State of New Jersey

CHRIS CHRISTIE
Governor

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Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
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BOB MARTIN
Commissioner

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
7011 2970 0003 7284 1354
June 10, 2016

John F. Perry, Vice President Salem
PSEG Nuclear LLC
80 Park Plaza
Newark, NJ 07101

Re: Final Surface Water Renewal Permit Action
Category: B -Industrial Wastewater
NJPDES Permit No. NJ0005622
PSEG NUCLEAR LLC SALEM GENERATING STATION
Lower Alloways Creek Township, Salem County

Dear Mr. Perry:

Enclosed is a **final** New Jersey Pollutant Discharge Elimination System (NJPDES) permit action identified above which has been issued in accordance with N.J.A.C. 7:14A. The comment period began on June 30, 2015 and the public notice was published in the *South Jersey Times* as well as the July 8, 2015 *DEP Bulletin*. The draft NJPDES permit was posted on the New Jersey Department of Environmental Protection's (the Department's) website at www.state.nj.us/dep/dwq during the public comment period. The Department held two public hearings (an afternoon and an evening session) at the Old County Court House, Salem, New Jersey (NJ) on August 5, 2015. The public comment period was originally scheduled to end on September 4, 2015 but was extended to September 18, 2015 in accordance with NJAC 7:14A-15.14 and-15.10.

A summary of the significant and relevant comments received on the draft action during the public comment period, the Department's responses, and an explanation of any changes from the draft action have been included in the Response to Comments document attached hereto as per N.J.A.C. 7:14A-15.16.

Any requests for an adjudicatory hearing shall be submitted in writing by certified mail, or by other means which provide verification of the date of delivery to the Department, within 30 days of receipt of this Surface Water Renewal Permit Action in accordance with N.J.A.C. 7:14A-17.2. You may also request a stay of any contested permit condition, which must be justified as per N.J.A.C. 7:14A-17.6 et seq. The adjudicatory hearing request must be accompanied by a completed Adjudicatory Hearing Request Form; the stay request must be accompanied by a completed Stay Request Form. Copies of these forms can be downloaded from the Department's website at http://www.nj.gov/dep/dwq.

As per N.J.A.C. 7:14A-4.2(e)3, any person planning to continue discharging after the expiration date of an existing NJPDES permit shall file an application for renewal at least 180 calendar days prior to the expiration of the existing permit.

All monitoring shall be conducted in accordance with 1) the Department's "Field Sampling Procedures Manual" applicable at the time of sampling (N.J.A.C. 7:14A-6.5(b)4), and/or 2) the method approved by the Department in Part IV of the permit. The Field Sampling Procedures Manual is available at http://www.nj.gov/dep/srp/guidance/fspm/.

As a result of this permit action, your monitoring report forms (MRFs) have been changed and will be mailed to your current MRF recipient. Beginning the effective date of this permit action, please use the new forms. If these revised forms are not received within 2 weeks, please contact the Office of Permit Management at (609) 984-4428 for copies.

On October 22, 2015, the U.S. Environmental Protection Agency (EPA) promulgated the final National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule (see Federal Register 80:204 p. 64064). This rule requires entities regulated under the Clean Water Act NPDES program to report certain information electronically instead of filing paper reports. Consistent with this rule, please be advised that the Department will issue a subsequent permit modification requiring electronic reporting of the MRF's effective December 21, 2016. To view the final rule, please visit https://www.gpo.gov/fdsys/pkg/FR-2015-10-22/pdf/2015-24954.pdf. Information on how to enroll in electronic reporting may be obtained from the Department's website at www.nj.gov/dep/dwq/mrf.htm.

.For your convenience, a schedule of submittal requirements has been included with this permit package.

Questions or comments regarding the final action should be addressed to Heather Genievich or Rachael Pepe at (609) 292-4860.

Sincerely,

Pilar Patterson, Chief
Bureau of Surface Water Permitting
Division of Water Quality

Enclosures

cc: Permit Distribution List
Masterfile #: 15647; PI #: 46814

FACILITY SUBMITTALS

1. GDR - General Discharge Requirements

Task Description	Actual Due Date
Submit a Complete Permit Renewal Application	02/01/2021

2. B - Industrial Wastewater

Task Description	Actual Due Date
Submit an Acute Whole Effluent Toxicity Test Report	02/26/2017
Submit an Acute Whole Effluent Toxicity Test Report	08/26/2017
Submit an Acute Whole Effluent Toxicity Test Report	02/26/2018
Submit an Acute Whole Effluent Toxicity Test Report	08/26/2018
Submit an Acute Whole Effluent Toxicity Test Report	02/26/2019
Submit an Acute Whole Effluent Toxicity Test Report	08/26/2019
Submit an Acute Whole Effluent Toxicity Test Report	02/26/2020
Submit an Acute Whole Effluent Toxicity Test Report	08/26/2020
Submit an Acute Whole Effluent Toxicity Test Report	02/26/2021

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This permit package contains the items below:

New Jersey Department of Environmental Protection
Division of Water Quality
Bureau of Surface Water Permitting

RESPONSE TO COMMENTS

This document contains responses to public comments on the New Jersey Pollutant Discharge Elimination System (NJPDES) draft Surface Water Renewal Permit Action No. NJ0005622 issued to PSEG Nuclear, LLC on June 30, 2015, for discharges from the Salem Generating Station in Lower Alloways Creek Township, Salem County. The comment period began on June 30, 2015 and the public notice was published in the *South Jersey Times* as well as the July 8, 2015 *DEP Bulletin*. The draft NJPDES permit was posted on the New Jersey Department of Environmental Protection's (the Department's) website at www.state.nj.us/dep/dwq during the public comment period. The Department held two public hearings (an afternoon and an evening session) at the Old County Court House, Salem, New Jersey (NJ) on August 5, 2015. The public comment period was originally scheduled to end on September 4, 2015 but was extended to September 18, 2015 in accordance with NJAC 7:14A-15.14 and-15.10.

During the public comment period the Department accepted written comments from numerous parties and individuals. The Department also accepted oral testimony as comments since the public hearings were stenographically recorded and transcribed. The Administrative Record is available for review by requesting an appointment through the Department's Open Public Records Act (OPRA) office where details are available online at www.nj.gov/dep/opra or by calling (609) 341-3121. The Administrative Record includes, but is not limited to, copies of all written comments, testimony given at the public hearings, and any documents identified in this Response to Comments document consistent with NJAC 7:14A-15.17.

The Department has summarized all comments and public testimony received on the draft NJPDES permit. Pursuant to NJAC 7:14A-15.16(a)3, the Department has addressed all comments that are relevant to the scope of the NJPDES permit. The Department has identified the commenters by their respective commenter numbers. If a person submitted written comments as well as testimony at the public hearing under the same affiliation, then that person was assigned one commenter number. The Department has provided responses to these comments as well as an explanation of any changes from the draft action. A list of acronyms used in this document is included at the end of this response to comments document.

