdensome and costly. First, EPA has provided five compliance alternatives to choose from, one of which allows a facility to install an approved design and construction technology with minimal CDS requirements. In addition, facilities with design intake flow commensurate with closed-cycle recirculating systems are exempt entirely from the CDS; facilities may only have to submit partial CDS information if they have reduced their design intake velocity to less than or equal to 0.5 feet per second and are only required to meet requirements as they relate to reductions in entrainment. In addition, requiring an early submission of the Proposal for Information Collection allows the Director to potentially minimize the amount of information required by the facility. Also, by allowing the use of historical data, EPA has minimized costs for many facilities. In the cases where new studies are required, EPA has given the permittee and the Director discretion to set conditions for the studies which will not be overly burdensome. Facilities may also reduce costs incurred through the information collection process in subsequent permit terms by submitting, one year prior to expiration of the existing permit, a request for reduced permit application information based on conditions of their cooling water intake structure and waterbody remaining substantially unchanged since the previous permit issuance.

One commenter expressed concern that historical data should not be allowed in the development of the CDS, as it may not accurately reflect current conditions. EPA believes that some historical data may be appropriate for determining the calculation baseline and for characterizing the nature of impingement and entrainment at the site, and therefore has given the Director the discretion to determine whether historical data are applicable to current conditions. EPA expects to provide guidance to Directors to help them make determinations about historical data submitted by facilities. Historical data will not be used to determine attainment of performance standards; this will be verified through a monitoring program approved by the Director.

b. Timing of Submitting Information

Commenters submitted a variety of opinions about timing. Generally, most favored limiting the submittal of CDS components to a frequency equal to or greater than once every five years (one permitting cycle) to reduce burden. Another commenter argued that there is no reason to mandate timing, and that approval of the Director should not be necessary. Other commenters suggested that a time frame is necessary, and that the information should be submitted with the renewal application for a NPDES permit. Numerous commenters asserted that consultation activities should occur prior to development of the Comprehensive Demonstration Study; that schedules and requirements should be specified in the permit for various data collection, analysis, and application submission activities; implementation schedules are too strict; and monitoring requirements need clarification. Yet another commenter suggested to "start the clock" with the issuance of the renewed permit. Commenters also indicated that anywhere from one year to several years might be necessary to verify success in meeting the performance standards. Several commenters suggested that given the nature of cooling water intake impacts and the proposed requirements, section 316(b) permit and BTA determinations should not be made every five years. Instead, they suggested that one-time determinations should suffice, or that facilities should be allowed to rely on previous section 316(b) demonstrations if conditions remain essentially unchanged. There was also some general confusion as to when the rule would actually become effective.

In response to the comment that EPA should not request submittal of CDS components more frequently than every five years or more, EPA has included a provision whereby a facility may be granted reduced CDS submittal requirements if it can prove that conditions at the facility and in the waterbody have not substantially changed. Facilities will be required to review whether conditions, such as biological, chemical or physical conditions, have substantially changed at each permit renewal cycle. If conditions have changed, facilities will be required to submit all of the relevant CDS components (those that would be affected by the changed conditions when they submit the application for permit renewal.

One commenter stated that the CDS should be a one-time submittal. EPA disagrees that all components of the CDS should only be researched and submitted a single time for the lifetime of the facility, regardless of potential changes in the plant and/or waterbody, because the natural and anthropogenic changes that occur in waterbodies over time may affect a facility's ability to meet performance standards using the current design and construction technologies, operational measures, and/or restoration measures in place.

In response to comments that timing was not clear in previous versions of the rule, EPA agrees, and has clarified timing issues in today's final rule. A facility whose permit expires more than four years after the date of publication of this final rule must submit the required information 180 days before the expiration of their permit. A facility whose permit expires within four years of the date of publication of this final rule may request that the Permit Director establish a schedule for submission of the permit application, but that such submission should be as expeditiously as practicable, but no later than three and one-half years from the date of publication of this final rule. It is expected that the time that facilities need to comply with permitting requirements will be variable, ranging from one year for those not needing to do an impingement mortality and entrainment study to over three years for those needing to collect more than one years worth of impingement and entrainment data.

Some commenters felt that decisions about the timing of the CDS submittal should be left to the Director. EPA agrees and has provided only that the proposal for information collection should be submitted prior to the start of information collection activities, but that the facility may initiate information collection prior to receiving comment from the Permit Director. All other components of the Comprehensive Demonstration Study must be submitted 180 days prior to permit expiration except as noted above for the first, permit term following promulgation of the rule.

5. State Programs

Many States requested that existing State section 316(b) programs be allowed to be used to meet the requirements of Phase II. One commenter asserted that the Phase II rule should not overturn past State section 316(b) decisions at existing facilities that were made on a site-specific basis and that examined the impacts of the cooling water intake structure in relation to the specific biological community. Several commenters stated that EPA did not sufficiently recognize the work already done by the States in implementing section 316(b). Several commenters do not believe that a State should have to demonstrate that its program is "functionally equivalent" to today's rule (*i.e.*, that its alternative regulatory requirements achieve environmental performance within a watershed that is comparable to the reductions of impingement mortality and entrainment that would otherwise be achieved under § 125.94).

In response to comments about existing State section 316(b) programs, EPA believes that § 125.90(c) in today's rule, by allowing alternative State programs, acknowledges the work already done by States. In response to the comment that a State should not have to prove that its program achieves environmental performance comparable to those that would be achieved under § 125.94, EPA disagrees. While EPA is giving significant flexibility to permitting agencies at the State level to determine how and what each facility must protect and monitor, it believes it is important to set uniform national performance standards.

F. Restoration

In the proposed rule EPA requested comments on the use of restoration measures by facilities within scope of the rulemaking (67 FR 17146). EPA received diverse comments. Many commenters supported a role for restoration measures. Several commenters stated that allowing restoration provides additional flexibility to those who must comply with the section 316(b) requirements, and may provide a more cost-effective means of minimizing adverse environmental impact than operational measures or design and construction technologies. Other commenters stated that restoration is a well-accepted concept that should have a voluntary role in section 316(b) determinations and constitutes an appropriate means for reducing the potential for causing adverse environmental impact. Several commenters felt that restoration could provide significant benefits in addition to compensating for impingement and entrainment losses. A number of commenters requested flexibility in the implementation of restoration projects. Some commenters stated that restoration should not be limited to supplementing technology or operational measures, but should instead be allowed as a complete substitute for such measures. However, other commenters stated that restoration measures should only be used once every effort has been made to use technology to avoid impacts.

Commenters further stated that restoration should not be mandatory and that EPA lacks authority under section 316(b) to require it, but also asserted that it should have an important role in section 316(b) permitting decisions. Commenters also stated that restoration should not be considered the best technology available for minimizing adverse environmental impact because it is not a technology that addresses the location, design, construction, or capacity of a cooling water intake structure. However, one commenter argued that past restoration measures should be considered during a regulator's determination of whether or not adverse environmental impact is occurring from a cooling water intake structure.