Public Service Energy Group Nuclear LLC ("PSEG" or the "permittee") is the operator of the Salem Generating Station ("PSEG-Salem", the "Station", or the "plant"). PSEG requested a name change to its NJPDES permit on April 24, 2000 where the previous name was "PSE&G". Throughout this document the Department has utilized the term PSEG in referring to the permittee. Some commenters have utilized the term PSE&G; however, the Department has standardized the term as PSEG.

Testimony at Public Hearing on August 5, 2015		
Afternoon Session		
Person Commenting	**Affiliation / Title**	**Commenter Number**
Michael Egenton	Vice President, New Jersey Business and Industry Association	1
Jeff Tittel	Director, New Jersey Sierra Club	2
John Rogalo	Vice President, New Jersey State Federation of Sportsmen's Clubs - North	3

Person Commenting	Affiliation / Title	Commenter Number
Phil Sgro	Deputy Director, New Jersey Energy Coalition	4
Moe Hufsey	Nuclear Business Agent, IBEW Local 94	5
Helene Pierson	Community Development Director, Stand Up for Salem	6
David Bailey, Jr.	CEO, Ranch Hope, Incorporated	7
Jennifer Jones	Executive Director, Salem County Chamber of Commerce	8
Bob Braun	Chief Nuclear Officer, PSEG Nuclear	9
Richard Horwitz	Lead Scientist, Fishery Section, Patrick Center for Environmental Research, Academy of Natural Sciences of Drexel University	10
Eric Sparks	Aide to Senate President Steve Sweeney, Assemblyman John Burzichelli and Assemblyman Adam Taliaferro	11
Kathy Klein	President, Water Resources Association of the Delaware River Basin	12
Dr. Barbara Brummer	State Director, New Jersey Chapter of the Nature Conservancy	13
Doug O'Malley	Director, Environment New Jersey	14
Bill Wolfe	Self	15
Julie Acton	Salem County Freeholder	16

Testimony at Public Hearing on August 5, 2015		
Evening Session		
Person Commenting	**Affiliation / Title**	**Commenter Number**
Kathy Wiwel	Educator, Volunteer with Tri-State Bird Rescue and Research, Volunteer with Delaware Bat Spotters Program	17
Bob Braun	Chief Nuclear Officer, PSEG Nuclear	9
Timothy Bradway	Mayor, Township of Lower Alloways Creek	18
Jamie Zaccaria	Representative, New Jersey Sierra Club	19
Tammy Morin	Representative, Women in Nuclear	20
Blaine Burns	Radiation Protection Technologist, PSEG Hope Creek Generating Station	21

Mass E-mails, Letters or Petitions	
Commenter 22 includes those persons who submitted either e-mails, letters or signed a petition for which the content was identical or similar. Individual names are listed as Attachment 1 at the end of this document.	22
Commenter 23 includes those persons who submitted either e-mails, letters or signed a petition for which the content was identical or similar. Individual names are listed as Attachment 2 at the end of this document.	23

Written Comments		
Person Commenting	**Affiliation / Title**	**Commenter Number**
Kim Vanderslice	Resident of Salem County	24
Jean Public	Self	25
Michael Cathell	Self	26
Eric C. Butto, Jr.	Delaware Bay Fisherman	27
Sara Bluhm	Vice President, Environment, Energy & Federal Affairs, New Jersey Business and Industry Association	28
Jeff Tittel	Sierra Club, New Jersey Chapter	2
John Bullard	Regional Administrator, National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS)	29
Eric Schrading	Field Supervisor, United States Fish and Wildlife Service (USFWS), New Jersey Field Office	30
Jim Vogt David Pringle David Carter Charlie Furst Maya van Rossum Doug O'Malley Jeff Tittel Cindy Zipf	President, Aquashicola / Pohopoco Watershed Conservancy NJ Campaign Director, Clean Water Action President, Delaware Audubon Society Delaware River Shad Fishermen's Association The Delaware Riverkeeper, Delaware Riverkeeper Network Director, Environment New Jersey Director, NJ Sierra Club Executive Director, Clean Ocean Action	31
Leroy M. Young, Jr.	Policy Committee Chairman, Delaware River Basin Fish & Wildlife Management Cooperative	32
Amy Roe, PhD	Conservation Chair, Delaware Audubon Society	33
Tim Dillingham	Executive Director, American Littoral Society	34
Maya K. van Rossum	The Delaware Riverkeeper, Delaware Riverkeeper Network	35
Cindy Zipf	Executive Director, Clean Ocean Action	36
Emile DeVito, PhD	Manager of Science and Stewardship, NJ Conservation Foundation	37
Grace Neff	Self	38
David Saveikis	Director, Division of Fish and Wildlife, Delaware Department of Natural Resources and Environmental Control	39
Chris Ford	Self	40
Patricia P. Smith	Self	41
Virginia Tamuts	Self	42
Donna Burch	Self	43
David Pringle	Self	44
Suzanne Curry	Self	45
Zachary Nickerson	Self	46

Judith K. Canepa	Co-Founder, New York Climate Action Group	47
Tim Dillingham Cpt. Paul Eidman Jim Vogt Frank O'Donnell David Pringle Cindy Zipf Norm Cohen Amy Roe, PhD Maya van Rossum Charles Furst Doug O'Malley Paul Haertel Jeff Tittel Christine Nolan	Executive Director, American Littoral Society Director, Anglers Conservation Network NJ Campaign Director, Clean Water Action President, Blue Mountain Preservation Association President, Delaware Audubon Society Executive Director, Clean Ocean Action Executive Director, Coalition for Peace and Justice Conservation Chair, Delaware Audubon Society The Delaware Riverkeeper, Delaware Riverkeeper Network Delaware River Shad Fishermen's Association Director, Environment New Jersey President, Jersey Coast Anglers Association Director, NJ Sierra Club Executive Director, South Jersey Land and Water Trust	48
John K. Perry	Vice President, Salem, PSEG	PSEG Comment

To the extent practicable, the Department has grouped the comments into the following general categories:

General Topics	**Comment Numbers**
Administrative Issues	Comments 1 to 3
Ancillary Issues	Comments 4 to 8
Closed-Cycle Cooling or Cooling Towers	Comments 9 to 22
Impingement and Entrainment Losses	Comments 23 to 29
Impacts of Losses	Comments 30 to 38
Estuary Enhancement Program	Comments 39 to 45
Special Conditions	Comments 46 to 52
Thermal Issues	Comments 53 to 58
Other	Comment 59
PSEG Comments	PSEG Comment 1 to 22

Comment 1

Many commenters (represented collectively as Commenter 22) request an extension to the public comment period to encompass 120 days, arguing that it took the Department nine years to review all the materials necessary to craft the 151 page draft NJPDES permit. These commenters also claim that it is unfair and disingenuous for the Department to allow a public comment period of only 60 days during the height of the summer vacation season. These commenters request a minimum of five public hearings with three to be held in impacted New Jersey communities; one in Delaware; and one in Pennsylvania given that all these communities are impacted by the outcome of permitting for the PSEG-Salem facility. These commenters ask that these additional hearings be scheduled for September which would ensure that people have returned from summer vacation and can be prepared to be fully informed and engaged.

Commenter 14 states that the Department should reconsider its decision to deny the request by the Riverkeeper to extend the public comment period.

Commenter 14 states that the Department should consider broadening the area for public comment by holding three public hearings in South Jersey (one in Trenton), one in Pennsylvania, and one in Delaware. Commenter 33 expresses disappointment that a hearing was not held in Delaware.

Commenter 25 states that all public comments should be visible online. Commenter 25 expresses concern that public comments are not counted properly or taken into consideration in an appropriate manner.

(Commenter 14, 22, 25, 33, 42, 44, 47, 48)

Response 1

The Department issued a draft NJPDES permit on June 30, 2015. Pursuant to NJAC 7:14A-15.10(c)1.i., the comment period for NJPDES permits "shall close no sooner than 30 days after the last newspaper publication." However, as specified in the public notice of the draft NJPDES permit, the Department established a 60 day public comment period by stating that the public comment period would end 60 days after the appearance of the public notice in the *South Jersey Times*. The Department provided an extended public comment period of 60 days in anticipation of significant public interest in this draft permit and also posted the draft NJPDES permit on its website at www.state.nj.us/dep/dwq. Given the fact that the public notice was published on July 5, 2015, the comment period was due to expire on September 4, 2015.

As detailed in the public notice and as described previously, the Department held two public hearings (an afternoon and an evening session) at the Old County Court House in Salem, NJ on August 5, 2015. These public hearings allowed sufficient opportunity for members of the public to speak since all who expressed an interest in speaking were allotted ample time to do so. As a result, the Department determined that additional public hearings were unnecessary. If concerned citizens were unable to attend the public hearings, written comments could be submitted via regular mail or e-mail to the name and address printed in the public notice. The Department weighs both oral and written comments equally.

While the Department already doubled the comment period beyond that required by its NJPDES regulations, the Department extended the public comment period an additional 14 days as a courtesy in accordance with NJAC 7:14A-15.14 and-15.10. As a result, the public comment period closed on September 18, 2015. All interested parties who had previously provided comment or expressed interest in the NJPDES permit renewal were notified of this extension to the public comment period.

All public comments as well as testimony from the public hearings are considered part of the Administrative Record which is available for inspection by appointment, Monday through Friday, between 8:30 A.M. and 4:00 P.M. Appointments for inspection may be requested through the OPRA office. Details are available online at www.nj.gov/dep/opra or by calling (609) 341-3121. All comments have been summarized and responded to in this Response to Comments document pursuant to NJAC 7:14A-15.16. While individual public comments and the public hearing transcript are not displayed online, the final permit (which includes this Response to Comments document) is available online at www.state.nj.us/dep/dwq.

Comment 2

Commenter 33 asks that a copy of its comments be submitted to the United States Environmental Protection Agency (EPA) as well as the complete hearing record so that EPA can use this information in its evaluation of the NJPDES permit. Commenter 33 also asks to be kept apprised of the process for finalizing the NJPDES permit and that a copy of any final permit or revised draft permit be transmitted as soon as it becomes available.

(Commenter 33)

Response 2

Under both federal and state law, the re-issuance of this NJPDES permit is the responsibility of the Department, which implements the NJPDES program under authority delegated by the EPA pursuant to the federal Clean Water Act. NJAC 7:14A-2.1(a); see 33 U.S.C.A. 1342(b). Under federal law, the Department is required to notify the EPA of each NJPDES permit proposed to be issued by the Department, and the Department may issue a final permit if the EPA does not object in writing within ninety days. 33 U.S.C.A. 1342(d).

The Department has complied with the federal requirements for issuance of this NJPDES permit by timely notifying the EPA of the proposed permit. The Department provided a copy of the draft NJPDES permit to EPA Region 2 on June 30, 2015. Circulation of the draft NJPDES permit for input and comment to EPA Region 2 is consistent with the April 13, 1982 Memorandum of Agreement (MOA) in which the National Pollutant Discharge Elimination System (NPDES) program was delegated to the Department. EPA Region 2 has not objected to the issuance of this permit. The Department is willing to provide copies of any public comments or testimony to EPA Region 2 should EPA Region 2 request them. However, at this time, no further review by the EPA is required before issuance of the final permit.

The Department has provided notification of the release of the final permit to Commenter 33 as well as to all persons who submitted written comments (including e-mail) or oral testimony pursuant to NJAC 7:14A-15.15. The Department has posted the final NJPDES permit on the Division of Water Quality website at www.state.nj.us/dep/dwq. The Department will also send hard copies of the final permit to accommodate those who do not have e-mail access. The Department maintains that these comprehensive measures go beyond the measures required by the NJPDES Regulations.

Comment 3

Some commenters cite the delays in the renewal of the 2006 NJPDES permit. Commenter 2 notes that the NJPDES permit has been expired for 10 years. Commenter 31 states that PSEG-Salem has been operating under a permit that was administratively extended through a legal loophole but should have expired nine years ago and was issued 14 years ago.

(Commenter 2, 31)

Response 3

This subject NJPDES permit action serves to renew the NJPDES permit that was issued to the permittee on June 29, 2001 and expired on July 31, 2006. Because the permittee submitted a timely renewal application, the terms of the 2001 NJPDES permit remain in full force and effect until such time as this subject renewal permit becomes effective. The administrative extension of an expired NJPDES permit is legal as it is in

accordance with the NJPDES Regulations at NJAC 7:14A-2.8(a). The delay in the Department's renewal of the June 29, 2001 NJPDES permit is due largely to the repeated delays by EPA to issue Section 316(b) regulations for existing facilities pursuant to a federal consent decree, as described in further detail in **Response 10.**

Comment 4

A number of commenters support the final permit and state that PSEG-Salem provides economic benefits, jobs, and is an important part of the community. Commenter 1 states that PSEG's Hope Creek and Salem nuclear facilities are a primary economic engine for the local community. Commenter 1 states that PSEG is the largest employer in Salem County with more than 1500 employees. Commenter 8 states that local jobs provided by PSEG benefit small businesses. Commenter 6 states that PSEG-Salem is a great community partner as it sponsors numerous community events and neighborhood revitalization efforts. Commenter 7 states that PSEG and its management team support nonprofit projects throughout Salem County and in the greater community.

Commenter 6 states that PSEG is effective in educating and communicating with the community and that the local workforce is professional and dedicated. Commenter 18 states that PSEG staff is "top notch" and strives to keep the mayor of Lower Alloways Creek Township and residents well informed and prepared for any situation that arises at the Station. Commenter 18 states that PSEG strives to be transparent regarding the safety and well-being of the community.