Other commenters felt restoration should have a limited role or no role in the context of section 316(b). One commenter wrote that restoration measures, in the context of section 316(b), are generally unworkable and that the only measurable restoration method would be offsetting, in which an applicant stops use of an older intake facility that does more harm than the proposed one. One commenter stated that restoration methods must reproduce the ecological value of lost organisms and that they have not seen restoration projects adequately successful in this manner in their region of the country. Many commenters pointed out uncertainties associated with compensating for those organisms impacted by a cooling water intake structure through restoration.

Some commenters suggested that, if restoration is allowed, there should be consultation with other State and Federal resource agencies to avoid inconsistent approaches and to provide useful information on the affected waterbody.

Several commenters remarked on EPA's proposal to include requirements for uncertainty analysis, adaptive management plans, and peer review in the final rule. Some commenters were in favor of the requirements and felt that they would enhance restoration measure certainty and performance. Some commenters were concerned that the requirements would be overly burdensome or would overly restrict the restoration measure options available to permit applicants.

EPA has retained restoration in the final rule and believes that the restoration requirements strike an appropriate balance between the need for flexibility and the need to ensure that restoration measures achieve ecological results that are comparable to other technologies on which the performance standards are based. Facilities that propose to use restoration measures, in whole or in part, must demonstrate to the Director that they have evaluated the use of design and construction technologies and/or operational measures and found them to be less feasible, less cost-effective, or less environmentally desirable than meeting the applicable performance standards in whole or in part through the use of restoration measures. The requirement to look at design and construction technologies and/or operational measures in order to ensure that facilities give due consideration to the technologies on which the performance standards are based.

Facilities must also demonstrate that the use of restoration measures achieves performance levels that are substantially similar to those that would be achieved under the applicable performance standards. To address concerns regarding the uncertainty of restoration measures, EPA has included, among other things, requirements for uncertainty analysis, adaptive management plans, monitoring, and peer review, if requested by the Director. Finally, EPA does not believe the requirements for restoration measures are overly burdensome or prescriptive as there is a need to ensure that these types of measures achieve the anticipated environmental benefit. Moreover, under the rule, facilities are *provided at least three and one-half* years to submit their restoration plan and complete the required studies.

G. Costs

1. Facility-Level Costs

Generally, commenters were split regarding the national costs of the rule. Industry commenters stated that the cost analysis presented in the proposal underestimated the compliance costs in several facets of the analysis, including capital costs of the technology, the site-specific contingencies associated with retrofitting, and facility down time. Several commenters stated that EPA underestimated the costs for the monitoring requirements for both the characterization study in the permit application and for verification monitoring. Other commenters generally stated the opposite, arguing that EPA overestimated the compliance costs, especially for installing cooling towers. Some commenters stated that costs should not be a consideration in section 316(b) determinations.

The Agency significantly revised the approach to developing costs for the NODA. Those revisions incorporated some of the comments on the costing methodology for technologies that reduce impingement and entrainment. EPA's approach to estimating the costs of the requirements of the final rule reflect the NODA comments on the revised methodology, and additional analyses. EPA, however, did not revise its estimates for cooling towers subsequent to the NODA because it decided not to further pursue this regulatory option for the reasons outlined more specifically in Section VII. EPA believes that our costing of cooling tower technology is appropriate as it is based on vendor and engineering firm experience in developing costs for Phase II facilities.

2. Market-Level Impacts

Numerous industry commenters stated that EPA significantly underestimated the impacts to generators, consumers, reliability, and energy supply. EPA disagrees with these commenters. EPA performed an analysis of facility- and market-level impacts (including impacts to generators, consumers, reliability, and energy supply) using the Integrated Planning Model (IPM®), which has been widely used in air quality regulations and in other public policy arenas affecting the electric power generation industry.

One commenter stated that the IPM analysis does not account for the economic impacts of other regulatory programs. EPA disagrees with this assertion. The IPM base case accounts for costs associated with current federal and state air quality requirements, including future implementation of SO_2 and NO_X requirements of Title IV of the Clean Air Act and the NO_X SIP call as implemented through a cap and trade program. Because of its relative newness, it does not account for costs associated with the Phase I facility regulations.

One commenter stated that EPA justified the rule by using a cost-to-revenue comparison and that this comparison neither measures profitability nor represents the most efficient economic solution for each facility. As discussed in Section VII. above, the economic practicability of the Phase II regulation is based on the electricity market model analyses using the IPM, not the cost-to-revenue ratio. The cost-to-revenue ratio is only one of several additional measures EPA used to assess the magnitude of compliance costs.

Some commenters stated that EPA did not properly take account of differences between utilities, which own and operate rate-based facilities, and nonutilities, which own and operate competitive generating facilities. EPA disagrees with this comment. EPA believes that in a deregulated market, the distinction between utilities and nonutilities is no longer relevant. While such a distinction may have been important in the past, when only a few unregulated nonutilities competed with regulated utilities, this is no longer the case. The share of Phase II facilities that are owned by unregulated entities has increased from 2 percent in 1997 to 31 percent in 2001. By the time the final rule will take effect, even more Phase II facilities that currently operate under a rate-based system will be operating in a competitive market. Furthermore, EPA does not believe that nonutilities will be differentially impacted compared to utilities, even in the case that deregulation might not have taken effect in all markets by the time this rule is implemented. Competitive pressures, even in regulated environments, will reduce the ability of utilities to pass on costs to their consumers.

Some commenters stated that small or publicly owned facilities may be significantly affected. EPA disagrees with this statement. EPA's SBREFA analysis showed that this rule will not lead to a significant economic impact on a substantial number of small entities (See Section XIII.C below). While municipally owned facilities bear a relatively larger compliance cost per MW of generating capacity than do facilities owned by other types of entities, EPA's analyses show that these costs are not expected to lead to significant economic impacts for these facilities.

Some commenters stated that even a requirement to convert all facilities to closed-cycle cooling would not significantly affect energy supply and that the costs to facilities and consumers is small and in some cases, overstated by EPA's analysis. EPA disagrees with this statement. EPA considered several options that would require some or all facilities to install closed-cycle recirculating systems and rejected them on the basis of economic practicability and technological feasibility. See Section VII.B for more detail on why EPA rejected closed-cycle recirculating systems.

H. Benefits

In its analysis for section 316(b) Phase II Proposal, EPA relied on nine case studies to estimate the potential economic benefits of reduced impingement and entrainment. EPA extrapolated facility-specific estimates to other facilities located on the same waterbody type and summed the results for all waterbody types to obtain national estimates. During the comment period on the proposed rule EPA received numerous comments on the valuation approaches applied to evaluate the proposed rule, including commercial and recreational fishing benefits, non-use benefits, benefits to threatened and endangered species (T&E), as well as on the methods used to extrapolate case study results to the national level. EPA tried to address concerns raised by commenters on the proposal in the revised methodology presented in the NODA and the final rule analysis.

1. Benefits Analysis Design

A number of commenters expressed concern about EPA's reliance on a few case studies and the extrapolation method used for estimating benefits at the national level for the proposed rule analysis. The commenters noted that even within the same waterbody type, there are important ecological and socioeconomic differences among different regions of the country. To address this concern, EPA revised the design of its analysis to examine cooling water intake structure impacts at the regional-scale. The estimated benefits were then aggregated across all regions to yield the national benefits estimate. These analytical design changes were presented in the NODA. No major comments were received on EPA's regional benefit approach as described in the NODA.