(Commenter 1, 4, 6, 7, 8, 18, 24, 28)

Response 4

The Department acknowledges these comments asserting that PSEG–Salem benefits the local and regional economy as well as statements that relate to PSEG-Salem being a community partner and sponsor of local events. However, these general statements are not specific to the conditions of the NJPDES permit. In addition, while the Department acknowledges positive comments that relate to PSEG's communication and education efforts with the local community, these issues are outside the scope of the NJPDES permit.

Comment 5

Commenter 15 states that issues relating to PSEG being a good neighbor, generating jobs and contributing to economic development are unrelated to permit decision making. Regulatory decisions must be based on published peer reviewed science. Commenter 2 states that PSEG's support of groups across the state should not be used as a rationale to re-issue the Station's NJPDES permit.

Commenter 41 states that PSEG has been given an unfair advantage in the permitting process due to its financial and political influence in the state. Commenter 41 states that it is inappropriate for PSEG to be accorded a higher value than the citizens who consume the power generated, pay taxes, and wish to have input into what happens around our waterways. Commenter 43 states that even though PSEG generates revenues and jobs for New Jersey and the local economy, PSEG should be a good steward of our natural resources.

(Commenter 2, 15, 41, 43)

Response 5

As noted in **Response 4**, the Department agrees that ancillary issues such as PSEG being a good neighbor, generating jobs, contributing to economic development, and supporting various groups are not specific to the conditions of this NJPDES permit. This NJPDES permit is premised on state and federal regulations as described in detail in the draft permit Fact Sheet. The Department maintains that this final permit is in accordance with applicable state and federal regulations including those federal regulations that implement Section 316(a) and 316(b) of the federal Clean Water Act.

The Department disagrees with assertions that the permittee was given an advantage in the permitting process. As noted above, all relevant regulations were considered and implemented. The Department solicited public input and considered all public comments along with those of PSEG, as required by the NJPDES Regulations at NJAC 7:14A-15.

Comment 6

Several commenters cite benefits of the plant for power production. Commenter 1 states that the continued operation of PSEG-Salem and PSEG-Hope Creek is critical to the reliability of the system, particularly in light of the scheduled retirement of Oyster Creek in 2019. Commenter 4 states that PSEG-Salem Units 1 and 2 have compiled an exemplary service record since beginning commercial operations in 1977 and 1981, respectively. Commenter 4 states that PSEG-Salem produces safe, environmentally friendly base-load power on a year-round basis to over 2.5 million homes. Commenter 4 states that the PSEG-Salem plants continue to set new standards for producing safe, reliable and affordable energy without the production of greenhouse gases. Commenter 28 states that nuclear power generation is emission free, reliable, and a source of 52% of New Jersey's power.

Some commenters cite the benefits of nuclear power production from the standpoint of air pollution. Commenter 5 states that the 2400 megawatts of base-load power supplied by PSEG-Salem Units 1 and 2 helps to ensure that New Jersey is on track to meet the carbon dioxide emissions requirements by 2020 given that nuclear plants do not produce greenhouse gases, NO_x, SO_x or other air particulates. Commenter 5 states that 2400 megawatts of replacement power cannot be ready overnight; is unlikely to come from solar; and is more likely to come from dirtier generating stations to our west which is not in our best interest. Commenter 28 states that retrofitting with closed-cycle cooling would result in a measurable environmental detriment due to increased air emissions and would pose challenges for the state in complying with the United States EPA Clean Power Plan.

Commenter 17 cites issues related to climate change and issues related to land requirements for renewable energy sources. Commenter 17 states that carbon emissions must be reduced to combat climate change and the PSEG-Salem nuclear plants generate large amounts of carbon-free power more reliably than any renewable power facility. In addition to these plants being online 90% of the time or greater, this power generation takes place on a substantially smaller footprint in comparison to equivalent renewables. Commenter 17 states that the size of a wind farm needed to equal the electrical output of the PSEG-Salem generating units would be roughly 4000 large scale turbines occupying a land mass of over 450,000 acres or over 700 square miles. Similarly, a photo-voltaic solar installation would occupy between 11,000 and 22,000 acres, or more than 30 square miles. In addition to power generation from renewable energy sources being available nominally for only 20% of the time in our region, some means of energy storage would be necessary to provide power during the other 80% of the time. Commenter 17 states that there would be significant impacts to regional and migratory bird and bat populations from the extremely large footprint that

would be necessary for the size for any renewable power facility. The use of large contiguous land areas for renewables has an equally detrimental impact to the habitats of many other wildlife species.

Commenter 17 cites other impacts from wind farms and turbines to bats and avian species. Commenter 17 cites that research indicates that large scale wind farms are killing increasing numbers of raptors and other migratory bird species due to collisions with turbine towers and blade impacts. Wind turbines have been shown to attract and kill regional bats thus impacting already declining populations. Wind turbines can also harm bats and birds as their lungs can violently rupture when they fly through the large pressure drop produced by spinning wind turbine blades. Finally, large scale wind farms have also been shown to negatively affect migratory patterns of avian species due to the extensive land masses required to generate meaningful amounts of electricity.

(Commenter 1, 4, 5, 17, 28)

Response 6

The Department did not consider the relative benefits of nuclear versus other forms of energy production when evaluating the permit renewal application as these considerations are beyond the scope of the analysis required by 40 CFR Section 122.21(r) for NJPDES permit actions. The EPA, in adopting final Section 316(b) standards, considered a range of societal costs to make its determination that closed cycle cooling should not be categorically required at existing electric generating facilities. 40 Fed. Reg. 48389-48392.

The commenters' specific contentions relating to nuclear power production are not directly relevant to the regulatory standards governing issuance of this NJPDES permit. This includes general issues relating to safety, reliability and land impacts from renewable power sources. The Department acknowledges these comments for the purpose of the Administrative Record.

The Department also acknowledges the general comments that relate to air pollution that could result from replacement power. This NJPDES permit action requires a Non-water Quality Environmental and Other Impacts Study in accordance with the Section 316(b) regulations at 40 CFR 122.21(r)(12) as Part IV.G.8.c. This study requires submission of a detailed facility-specific discussion of the changes in non-water quality environmental and other impacts attributed to each technology and operational measure considered as part of the Comprehensive Technical Feasibility and Cost Evaluation Study (which is required as Part IV.G.8.a as per 40 CFR 122.21(r)(10)) Factors relevant to this study include estimates of changes to energy consumption; air pollutant emissions and associated human health and environmental impacts; safety; and reliability.

Comment 7

Commenter 24 supports the construction of another reactor at the site and suggests that the United States Nuclear Regulatory Commission (USNRC) give approval for such.

(Commenter 24)

Response 7

The Department acknowledges that this commenter suggests that approval be granted for another reactor at the site. These issues are outside the scope of this NJPDES permit since this subject NJPDES permit does

not authorize any water withdrawal or discharge associated with another reactor. For key documents and correspondence relating to the status of a third reactor, please refer to the USNRC's website at www.nrc.gov/reactors/new-reactors/esp/pseg.html.

Comment 8

Commenter 42 contends that the energy production from PSEG is unnecessary for the PJM (Pennsylvania, New Jersey, Maryland) grid.

Commenter 45 states that while we need energy, we need power plants that are up to code and that produce the least amount of by-products and detrimental effects.

(Commenter 42, 45)

Response 8

Issues relating to energy production and transmission are not within the regulatory authority of the NJPDES permit and are rather controlled by PJM. The PJM Interconnection is a regional transmission organization that coordinates the movement of wholesale electricity in all or parts of thirteen states (including New Jersey) and the District of Columbia. Additional information regarding PJM can be found at www.pjm.com.

Regarding the request for power plants that are "up to code", PSEG-Salem is subject to a myriad of federal and state regulations which include the regulation of emissions through air, water and other environmental media. While the commenter has cited concern about by-products and detrimental effects, additional detail would be necessary in order to properly respond to this contention and to offer information regarding the implementation of regulations, authority, or controls.

Comment 9

Several commenters express general support for the 2015 NJPDES permit renewal. Commenter 10 states that the draft permit protects the ecological integrity of the Delaware Estuary; balances competing interests; recognizes the efforts that PSEG has made in reducing environmental impacts of the Station; and recognizes the efforts that PSEG has made in increasing the ecological capital of the region. Commenter 1 commends EPA's and New Jersey's thorough analysis and implementation of the Clean Water Act and for recognizing that a one-size-fits-all approach to controlling impingement and entrainment is not appropriate to all facilities. Commenter 1 agrees that other factors, including a site specific cost-benefit analysis, must be considered in order to mitigate any adverse environmental and ecological impacts.

Some commenters state that the current cooling water intake structure is the best technology available for minimizing potential adverse environmental impact. Commenter 10 states that the new regulations define additional analyses that need to be done to document performance of intake technology, estimate impacts, and assess costs and benefits associated with the operation of intakes all of which are reflected in the draft permit conditions with timelines. Commenter 10 states that PSEG has worked to decrease impingement and entrainment mortality and that the upgraded screen technology increases survival of impinged fish. Commenter 3 expresses support for the continuation of permit conditions relating to improved intake screens and fish buckets; a limit on intake flow; and study that requires the use of sound and light to deter fish from entering the intakes.

(Commenter 1, 3, 4, 5, 7, 8, 10, 11, 12, 17, 18, 20, 28)

Response 9

The Department acknowledges these comments which indicate general support of the 2015 NJPDES permit renewal for the purpose of the Administrative Record. Additional details on the application of Section 316(b) of the Clean Water Act are available in **Response 10** as well as in **Response 13.**

Regarding the comment which expresses support of a sound and light study to deter fish from entering the intake, please note that this study was required in the 2001 NJPDES permit renewal but was not carried forward in the 2015 NJPDES permit renewal. Please refer to pages 20 to 24 of the draft permit Fact Sheet which contains a detailed basis and background regarding the Department's conclusions on the feasibility of light and sound deterrents at the cooling water intake structure.

Comment 10

Many commenters (expressed collectively as Commenter 22 and 23) express support for a closed-cycle cooling system or cooling towers. These commenters express opposition to the draft NJPDES permit for PSEG-Salem arguing that the permit grandfathers an outdated cooling technology they claim kills more than 3 billion fish a year, whereas a closed-loop cooling system, they claim, would reduce fish deaths by 95%. Some of the commenters state that closed-cycle cooling is technologically and economically available.

Several commenters state that cooling towers are best technology available (BTA) and are required by the Clean Water Act. Commenter 30 states that BTA for all nuclear power plants that operate in New Jersey is closed-cycle cooling. Commenter 32 states that retrofitting with a closed-cycle cooling system is the only effective measure to adequately protect fishery resources in the Delaware River. Commenter 2 is opposed to the draft permit and states that if this plant was built today, or any time after 1972, it would be required to have a closed-loop system which would resolve the problems of impingement and heated discharge water. Commenters 2 and 19 state that a closed-loop system is feasible from an engineering and economic standpoint. Commenter 46 states that PSEG-Salem should be held to the same standard as PSEG-Hope Creek which is equipped with a cooling tower and uses far less water and avoids thermal pollution. Commenter 14 states that there is clear harm to the Delaware River and there's a clear solution, namely closed-cycle cooling, which is in place on the same site. Commenter 14 states that the plants were outdated from the moment they commenced operation using once-through cooling. Commenters 26 and 27 state that the years of past damage can be reversed by installing a closed-loop cooling system. Commenter 44 states that Governor Christie pledged to stop fish kills caused by PSEG-Salem's cooling water system.

Commenters 29, 30 and 33 state that closed-cycle cooling would drastically reduce the amount of water withdrawn from the Delaware Estuary and significantly reduce the entrainment and impingement of aquatic organisms. Commenter 19 states that the new permit is basically the same as the old permit because it does not require a closed-loop cooling system.

Commenter 35 asserts that to choose an alternative other than closed-cycle cooling, or its functional equivalent, would be arbitrary, capricious and an abuse of discretion by the Department in exercising its best professional judgment (BPJ) given the well documented impingement and entrainment data and high level age-1 equivalent losses; impacts to endangered and threatened species; extended operational life to PSEG-Salem; location of the facility in the ecosystem; cost and technical analysis; and importance of commercial and recreational fishing. Other factors include land availability, as it relates to the feasibility of a particular

entrainment technology; quantified/qualitative social benefits and costs of available entrainment technologies; thermal discharge impacts; and impacts on the reliability of energy delivery within the immediate area. Commenter 35 states that PSEG-Salem is the largest industrial source of fish mortality on the Delaware River and there is no policy, legal or scientific justification to allow the continued use of once-through cooling.

Some commenters state that a closed-loop system would provide jobs. Commenter 19 states that a closed-loop system would result in good, high paying construction jobs that would result in the plant being here longer. Commenter 2 states that cooling towers would improve the economy of the region by helping with the fisheries, the ecosystem, and many of the businesses that are dependent on tourism and fishing.

(Commenter 2, 14, 15, 19, 22, 23, 26, 27, 30, 31, 32, 33, 34, 35, 36, 40, 42, 43, 44, 45, 46)

Response 10

The legal basis for the Department's BTA determination in this permit is described in detail at pages 46 to 75 of the Fact Sheet that accompanied the draft permit. In response to these comments, the Department first summarizes the regulatory history of the site, then discusses why the BTA determination in this permit is consistent with federal Section 316(b) regulations adopted in 2014, and why the Department concluded that closed cycle cooling is not required in this permit.