2. Commercial Fishing Benefits

During the comment period on the proposed rule EPA received a number of comments on the methods used to estimate producer surplus and consumer surplus in the commercial fishing sector. Commenters felt that the methods overestimated benefits. The new methods used by EPA assume that producer surplus is 0% to 40% of gross revenues in the commercial fishing sector. EPA also now assumes that the Phase II rule will not create increases in commercial harvest large enough to impact prices. Thus, no consumer surplus impact is estimated. Commenters on the NODA noted these changes and agreed with them.

3. Recreational Fishing Benefits

A number of comments were received on the recreational fishing benefits estimates EPA included in the proposal, which primarily relied on a benefits transfer approach. Benefit transfer involves adapting research conducted for another purpose in the available literature to address the policy questions in hand. For more detail on the valuation methods used in the final rule analysis, see Chapter A9 of the Regional Analysis document (DCN 6–0003). For three of the nine case studies, this analysis was supplemented by original revealed preference studies. Revealed preference methods use observed behavior to infer users' value for environmental goods and services. Examples of revealed preference methods include travel cost, hedonic pricing, and random utility models (RUM). For more detail on the revealed preference methods used in the final rule analysis, see Chapters A9 and A11 of the Regional Analysis document (DCN 6–0003). Although most commenters agreed that properly executed benefits transfer is an appropriate method for valuing nonmarket goods, they pointed out that original revealed preference studies that provide site-specific recreational fishing benefit estimates provide a superior alternative to benefits transfer. In response to these comments, EPA developed original or used available region-specific recreational angler behavior models, which provide site-specific estimates of willingness-to-pay for improvements in recreational fishing opportunities, to estimate recreational fishing benefits from reduced impingement and entrainment for seven of the eight study regions. Chapter A11 of the Regional Analysis document provides detailed discussion of the methodology used in EPA's RUM analysis (DCN 6–0003). Due to data limitations, EPA used a benefit transfer approach to value recreation fishing benefits from reduced impingement and entrainment in the Inland region.

4. Non-Use Benefits

Numerous comments were received on EPA's proposed non-use benefit estimates. Most commenters agreed that non-use values are difficult to estimate and that EPA's estimates of non-use benefits using the 50% rule was inappropriate because it relies on outdated studies. Commenters, however, disagreed as to whether EPA had vastly overstated or underestimated non-use benefits in the proposed Phase II rule analysis.

Some commenters stated that EPA's approach to estimating non-use benefits of the proposed rule significantly overestimates total benefits and that ecological benefits of the section 316(b) regulation are negligible. Other commenters asserted that EPA's benefits estimates significantly undervalued the total ecological benefits (including use and non-use) of preventing fish kills. These commenters indicated that it would be impossible to claim that the value of the unharvested commercial and recreational and forage species lost to impingement and entrainment was equal to zero. Reasons some commenters gave for the underestimation of total benefits included the following: total losses were underestimated by using outdated monitoring data for periods when population levels (and therefore impingement and entrainment) were much lower than the present; cumulative impacts were not sufficiently considered; recreational and commercial values were underestimated; commercial invertebrate species were ignored; ecological value of forage species was not considered; non-use benefits were underestimated; and secondary economic impacts were not included. Overall these commenters argued that a net benefit underestimation could be corrected by (1) assuming that non-use values were two times the estimated value of recreation, commercial and forage values; and (2) assuming that unharvested fish had a value greater than zero.

In response to public comments regarding the analysis of non-use values in the proposed rule, EPA considered the results of several different approaches to quantifying non-use values. The Agency points out that none of the available methods for estimating either use or non-use values of ecological resources is perfectly accurate; all have shortcomings.

EPA has determined that none of the methods it considered for assessing non-use benefits provided results that were appropriate to include in this final rule, and has thus decided to rely on a qualitative discussion of non-use benefits. The uncertainties and methodological issues raised in the approaches considered could not be resolved in time for inclusion in the rule. EPA continues to evaluate various approaches for evaluating non-use benefits of CWA rules.

5. Habitat Replacement Cost (HRC)

Some commenters argued that the HRC methods are not legitimate valuation methods because they concern costs, not benefits. However, other commenters argued that although HRC analysis is not a benefit's analysis in the strict economic sense it can provide a practical approach to capturing the full range of ecosystem services and, thus, is appropriate for evaluating the benefits of this rule. These commenters further pointed out that "restoration cost is used as a measure of damages under CERCLA for Superfund sites, under the National Marine Sanctuaries Act, and under the oil spill provisions of the Clean Water Act. Use of restoration costs was explicitly upheld in the landmark Ohio vs. Interior court decision of 1989."

EPA has removed the disputed results of the HRC analyses from its benefits estimates for the final rule. For the NODA, EPA revised the HRC analysis presented in the proposed rule (see 67 FR 17191). Instead of the costs of habitat replacement, EPA used estimated willingness-to-pay values for the resource improvements that would be achieved by the habitat replacement/ restoration equivalents.

27

■ b. In paragraph (a), last sentence, revise "SAF/MIQ" to read "SAF/IEE."
■ c. In paragraph (b), third sentence, revise "HQ USAF/ILEB" to read "HQ USAF/A7CI."
■ d. In paragraph (b), third sentence, revise "SAF/MIQ" to read "SAF/IEE".

§ 989.36 [Amended]

■ 17. In § 989.36, make the following technical corrections:
■ a. In first sentence, revise "NEPA" to read "EIAP" at its first occurrence.
■ b. In first sentence, revise "SAF/MIQ" to read "SAF/IEE".

§ 989.38 [Amended]

■ 18. In § 989.38, make the following technical corrections:
■ a. In paragraph (b), revise "HQ USAF/ILEB" to read "HQ USAF/A7CI".
■ b. In paragraph (c), revise "HQ USAF/ILEB" to read "HQ USAF/A7CI".
■ c. In paragraph (c), revise "AFCEE/EC" to read "AFCEE/TDB".
■ d. In paragraph (d), revise "HQ USAF/ILEB" to read "HQ USAF/A7CI" in the four places it appears.

Appendix A to Part 989 [Amended]

■ 19. In Appendix A, make the following technical corrections:
■ a. In U.S. Government Agency Publications, revise "(DoDD) 4715.1, Environmental Security" to read "DoDD 4715.1E, Environment, Safety, and Occupational Health".
■ b. In U.S. Government Agency Publications, revise "DoDD 5000.1, Defense Acquisition" to read "Department of Defense Directive DoDD 5000.1, The Defense Acquisition System".
■ c. In Abbreviations and Acronyms, Change acronym definition for "AFCEE" from "Air Force Center for Environmental Excellence" to read "Air Force Center for Engineering and the Environment".
■ d. In Abbreviations and Acronyms, revise "AFCEE/EC" to read "AFCEE/TDB". Change acronym definition from "AFCEE Environmental Conservation and Planning Directorate (AFCEE/EC)" to read "AFCEE Technical Directorate, Built Infrastructure Division (AFCEE/TDB)".
■ e. In Abbreviations and Acronyms, revise "AFLSA/JACE" to read "AFLOA/JACE".
■ f. In Abbreviations and Acronyms, revise "AFLSA/JAJT" to read "AFLOA/JAJT".
■ g. In Abbreviations and Acronyms, revise "HQ USAF/ILE" to read "HQ USAF/A7C".
■ h. In Abbreviations and Acronyms, revise "SAF/MI" to read "SAF/IE." Change acronym definition from "Assistant Secretary of the Air Force for Manpower, Reserve Affairs, Installations, and Environment" to "Assistant Secretary of the Air Force for Installations, Environment & Logistics".
■ i. In Abbreviations and Acronyms, revise "SAF/MIQ" to read "SAF/IEE." Change acronym definition from "Assistant Secretary of the Air Force for Manpower, Reserve Affairs, Installations, and Environment" to "Deputy Assistant Secretary of the Air Force for Environment, Safety and Occupational Health (ESOH)".
■ j. In Terms, under "BMPs" revise "40 CFR 1508.22" to read "32 CFR 989.22".