The detailed planning process for design and construction of PSEG-Salem Units 1 and 2 began in 1968 and construction of PSEG-Salem began in 1970. As part of the licensing process, federal and state agencies charged with protecting aquatic resources reviewed the plant design. Various regulatory approvals were required including an application to the Atomic Energy Commission (AEC) in 1968 and an application to the Delaware River Basin Commission (DRBC) in 1968 (Docket No. D-68-20 CP approved in 1970). Thus, by the time Section 316 of the Clean Water Act was adopted in 1972, both Salem units had already been designed and approved and were under construction.

AEC issued a final Environmental Impact Statement (as required by the National Environmental Policy Act) in April 1973. AEC's NEPA review included an evaluation of the probable effects of the planned cooling water intake structure as well as the thermal discharge. One of AEC's findings was that a closed-cycle cooling system was not needed in light of the insignificant environmental impacts predicted and the high cost of retrofitting such a system to a station that was already substantially constructed. Therefore USNRC (as successor to the AEC) issued authorization for Unit 1 to proceed to full power operation in April 1977, and for Unit 2 to proceed to full power operation in 1981, using the Station's existing once-through cooling system.

Section 316(b) "require[s] that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." The Department does not agree that the 1972 Clean Water Act unequivocally mandates the construction of cooling towers, nor does the plain language of Section 316(b) mandate cooling towers. Despite extensive litigation before federal courts over the past decade, no court has determined that the plain language of Section 316(b) automatically mandates cooling towers for existing facilities as the best technology available nor has the EPA ever promulgated rules to that effect.

The majority of environmental impacts associated with intake structures are caused by water withdrawals that ultimately result in aquatic organism losses. In that regard, cooling water intakes can have two types of

effects, namely impingement and entrainment. Impingement takes place when organisms are trapped against intake screens by the force of the water passing through the cooling water intake structure. 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, planktonic, and nektonic 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.

This is the first NJPDES permit in New Jersey to apply new federal Section 316(b) technology-based standards for existing facilities built before 1972. As described in the Fact Sheet, the plant's 2001 permit was granted as a matter of the Department's best professional judgment, and pending release of long-awaited federal regulations the permit was administratively continued under NJAC 7:14A-2.8 based on the timely submission of a renewal application. In November 2010 EPA entered into a consent decree with the Riverkeeper, Inc. and other environmental plaintiffs to draft and issue new Section 316(b) regulations over the next two years. EPA agreed to propose new Section 316(b) rules by March 28, 2011, with the goal of issuing final rules on July 27, 2012. EPA met its first deadline when it published draft regulations in the Federal Register on April 20, 2011. *Cooling Water Intake Structures at Existing Facilities and Phase I Facilities*, 76 Fed. Reg. 22,174 (April 20, 2011). In the draft rules, EPA proposed that Ristroph screens and equivalent modified traveling screens may be BTA for Phase II facilities and relied upon this finding as the basis for EPA's compliance cost estimates in the rule proposal. *Id.* at 22,203, 22,214. Although promising final standards for 2012, EPA sought and was granted four extensions by the environmental plaintiffs to complete revisions in its final rules.

The final Section 316(b) regulations were published on August 15, 2014, and became effective October 14, 2014. *National Pollutant Discharge Elimination System – Final Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities and Amend Requirements at Phase I Facilities*, 79 Fed. Reg. 48,300. The regulations address impingement and entrainment effects for new and existing facilities across the country. In its Executive Summary of the 2014 rule, EPA provides the following summary:

> "This rule includes a national performance standard as the BTA to address impingement mortality (IM) at existing cooling water intake structure (CWIS). This national standard for impingement reflects EPA's assessment that impingement reduction technology is available, feasible and demonstrated, and thus BTA for existing facilities. The impingement mortality standard is based on modified traveling screens with fish returns and includes a performance standard as one compliance alternative, but also offers six other compliance alternatives that are equivalent or better in performance. With regard to entrainment, this rule contains a national BTA standard that is a process for a site-specific determination of entrainment mitigation requirements at existing CWIS. The entrainment provision reflects EPA's assessment that there is no single technology basis that is BTA for entrainment at existing facilities, but instead a number of factors that are best accounted for on a site-specific basis."
>
> [79 Fed. Reg. at 48302-03.]

Because EPA has established a national performance standard to address impingement mortality, prescriptive alternatives are described. As per 40 CFR 125.94(c), existing facilities can select one of seven alternatives for meeting the BTA impingement standard. Some of these options are essentially preapproved technologies with a requirement to demonstrate that the flow reduction and control measures are functioning as EPA envisions. Other options require more detailed information be submitted to the permitting authority before

they can be specified as the BTA to reduce impingement mortality. Note that the circulating water intake structure at PSEG-Salem has been equipped with modified traveling screens and a fish return system since 1995, and that this technology is an acceptable compliance alternative under 40 CFR 125.94(c).

EPA has determined that there is no single technology that is BTA for entrainment at existing facilities. Rather, BTA for entrainment is comprised of a process for a site-specific determination of entrainment mitigation requirements at existing cooling water intake structures. As stated on page 48330 of the rule publication in the Federal Register:

> "While site-specific permit requirements are not new, what is different about this approach from the current requirement for permits to include 316(b) conditions is that for the first time, EPA is establishing a detailed specific framework for determining BTA entrainment control requirements. Thus, the rule identifies what information must be submitted in the permit application, prescribes procedures that the Director must follow in decision making and factors that must be considered in determining what entrainment controls and associated requirements are BTA on a site-specific basis."
>
> [79 Fed. Reg. at 48330.]

Installation of cooling towers was not adopted as BTA for impingement or entrainment at existing facilities. As explained on page 48343:

> "After fully considering all comments and data, EPA still finds closed-cycle cooling is not the ''best technology available for minimizing adverse environmental impact'' required by section 316(b). Because of a combination of concerns over feasibility/availability, air emissions, and remaining useful life of the facility, EPA has rejected closed-cycle recirculating systems as the basis for national impingement and/or entrainment controls. Nor is EPA able to identify a subcategory for which these concerns no longer apply…EPA decided not to establish any presumptive BTA entrainment outcome."
>
> [79 Fed. Reg. at 48343.]

For existing facilities, the Director (i.e. permitting authority) is directed to establish BTA standards for entrainment for each intake on a site-specific basis. These standards will reflect the permitting authority's determination of the maximum reduction in entrainment warranted after consideration of the relevant factors as specified in 125.98(f). The application components at 40 CFR 122.21(r)(2) through (r)(13) provide the permitting authority with the necessary information to render a decision on impingement and entrainment. This final permit action contains a schedule for submission of all these application components that have not yet been addressed.

The Department agrees that closed-cycle cooling is a technology which minimizes the withdrawal of cooling water as compared to a once-through cooling system. However, cooling towers have numerous environmental impacts such as:

- Impacts of particulate emissions on air quality including potential impact on soils, vegetation and visibility.
- The height and visual obtrusion of the towers.
- The effects of the cooling tower blowdown on marine biota and populations.