Appendix B to Part 989 [Amended]

■ 20. In Appendix B, make the following technical corrections:
■ a. In paragraph A3.1.1, revise "AFLSA/JAJT" to read "AFLOA/JAJT".
■ b. In paragraph A3.1.2, revise "AFLSA/JAJT" to read "AFLOA/JAJT".

Appendix C to Part 989 [Amended]

■ 21. In Appendix C, make the following technical corrections:
■ a. In paragraph A3.1.3, last sentence, revise "HQ USAF/ILEVP" to read "HQ USAF/A7CI."
■ b. In paragraph A3.1.3, last sentence, revise "SAF/MIQ" to read "SAF/IEE".
■ c. In paragraph A3.2.2.1, revise "HQ USAF/ILEB" to read "HQ USAF/A7CI".
■ d. In paragraph A3.2.3.3. revise "The name and telephone number of a person to contact for more information" to read "The name, address, and telephone number of the Air Force point of contact".
■ e. In paragraph A3.5.1., revise "AFLSA/JAJT" to read "AFLOA/JAJT".
■ f. In paragraph A3.5.1., revise "military trial judge" to read "hearing officer".
■ g. In paragraph A3.5.1., revise "military trial judge" to read "hearing officer".
■ h. In paragraph A3.8, third to last sentence, revise "SAF/MIQ" to read "SAF/IEE",

Bao-Anh Trinh,

Air Force Federal Register Liaison Officer, Department of the Air Force.

[FR Doc. E7–13253 Filed 7–6–07; 8:45 am]

BILLING CODE 5001–05–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 122 and 125

[EPA–HQ–OW–2002–0049; FRL–8336–9]

RIN 2040–AD62

National Pollutant Discharge Elimination System—Suspension of Regulations Establishing Requirements for Cooling Water Intake Structures at Phase II Existing Facilities

AGENCY: Environmental Protection Agency (EPA).

ACTION: Suspension of final rule.

SUMMARY: This action suspends the requirements for cooling water intake structures at Phase II existing facilities, pending further rulemaking. The Phase II regulation addressed existing power utilities that use a cooling water intake structure to withdraw cooling water from waters of the United States at a rate of 50 million gallons per day (MGD) or greater.

DATES: Effective July 9, 2007, 40 CFR 122.21(r)(1)(ii) and (5), 125.90(a), (c) and (d) and 125.91 through 125.99 in Subpart J are suspended.

FOR FURTHER INFORMATION CONTACT: Janet Goodwin at (202) 566–1060, *goodwin.janet@epa.gov* or Deborah Nagle at (202) 564–1185, *nagle.deborah@epa.gov*.

SUPPLEMENTARY INFORMATION: This action suspends the Phase II regulations with the exception of 40 CFR 125.90 (b), for cooling water intake structures.

I. General Information

A. Does This Action Apply to Me?

Entities potentially affected by this action are classified under NAIC 22111. Affected categories and entities include:

Category	Examples of regulated entities
Electric Utilities	Electric Power Generating Facilities.
State governments ..	Department of Environmental Protection.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities affected by this action. Other types of entities not listed in the table could also be affected. To determine whether your facility is affected by this action, you should carefully examine the definition in § 125.91. If you have questions regarding the applicability of this action to a particular entity, consult one of the persons listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. Table of Contents

I. Legal Authority

EPA is issuing this suspension of the Phase II rule pursuant to 5 U.S.C. 553(b) and (d), which authorizes administrative agencies to issue administrative suspensions immediately, where good cause justifies the action. Public comment on this suspension is unnecessary, as a decision issued by the U.S. Court of Appeals for the Second Circuit (Second Circuit), *Riverkeeper, Inc.* v. *EPA*, 475 F.3d 83 (2d Cir. 2007), precludes EPA from applying the Phase II rule unless and until EPA takes further action and today's suspension action merely carries out the effect of that decision on the Phase II rule. Additionally, the decision has resulted in uncertainty among the regulated community and permitting agencies about how to proceed with ongoing permitting proceedings given the uncertainty as to the status of the Phase II rule. This suspension provides a clear statement by the Agency that the existing Phase II requirements (with the exception of one provision unaffected by the *Riverkeeper* decision that reaches beyond the Phase II rule, addressed below) are suspended and are not legally applicable.

II. Background

On February 16, 2004, EPA took final action on regulations governing cooling water intake structures at certain existing power producing facilities under section 316(b) of the Clean Water Act (Phase II rule). 69 FR 41576 (July 9, 2004). The final Phase II rule applies to existing facilities that are point sources that, as their primary activity, both generate and transmit electric power or generate electric power for sale to another entity for transmission; use or propose to use cooling water intake structures with a total design intake flow of 50 MGD or more to withdraw cooling water from waters of the United States; and use at least 25 percent of the water withdrawn exclusively for cooling purposes (see 40 CFR 125.91).

Under the Phase II rule, EPA established performance standards for the reduction of impingement mortality and entrainment (see 40 CFR 125.94). The performance standards consist of ranges of reductions in impingement mortality and/or entrainment. These performance standards were determined to reflect the Best Technology Available (BTA) for minimizing adverse environmental impacts at facilities covered by the Phase II rule.

These regulations were challenged by industry and environmental stakeholders. On judicial review, the Second Circuit decision (*Riverkeeper, Inc.* v. *EPA*, 475 F.3d 83, (2d Cir., 2007)) remanded several provisions of the Phase II rule on various grounds. The provisions remanded to EPA include:

- EPA's determination of the BTA under section 316(b);
- The rule's performance standard ranges;
- The cost-cost and cost-benefit compliance alternatives;
- The Technology Installation and Operation Plan provision;
- The restoration provision; and
- The "independent supplier" provision.

With several significant provisions of the Phase II rule affected by the decision, and with the need to provide timely direction to stakeholders about the continuing application of the Phase II rule, EPA's Assistant Administrator for Water issued a memorandum on March 20, 2007, which announced EPA's intention to suspend the Phase II rule. This memorandum also discussed the anticipated issuance of this **Federal Register** suspension document.

III. This Action

EPA is suspending § 122.21(r)(1)(ii) and (5), and Part 125 Subpart J with the exception of § 125.90(b). This suspension is appropriate for several reasons.

First, the Second Circuit's decision remanded key provisions of the Phase II requirements, including the determination of BTA and the performance standard ranges. This suspension responds to the Second Circuit's decision, while the Agency considers how to address the remanded issues.[1]

In addition, the decision has a significant impact on the regulated community and permitting agencies. Both groups have sought Agency guidance on how to proceed to establish cooling water intake structure permit requirements for facilities subject to the Phase II rule in light of this decision. These stakeholders support suspending the Phase II requirements until the Agency has considered and resolved the issues raised by the Second Circuit's remand. Permit requirements for cooling water intake structures at Phase II facilities should be established on a case-by-case best professional judgment (BPJ) basis.

Pursuant to 5 U.S.C. 553(b) and (d), EPA has determined for good cause that notice and public comment procedures are unnecessary. As noted, the Second Circuit's decision found key provisions of the Phase II rule to be inconsistent with the Clean Water Act and remanded most of the rule to the Agency. As a result, under the decision, EPA is precluded from applying the rule unless and until it takes further action to address the decision. Thus, today's action simply effectuates the legal status quo and public comment is therefore unnecessary.

Notably, EPA by this action is not suspending 40 CFR 125.90(b). This retains the requirement that permitting authorities develop BPJ controls for existing facility cooling water intake structures that reflect the best technology available for minimizing adverse environmental impact. This provision directs permitting authorities to establish section 316(b) requirements on a BPJ basis for existing facilities not subject to categorical section 316(b) regulations. Establishing requirements in this manner is consistent with the CWA, case law, and the March 20, 2007 memorandum's direction to do so. Phase II facilities are not subject to categorical requirements under Subpart J while this suspension is in effect, and therefore this provision applies in lieu of those requirements. In addition, this provision applies to other types of existing facilities subject to section 316(b) requirements (e.g., existing facilities addressed in EPA's section 316(b) Phase III rule). Moreover, this provision is an analogue to the provision in the 316(b) Phase I new facility rule providing for BPJ permitting where a facility is not subject to categorical requirements under Subpart I. See 40 CFR 125.80(c). Finally, this provision was not addressed, and is therefore not affected, by the Second Circuit's decision in *Riverkeeper*. Retaining it is therefore consistent with the approach EPA took in response to a judicial remand of its original section 316(b) regulations. See 44 FR 32854, 32956/1 (June 7, 1979) (withdrawing remanded regulations, but leaving intact a provision that had not been remanded).

IV. Statutory and Executive Order Reviews

Under Executive Order 12866 (58 FR 51735, October 4, 1993), this action is not a "significant regulatory action" and is therefore not subject to review under

[1] In the event that the court's decision is overturned after today's action, the Agency will take appropriate action in response.

the Executive Order. This action does not impose any new requirements and does not impose costs or impacts on the regulated industry and thus does not meet the requirements for Executive Order 12866 review. This action is not subject to the Regulatory Flexibility Act (RFA) since this rule is exempt from notice and comment rulemaking requirements for good cause which is explained in section I. Additionally, this rule will not significantly or uniquely affect small governments. EPA has determined that this rule would not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any one year. Thus, this rule is not subject to sections 202, 203, or 205 of the Unfunded Mandates Reform Act of 1999 (Pub. L. 104–4). In addition, the EPA has determined that this action does not have Tribal implications, as specified in Executive Order 13175 (63 FR 67249, November 9, 2000). This action will not have federalism implications, as specified in Executive Order 13132 (64 FR 43255, August 10, 1999) because it does not establish any requirements on State or local governments. This regulation is not subject to Executive Order 13045 because it is not economically significant as defined under Executive Order 12866, and because the Agency does not have reason to believe the environmental health and safety risks addressed by this action present a disproportionate risk to children. This action is not subject to Executive Order 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use" (66 FR 28355, May 22, 2001), because it is not a significant regulatory action under Executive Order 12866. This action does not involve technical standards; thus, the requirements of section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) do not apply. This action does not impose any new information collection burden under the provisions of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). The existing Information Collection requirements in this regulation were approved by the Office of Management and Budget under OMB control number 2040–0257.

List of Subjects

40 CFR Part 122

Environmental protection, Administrative practice and procedure, Confidential business information, Hazardous substances, Indians-lands, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Water pollution control.

40 CFR Part 125

Environmental protection, Cooling water intake structure, Reporting and recordkeeping requirements, Waste treatment and disposal, Water pollution control.

Dated: July 2, 2007.

Stephen L. Johnson,

Administrator.

■ For the reasons set forth in the preamble, EPA is amending 40 CFR parts 122 and 125 as follows:

PART 122—EPA ADMINISTERED PERMIT PROGRAMS: THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

■ 1. The authority citation for part 122 continues to read as follows:

Authority: The Clean Water Act, 33 U.S.C. 1251 *et seq.*

§ 122.21 [Amended]

■ 2. Section 122.21 (r)(1)(ii) is suspended.

■ 3. Section 122.21(r)(5) is suspended.

PART 125—CRITERIA AND STANDARDS FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

■ 4. The authority citation for part 125 continues to read as follows:

Authority: Clean Water Act, 33 U.S.C. 1251 *et seq.* unless otherwise noted.

§ 125.90 [Amended]

■ 5. Section 125.90(a), (c) and (d) are suspended.

■ 6. Sections 125.91 through 125.99 are suspended.

[FR Doc. E7–13202 Filed 7–6–07; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 131

[EPA–HQ–OW–2007–0467; FRL–8337–2]

RIN NA2040

Withdrawal of Federal Marine Aquatic Life Water Quality Criteria for Toxic Pollutants Applicable to Washington State

AGENCY: Environmental Protection Agency (EPA).

ACTION: Direct final rule.

SUMMARY: EPA is proposing to amend the Federal regulations to withdraw its 1992 federally promulgated marine copper and cyanide chronic aquatic life water quality criteria for Washington State, thereby enabling Washington to implement its current EPA-approved chronic numeric criteria for copper and cyanide that cover all marine waters of the State.

In 1992, EPA promulgated Federal regulations establishing water quality criteria for priority toxic pollutants for 12 States, including Washington, and two Territories that had not fully complied with the Clean Water Act (CWA). These regulations are known as the "National Toxics Rule" or "NTR." On November 18, 1997, Washington adopted revised chronic marine aquatic life criteria for copper and cyanide, the only two marine aquatic life priority toxic pollutants in the NTR applicable to Washington. These revisions included a chronic marine aquatic life water quality criterion for copper for all marine waters and a chronic site-specific cyanide criterion for the Puget Sound. EPA approved these criteria on February 6, 1998. On August 1, 2003, Washington adopted revisions to its water quality standards, including a chronic marine criterion for cyanide for all marine waters except the Puget Sound. EPA approved this criterion on May 23, 2007. Since Washington now has marine copper and cyanide chronic aquatic life criteria effective under the CWA that EPA has approved as protective of Washington's designated uses, EPA is proposing to amend the NTR to withdraw the federally promulgated criteria.