- The impingement and entrainment impacts relating to the withdrawal of water for cooling tower make-up water.
- Tower vapor plume effects due to size, frequency, or trajectory, including icing and fogging effects.
- Salt drift and noise impacts from the towers on the nearby community.
- Noise impacts on neighbors.

The Department supports the extensive rule requirements in 40 CFR 122.21(r)(2) through (r)(13) since it requires a holistic analysis of many factors including non-water quality and other environmental impacts (as required in 40 CFR (r)(12)) as cited above. Please refer to **Response 23** and **24** for additional information regarding fish losses.

In summary, the Department acknowledges that this renewal permit action does not require closed-cycle cooling at this time; however, this decision will be revisited in the next permit cycle after all the application components at 40 CFR 122.21(r)(2) through (r)(13) are submitted.

Comment 11

Several commenters state that they are opposed to the construction of cooling towers. Some commenters state that requiring PSEG-Salem to retrofit to a closed-cycle system would present significant economic and technological challenges resulting in lower plant efficiency; higher power costs for consumers; and no appreciable environmental benefits beyond what is already in place. Commenter 18 states that cooling towers would be a financial burden that the town, county and state cannot afford. Commenter 24 states that forcing PSEG-Salem Units 1 and 2 to be equipped with cooling towers would significantly hurt the financial status of the plants and lead to shut down resulting in impacts on the county's economy. Commenter 28 states that retrofitting with closed-cycle cooling is not warranted based on the requirements of the final Section 316(b) regulations.

Commenter 17 states that requiring a closed-loop system would not be conducive to species protection and the reduction of carbon emissions.

(Commenter 5, 17, 18, 24, 28)

Response 11

Please refer to **Response 10** for the Department's rationale on not requiring cooling towers in this NJPDES permit action.

Comment 12

Some commenters state that the Department has the authority to require cooling towers before PSEG has time to fully comply with the requirements of 40 CFR 122.21(r) based on the Department's exercise of its best professional judgment (BPJ). Commenter 2 states that the Section 316(b) rule allows states to impose controls that are more protective of aquatic resources than the federal rules require based on site-specific needs. Commenter 34 states that the governing EPA regulations place the authority for determining BTA with the Department. Commenter 31 states that the Department has full legal authority to mandate closed-cycle cooling, or a technology that can reduce fish kills to a similar degree, and that the once-through cooling system does not honor the spirit and intent of the law or needs of the river, environment and region.

Commenters 31, 35 and 36 state that the Department is obligated to use its BPJ to ensure "that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact" as mandated by Section 316(b) of the Clean Water Act. Commenters 33 and 35 state that the years of data analysis on the record for PSEG-Salem and the well documented levels of impacts and mortality provides the basis for informing a BTA determination. Commenters 33 and 35 state that it would be irresponsible for the Department to give PSEG a "pass" for another five or more years while it conducts further entrainment studies.

Commenters 31, 33 and 35 state that EPA regulations at 40 CFR 125.98(g) allows the Department to "proceed with a determination of BTA standards for impingement and mortality and entrainment without requiring the facility to submit the information required in 40 CFR 122.21(r)", when the Director determines the information already submitted by the facility is sufficient, and in those cases where a final permit will be issued prior to July 14, 2018. Commenter 33 notes that because PSEG-Salem submitted the permit application on January 31, 2006 it falls within these parameters and a final BTA determination on entrainment should be made within this permit cycle.

Commenter 35 argues that the Department has sufficient information in the areas outlined in 40 CFR 125.98(f)(2) and (3), to make a determination that closed-cycle cooling is BTA for the facility and has failed to use BPJ to do so. Commenter 35 states that if the Department may appropriately move forward with an interim BTA assessment for 40 CFR 125.98(b)(6), the Department must establish interim BTA in PSEG-Salem's permit based on the Department's BPJ on a site-specific basis in accordance with 40 CFR 125.90(b) and 40 CFR 401.14. Commenter 35 contends that the Department providing PSEG with more time to continue to operate business as usual is a transparent ploy to take no action, given the excessive fish kills: large amounts of data collected by PSEG and analyzed by independent consultants (as commissioned by the Department); and data submitted by other agencies and organizations.

(Commenter 2, 31, 33, 34, 35, 36)

Response 12

The 2014 Section 316(b) regulations impose new requirements on applicants to gather evidence of entrainment effects and to demonstrate to the permitting agency that the applicant's facility satisfies BTA, supported by peer-reviewed studies. Where a permit renewal application was pending at the time EPA's final Section 316(b) rules became effective in October 2014, 40 CFR 125.98(b)(6) directs the permitting authority to issue an interim finding on BTA for entrainment and to require completion of all necessary entrainment studies to be included in a subsequent permit renewal application. 40 CFR 125.94(h) also authorizes the Department to determine BTA on an interim basis.

The Department made a deliberate decision not to begin permit proceedings (i.e. review and analysis of the permit renewal application and issuance of a fact sheet and draft permit) until after the publication of EPA's final 316(b) regulations for existing facilities. Because there were no permit proceedings pending on October 14, 2014, 40 CFR 125.98(g) does not apply. Moreover, the Department has determined that the information previously submitted by PSEG in its 2006 permit renewal application is not sufficient for the Department to make a final BTA determination under the new federal standards before submission of all information required by 40 CFR 122.21(r), including (r)(9) through (13) pursuant to 122.21(r)(1)(ii)(B). For these reasons, in this permit action the Department has made an interim BTA determination under 40 CFR 125.98(b)(6) and included a schedule for submission of the (r)(9) through (13) studies and analyses. The Department's BPJ determination concerning entrainment controls in the 2001 permit remains an appropriate

interim BTA finding based on review of the updated information presented in support of PSEG's 2006 renewal application.

The draft permit Fact Sheet contains a description of each specific component in 40 CFR 122.21(r)(2) through (13) that PSEG must comply with, as well as an accounting of the information that is already available in the Administrative Record. This analysis is described on pages 54 through 63 under the heading "Relevance of 2006 Application and Previous Studies to Current Application Requirements." For example, impingement and entrainment data is available since PSEG is required to conduct ongoing impingement and entrainment monitoring at the cooling water intake structure at a schedule that is more proactive than that which is suggested in the 2014 Section 316(b) regulations. PSEG has one of the most robust data sets in the nation since the Department has been requiring this data collection for over 20 years. However, the regulations require specific procedures for the collection of data so that it can be an input component for other studies and analysis.

Other study components are simply not available at this time such as the peer review requirement at 40 CFR 122.21(r)(13). The peer review applies to the Comprehensive Technical Feasibility and Cost Evaluation Study (Part IV.G.8.a); Benefits Valuation Study (Part IV.G.8.b); and Non-water Quality Environmental and Other Impacts Study (Part IV.G.8.c) where due dates are predicated on the effective date of the permit (EDP). Commenter 35 suggests that the Department move forward with a BPJ determination without the site-specific entrainment studies as outlined at 40 CFR 122.21(r) and 125.95. It would be premature and inappropriate to disregard these components of the Section 316(b) regulations and render a BTA determination without following the process established by the federal regulations where the Department has determined that all of the 122.21(r) requirements are necessary to evaluate entrainment controls for the Station.