DATES: This rule is effective on September 7, 2007 without further notice, unless EPA receives adverse comment by August 8, 2007. If EPA receives such comment, EPA will publish a timely withdrawal in the **Federal Register** informing the public that this rule, or the relevant provisions of this rule, will not take effect.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OW–2007–0467, by one of the following methods:

- *www.regulations.gov:* Follow the on-line instructions for submitting comments.
- E-mail: *ow-docket@epa.gov.*
- Mail to either: Water Docket, USEPA, Mailcode: 2822T, 1200 Pennsylvania Ave., NW., Washington, DC 20460 or Becky Lindgren, Washington Marine Aquatic Life NTR Removal, U.S. EPA, Region 10, OWW–131, 1200 Sixth Avenue, Seattle, WA 98101, Attention Docket ID No. EPA–HQ–OW–2007–0467.

28

LEXSTAT 40 CFR 125.84

*** THIS SECTION IS CURRENT THROUGH THE JANUARY 14, 2009 ISSUE OF ***
*** THE FEDERAL REGISTER ***

TITLE 40 -- PROTECTION OF ENVIRONMENT
CHAPTER I -- ENVIRONMENTAL PROTECTION AGENCY
SUBCHAPTER D -- WATER PROGRAMS
PART 125 -- CRITERIA AND STANDARDS FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
SUBPART I -- REQUIREMENTS APPLICABLE TO COOLING WATER INTAKE STRUCTURES FOR NEW FACILITIES UNDER SECTION 316(B) OF THE ACT

Go to the CFR Archive Directory

40 CFR 125.84

§ 125.84 As an owner or operator of a new facility, what must I do to comply with this subpart?

(a)(1) The owner or operator of a new facility must comply with either:

(i) Track I in paragraph (b) or (c) of this section; or

(ii) Track II in paragraph (d) of this section.

(2) In addition to meeting the requirements in paragraph (b), (c), or (d) of this section, the owner or operator of a new facility may be required to comply with paragraph (e) of this section.

(b) Track I requirements for new facilities that withdraw equal to or greater than 10 MGD. You must comply with all of the following requirements:

(1) You must reduce your intake flow, at a minimum, to a level commensurate with that which can be attained by a closed-cycle recirculating cooling water system;

(2) You must design and construct each cooling water intake structure at your facility to a maximum through-screen design intake velocity of 0.5 ft/s;

(3) You must design and construct your cooling water intake structure such that the total design intake flow from all cooling water intake structures at your facility meets the following requirements:

(i) For cooling water intake structures located in a freshwater river or stream, the total design intake flow must be no greater than five (5) percent of the source water annual mean flow;

(ii) For cooling water intake structures located in a lake or reservoir, the total design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);

(iii) For cooling water intake structures located in an estuary or tidal river, the total design intake flow over one tidal cycle of ebb and flow must be no greater than one (1) percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level;

(4) You must select and implement design and construction technologies or operational measures for minimizing impingement mortality of fish and shellfish if:

(i) There are threatened or endangered or otherwise protected federal, state, or tribal species, or critical habitat for these species, within the hydraulic zone of influence of the cooling water intake structure; or

(ii) Based on information submitted by any fishery management agency(ies) or other relevant information, there are migratory and/or sport or commercial species of impingement concern to the Director that pass through the hydraulic zone of influence of the cooling water intake structure; or

(iii) It is determined by the Director, based on information submitted by any fishery management agency(ies) or other relevant information, that the proposed facility, after meeting the technology-based performance requirements in paragraphs (b)(1), (2), and (3) of this section, would still contribute unacceptable stress to the protected species, critical habitat of those species, or species of concern;

(5) You must select and implement design and construction technologies or operational measures for minimizing entrainment of entrainable life stages of fish and shellfish if:

(i) There are threatened or endangered or otherwise protected federal, state, or tribal species, or critical habitat for these species, within the hydraulic zone of influence of the cooling water intake structure; or

(ii) Based on information submitted by any fishery management agency(ies) or other relevant information, there are or would be undesirable cumulative stressors affecting entrainable life stages of species of concern to the Director and the Director determines that the proposed facility, after meeting the technology-based performance requirements in paragraphs (b)(1), (2), and (3) of this section, would still contribute unacceptable stress to the protected species, critical habitat of those species, or these species of concern;

(6) You must submit the application information required in 40 CFR 122.21(r) and § 125.86(b);

(7) You must implement the monitoring requirements specified in § 125.87;

(8) You must implement the record-keeping requirements specified in § 125.88.

(c) Track I requirements for new facilities that withdraw equal to or greater than 2 MGD and less than 10 MGD and that choose not to comply with paragraph (b) of this section. You must comply with all the following requirements:

(1) You must design and construct each cooling water intake structure at your facility to a maximum through-screen design intake velocity of 0.5 ft/s;

(2) You must design and construct your cooling water intake structure such that the total design intake flow from all cooling water intake structures at your facility meets the following requirements:

(i) For cooling water intake structures located in a freshwater river or stream, the total design intake flow must be no greater than five (5) percent of the source water annual mean flow;

(ii) For cooling water intake structures located in a lake or reservoir, the total design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);

(iii) For cooling water intake structures located in an estuary or tidal river, the total design intake flow over one tidal cycle of ebb and flow must be no greater than one (1) percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level;

(3) You must select and implement design and construction technologies or operational measures for minimizing impingement mortality of fish and shellfish if:

(i) There are threatened or endangered or otherwise protected federal, state, or tribal species, or critical habitat for these species, within the hydraulic zone of influence of the cooling water intake structure; or

(ii) Based on information submitted by any fishery management agency(ies) or other relevant information, there are migratory and/or sport or commercial species of impingement concern to the Director that pass through the hydraulic zone of influence of the cooling water intake structure; or

(iii) It is determined by the Director, based on information submitted by any fishery management agency(ies) or other relevant information, that the proposed facility, after meeting the technology-based performance requirements in paragraphs (c)(1) and (2) of this section, would still contribute unacceptable stress to the protected species, critical habitat of those species, or species of concern;

(4) You must select and implement design and construction technologies or operational measures for minimizing entrainment of entrainable life stages of fish and shellfish;

(5) You must submit the application information required in 40 CFR 122.21(r) and § 125.86(b)(2), (3), and (4);

(6) You must implement the monitoring requirements specified in § 125.87;

(7) You must implement the recordkeeping requirements specified in § 125.88.

(d) Track II. The owner or operator of a new facility that chooses to comply under Track II must comply with the following requirements:

(1) You must demonstrate to the Director that the technologies employed will reduce the level of adverse environmental impact from your cooling water intake structures to a comparable level to that which you would achieve were you to implement the requirements of paragraphs (b)(1) and (2) of this section. This demonstration must include a showing that the impacts to fish and shellfish, including important forage and predator species, within the watershed will be comparable to those which would result if you were to implement the requirements of paragraphs (b)(1) and (2) of this section.

This showing may include consideration of impacts other than impingement mortality and entrainment, including measures that will result in increases in fish and shellfish, but it must demonstrate comparable performance for species that the Director identifies as species of concern. In identifying such species, the Director may consider information provided by any fishery management agency(ies) along with data and information from other sources.

(2) You must design and construct your cooling water intake structure such that the total design intake flow from all cooling water intake structures at your facility meet the following requirements:

(i) For cooling water intake structures located in a freshwater river or stream, the total design intake flow must be no greater than five (5) percent of the source water annual mean flow;

(ii) For cooling water intake structures located in a lake or reservoir, the total design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water except in cases where the disruption is determined to be beneficial to the management of fisheries for fish and shellfish by any fishery management agency(ies);

(iii) For cooling water intake structures located in an estuary or tidal river, the total design intake flow over one tidal cycle of ebb and flow must be no greater than one (1) percent of the volume of the water column within the area centered about the opening of the intake with a diameter defined by the distance of one tidal excursion at the mean low water level.

(3) You must submit the application information required in 40 CFR 122.21(r) and § 125.86(c).

(4) You must implement the monitoring requirements specified in § 125.87.

(5) You must implement the record-keeping requirements specified in § 125.88.

(e) You must comply with any more stringent requirements relating to the location, design, construction, and capacity of a cooling water intake structure or monitoring requirements at a new facility that the Director deems are reasonably necessary to comply with any provision of state law, including compliance with applicable state water quality standards (including designated uses, criteria, and antidegradation requirements).

HISTORY: [66 FR 65256, 65340, Dec. 18, 2001; 67 FR 78948, 78954, Dec. 26, 2002, withdrawn at 68 FR 14164, Mar. 24, 2003; 68 FR 36749, 36754, June 19, 2003]

AUTHORITY: AUTHORITY NOTE APPLICABLE TO ENTIRE PART:
The Clean Water Act, 33 U.S.C. 1251 et seq.

NOTES: [EFFECTIVE DATE NOTE: 68 FR 36749, 36754, June 19, 2003, amended this section, effective July 21, 2003.]

NOTES APPLICABLE TO ENTIRE CHAPTER:
[PUBLISHER'S NOTE: Nomenclature changes to Chapter I appear at 65 FR 47323, 47324, 47325, Aug. 2, 2000.]
[PUBLISHER'S NOTE: For Federal Register citations concerning Chapter 1 Notice of implementation policy, see: 71 FR 25504, May 1, 2006.]

NOTES TO DECISIONS: COURT AND ADMINISTRATIVE DECISIONS SIGNIFICANTLY DISCUSSING SECTION --
Riverkeeper, Inc. v United States EPA (2004, CA2) 358 F3d 174, 57 Envt Rep Cas 1961, 34 ELR 20017

1778 words

29

LEXSTAT 40 CFR 125.94

*** THIS SECTION IS CURRENT THROUGH THE JANUARY 14, 2009 ISSUE OF ***
*** THE FEDERAL REGISTER ***

TITLE 40 -- PROTECTION OF ENVIRONMENT
CHAPTER I -- ENVIRONMENTAL PROTECTION AGENCY
SUBCHAPTER D -- WATER PROGRAMS
PART 125 -- CRITERIA AND STANDARDS FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
SUBPART J -- REQUIREMENTS APPLICABLE TO COOLING WATER INTAKE STRUCTURES FOR PHASE II EXISTING FACILITIES UNDER SECTION 316(B) OF THE ACT

Go to the CFR Archive Directory

40 CFR 125.94

§ 125.94 How will requirements reflecting best technology available for minimizing adverse environmental impact be established for my Phase II existing facility? [This section is suspended. See 72 FR 37107, 37109, July 9, 2007.]

[PUBLISHER'S NOTE: This section was suspended for an indefinite period of time at 72 FR 37107, 37109, July 9, 2007, effective July 9, 2007.]

(a) Compliance alternatives. You must select and implement one of the following five alternatives for establishing best technology available for minimizing adverse environmental impact at your facility:

(1)(i)You may demonstrate to the Director that you have reduced, or will reduce, your flow commensurate with a closed-cycle recirculating system. In this case, you are deemed to have met the applicable performance standards and will not be required to demonstrate further that your facility meets the impingement mortality and entrainment performance standards specified in paragraph (b) of this section. In addition, you are not subject to the requirements in §§ 125.95, 125.96, 125.97, or 125.98. However, you may still be subject to any more stringent requirements established under paragraph (e) of this section; or

(ii) You may demonstrate to the Director that you have reduced, or will reduce, your maximum through-screen design intake velocity to 0.5 ft/s or less. In this case, you are deemed to have met the impingement mortality performance standards and will not be required to demonstrate further that your facility meets the performance standards for impingement mortality specified in paragraph (b) of this section and you are not subject to the requirements in §§ 125.95, 125.96, 125.97, or 125.98 as they apply to impingement mortality. However, you are still subject to any applicable requirements for entrainment reduction and may still be subject to any more stringent requirements established under paragraph (e) of this section.

(2) You may demonstrate to the Director that your existing design and construction technologies, operational measures, and/or restoration measures meet the performance standards specified in paragraph (b) of this section and/or the restoration requirements in paragraph (c) of this section.

(3) You may demonstrate to the Director that you have selected, and will install and properly operate and maintain, design and construction technologies, operational measures, and/or restoration measures that will, in combination with any existing design and construction technologies, operational measures, and/or restoration measures, meet the performance standards specified in paragraph (b) of this section and/or the restoration requirements in paragraph (c) of this section;

(4) You may demonstrate to the Director that you have installed, or will install, and properly operate and maintain an approved design and construction technology in accordance with § 125.99(a) or (b); or

(5) You may demonstrate to the Director that you have selected, installed, and are properly operating and maintaining, or will install and properly operate and maintain design and construction technologies, operational measures, and/or restoration measures that the Director has determined to be the best technology available to minimize adverse environmental impact for your facility in accordance with paragraphs (a)(5)(i) or (ii) of this section.

(i) If the Director determines that data specific to your facility demonstrate that the costs of compliance under alternatives in paragraphs (a)(2) through (4) of this section would be significantly greater than the costs considered by the Administrator for a facility like yours in establishing the applicable performance standards in paragraph (b) of this section, the Director must make a site-specific determination of the best technology available for minimizing adverse environmental impact. This determination must be based on reliable, scientifically valid cost and performance data submitted by you and any other information that the Director deems appropriate. The Director must establish site-specific alternative requirements based on new and/or existing design and construction technologies, operational measures, and/or restoration measures that achieve an efficacy that is, in the judgment of the Director, as close as practicable to the applicable performance standards in paragraph (b) of this section, without resulting in costs that are significantly greater than the costs considered by the Administrator for a facility like yours in establishing the applicable performance standards. The Director's site-specific determination may conclude that design and construction technologies, operational measures, and/or restoration measures in addition to those already in place are not justified because of the significantly greater costs. To calculate the costs considered by the Administrator for a facility like yours in establishing the applicable performance standards you must:

(A) Determine which technology the Administrator modeled as the most appropriate compliance technology for your facility;

(B) Using the Administrator's costing equations, calculate the annualized capital and net operation and maintenance (O&M) costs for a facility with your design intake flow using this technology;

(C) Determine the annualized net revenue loss associated with net construction downtime that the Administrator modeled for your facility to install this technology;

(D) Determine the annualized pilot study costs that the Administrator modeled for your facility to test and optimize this technology;

(E) Sum the cost items in paragraphs (a)(5)(i)(B), (C), and (D) of this section; and

(F) Determine if the performance standards that form the basis of these estimates (i.e., impingement mortality reduction only or impingement mortality and entrainment reduction) are applicable to your facility, and if necessary, adjust the estimates to correspond to the applicable performance standards.

(ii) If the Director determines that data specific to your facility demonstrate that the costs of compliance under alternatives in paragraphs (a)(2) through (4) of this section would be significantly greater than the benefits of complying with the applicable performance standards at your facility, the Director must make a site-specific determination of best technology available for minimizing adverse environmental impact. This determination must be based on reliable, scientifically valid cost and performance data submitted by you and any other information the Director deems appropriate. The Director must establish site-specific alternative requirements based on new and/or existing design and construction technologies, operational measures, and/or restoration measures that achieve an efficacy that, in the judgment of the Director, is as close as practicable to the applicable performance standards in paragraph (b) of this section without resulting in costs that are significantly greater than the benefits at your facility. The Director's site-specific determination may conclude that design and construction technologies, operational measures, and/or restoration measures in addition to those already in place are not justified because the costs would be significantly greater than the benefits at your facility.

(b) National performance standards. -- (1) Impingement mortality performance standards. If you choose compliance alternatives in paragraphs (a)(2), (a)(3), or (a)(4) of this section, you must reduce impingement mortality for all life stages of fish and shellfish by 80 to 95 percent from the calculation baseline.

(2) Entrainment performance standards. If you choose compliance alternatives in paragraphs (a)(1)(ii), (a)(2), (a)(3), or (a)(4) of this section, you must also reduce entrainment of all life stages of fish and shellfish by 60 to 90 percent from the calculation baseline if:

(i) Your facility has a capacity utilization rate of 15 percent or greater, and

(ii)(A) Your facility uses cooling water withdrawn from a tidal river, estuary, ocean, or one of the Great Lakes; or

(B) Your facility uses cooling water withdrawn from a freshwater river or stream and the design intake flow of your cooling water intake structures is greater than five percent of the mean annual flow.

(3) Additional performance standards for facilities withdrawing from a lake (other than one of the Great Lakes) or a reservoir. If your facility withdraws cooling water from a lake (other than one of the Great Lakes) or a reservoir and you propose to increase the design intake flow of cooling water intake structures it uses, your increased design intake flow must not disrupt the natural thermal stratification or turnover pattern (where present) of the source water, except in cases where the disruption does not adversely affect the management of fisheries. In determining whether any such disruption does not adversely affect the management of fisheries, you must consult with Federal, State, or Tribal fish and wildlife management agencies).

(4) Use of performance standards for site-specific determinations of best technology available. The performance standards in paragraphs (b)(1) through (3) of this section must also be used for determining eligibility for site-specific determinations of best technology available for minimizing adverse environmental impact and establishing site specific requirements that achieve an efficacy as close as practicable to the applicable performance standards without resulting in costs that are significantly greater than those considered by the Administrator for a facility like yours in establishing the performance standards or costs that are significantly greater than the benefits at your facility, pursuant to § 125.94(a)(5).

(c) Requirements for restoration measures. With the approval of the Director, you may implement and adaptively manage restoration measures that produce and result in increases of fish and shellfish in your facility's watershed in place of or as a supplement to installing design and control technologies and/or adopting operational measures that reduce impingement mortality and entrainment. You must demonstrate to the Director that:

(1) You have evaluated the use of design and construction technologies and operational measures for your facility and determined that the use of restoration measures is appropriate because meeting the applicable performance standards or site-specific requirements through the use of design and construction technologies and/or operational measures alone is less feasible, less cost-effective, or less environmentally desirable than meeting the standards or requirements in whole or in part through the use of restoration measures; and

(2) The restoration measures you will implement, alone or in combination with design and construction technologies and/or operational measures, will produce ecological benefits (fish and shellfish), including maintenance

or protection of community structure and function in your facility's waterbody or watershed, at a level that is substantially similar to the level you would achieve by meeting the applicable performance standards under paragraph (b) of this section, or that satisfies alternative site-specific requirements established pursuant to paragraph (a)(5) of this section.

(d)(1) Compliance using a technology installation and operation plan or restoration plan. If you choose one of the compliance alternatives in paragraphs (a)(2), (3), (4), or (5) of this section, you may request that compliance with the requirements of § 125.94(b) during the first permit containing requirements consistent with this subpart be determined based on whether you have complied with the construction, operational, maintenance, monitoring, and adaptive management requirements of a Technology Installation and Operation Plan developed in accordance with § 125.95(b)(4)(ii) (for any design and construction technologies and/or operational measures) and/or a Restoration Plan developed in accordance with § 125.95(b)(5) (for any restoration measures). The Technology Installation and Operation Plan must be designed to meet applicable performance standards in paragraph (b) of this section or alternative site-specific requirements developed pursuant to paragraph (a)(5) of this section. The Restoration Plan must be designed to achieve compliance with the applicable requirements in paragraph (c) of this section.

(2) During subsequent permit terms, if you selected and installed design and construction technologies and/or operational measures and have been in compliance with the construction, operational, maintenance, monitoring, and adaptive management requirements of your Technology Installation and Operation Plan during the preceding permit term, you may request that compliance with the requirements of § 125.94 during the following permit term be determined based on whether you remain in compliance with your Technology Installation and Operation Plan, revised in accordance with your adaptive management plan in § 125.95(b)(4)(ii)(C) if applicable performance standards are not being met. Each request and approval of a Technology Installation and Operation Plan shall be limited to one permit term.

(3) During subsequent permit terms, if you selected and installed restoration measures and have been in compliance with the construction, operational, maintenance, monitoring, and adaptive management requirements in your Restoration Plan during the preceding permit term, you may request that compliance with the requirements of this section during the following permit term be determined based on whether you remain in compliance with your Restoration Plan, revised in accordance with your adaptive management plan in § 125.95(b)(5)(v) if applicable performance standards are not being met. Each request and approval of a Restoration Plan shall be limited to one permit term.

(e) More stringent standards. The Director may establish more stringent requirements as best technology available for minimizing adverse environmental impact if the Director determines that your compliance with the applicable requirements of this section would not meet the requirements of applicable State and Tribal law, or other Federal law.

(f) Nuclear facilities. If you demonstrate to the Director based on 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 Nuclear Regulatory Commission's safety requirement.

HISTORY: [69 FR 41576, 41685, July 9, 2004; suspended at 72 FR 37107, 37109, July 9, 2007]

AUTHORITY: AUTHORITY NOTE APPLICABLE TO ENTIRE PART:
The Clean Water Act, 33 U.S.C. 1251 et seq.

NOTES: [EFFECTIVE DATE NOTE: 69 FR 41576, 41685, July 9, 2004, added Subpart J, effective Sept. 7, 2004; 72 FR 37107, 37109, July 9, 2007, suspended this section for an indefinite period of time, effective July 9, 2007.]

NOTES APPLICABLE TO ENTIRE CHAPTER:
[PUBLISHER'S NOTE: Nomenclature changes to Chapter I appear at 65 FR 47323, 47324, 47325, Aug. 2, 2000.]
[PUBLISHER'S NOTE: For Federal Register citations concerning Chapter 1 Notice of implementation policy, see: 71 FR 25504, May 1, 2006.]

2438 words