Comment 13

Commenter 35 disagrees with the interim BTA for impingement mortality as well as the entrainment BTA determination and contends that both determinations are not an accurate reflection of the law. Commenter 35 argues that the Department can use its BPJ based on the information on the record for a facility like PSEG-Salem for whom the permit application was submitted prior to 2014 and for whom there will be a final permit by mid-2018. Commenter 35 contends that the entrainment BTA determination is a circular argument since the Department is mandating more studies based on BPJ when in fact the BPJ option is intended by the regulations to allow the Department to act now, based on the information it has already before it in the record.

Commenter 35 states that the flow limitation of 3024 million gallons per day (MGD) is only a paper limitation. Prior to 1994, the first time this limitation was instituted, 3024 MGD already represented the maximum level at which the PSEG-Salem plant operated. EPA's Section 316(b) case study states that up until 1998 PSEG-Salem's withdrawals topped out at a mere 2612 MGD. This difference between the design capacity of the facility of 3200 MGD and 3024 MGD is a mere 176 MGD and is in fact no reduction based on the fact that PSEG-Salem did not historically operate above this level.

(Commenter 35)

Response 13

In order to render an entrainment BTA determination under the 2014 Section 316(b) regulations, the permittee is required to comply with 40 CFR 122.21(r)(2) through (r)(13). As described in the previous response, the Department will follow the Section 316(b) regulations to allow PSEG the ability to collect the necessary information as established in this relatively recent rule.

As noted in the draft permit Fact Sheet, the Department set forth an interim BTA determination for impingement, as established separately for the circulating water system and the service water system. The Department designated the use of the existing modified Ristroph traveling screens with a fish handling system as interim BTA for impingement mortality for the circulating water system until such time as a final impingement and entrainment determination is made based on submission and review of the required study components at 40 CFR 122.21(r)(2) through (r)(13). Selection of this technology as interim BTA is consistent with the Department's BPJ and is conditional on the proper operation and maintenance of such screens and fish return system. This determination is also consistent with 40 CFR 125.94(c)(5), which recognizes that modified traveling screens such as those installed at PSEG-Salem may be considered BTA for impingement at existing facilities.

For the service water system, the permittee operates traveling screens that do not have a modified traveling screen design and there is no fish handling system or return. Because the service water system is a non-contact cooling water system that uses 85 MGD, it is well above the eligibility threshold of 2 MGD. Therefore, the Department designated compliance with 40 CFR 122.21(r)(6) and the installation of control measures as specified at 40 CFR 125.94(c) as interim BTA for impingement mortality for the service water system. Most notably, the permittee shall comply with 40 CFR 125.95(c) within EDP + 4 years. Refer to **Response to PSEG Comment 2** below for further details on this requirement.

As an interim determination for entrainment at PSEG-Salem, the Department has determined that inclusion of a continued intake flow limit in combination with the conduct of the required studies at the circulating water system and the service water system is BTA for entrainment in accordance with its BPJ in accordance with 40 CFR 125.90(b) and 40 CFR 401.14 as per 40 CFR 125.98(b)(6). This decision will be revisited once the required studies are submitted.

The Department maintains that the flow limitation is appropriate and serves to limit the flow volume. PSEG-Salem's design flow is 185,000 gallons per minute (gpm) per pump or 3200 MGD. The 1994, 2001 and this subject NJPDES permit renewal continues this permit limitation by limiting the maximum flow for the two PSEG-Salem units to a monthly average of 3,024 MGD. This is equivalent to an average flow rate of 175,000 gpm per pump. PSEG-Salem is required to monitor and report intake flow values on Discharge Monitoring Report forms where a summary of monthly average data from 2009 to 2014 is as follows:

Intake Flow Values in MGD						
	2009	**2010**	**2011**	**2012**	**2013**	**2014**
January	2385	2357	2411	2375	2320	2806
February	2581	2500	2347	2542	2446	2713
March	2512	2560	2441	2652	2402	2778
April	2570	1556	1600	2671	1752	1995
May	2326	2447	2626	2440	1685	1803
June	2573	2643	1878	2672	2546	2156
July	2681	2260	2718	2518	2552	2854
August	2725	2654	2694	2522	2543	2868

September	2501	2428	2282	2353	2427	2765
October	1897	2481	2074	1686	2249	2158
November	2340	2443	1804	1767	2458	1741
December	2586	2553	2470	2343	2740	2698
Average	**2481.091**	**2411.364**	**2278.75**	**2378.727**	**2345.455**	**2411.727**

While the actual flow rate may vary from time to time due to many factors that affect the operation and efficiency of the intake, this flow limit requires PSEG-Salem to operate at a rate that is less than its design capacity. Note that flow values tend to be lower during the spring and fall when refueling outages typically occur, which coincides with fish migratory seasons and the periods of highest biological productivity in the River. Any time that PSEG-Salem operates below the 3024 MGD limit results in a reduction in intake volume which translates to less impingement and entrainment impacts.

Comment 14

Commenter 29 agrees with the Department's determination that further data collection, evaluation and justification is needed to demonstrate compliance with 2014 Section 316(b) regulations for a best available technology determination for the reduction of impingement and entrainment mortality as well as for the installation of modified traveling screens and a fish return for the service water intake structure. Commenter 29 understands the complex and lengthy history of PSEG-Salem; the measures that have been taken in the past to reduce and offset impacts of the facility's operation; and the regulatory and legal issues associated with the Department's determination to not require the use of closed-cycle cooling as the best available technology under Section 316(b) at this time.

(Commenter 29)

Response 14

The Department acknowledges these comments in support of the BTA determination.

Comment 15

Commenter 30 states that the permittee should furnish an updated BTA analysis of current methodologies utilized by the nuclear power industry since the time that BTAs were implemented at the project site in 1996. Commenter 30 states that some alternatives were evaluated in 2002 to 2003 after PSEG conducted a literature research; utilized sophisticated modeling; and conducted a series of laboratory tests. However, in the 2001 and 2006 NJPDES applications, several alternatives were examined (modifications to the intake screens or added wash down methodologies, or the installation of a noise or bubble deterrent system), that were discounted by PSEG because there was little demonstrated benefit to the aquatic environment. Commenter 30 requests that the permittee revisit these alternatives or others that have not been considered in previous NJPDES permit applications as the current information appears dated (over ten years old).

Commenter 30 recommends that the draft NJPDES permit consider the following project features as a means to avoid or minimize impacts to the aquatic environment: placement of additional screening/netting at the intake area; the utilization of a bubble or sound deterrent system in the intake area; employment of flow reduction options during low peak demands; construction of a large water impoundment or recirculation

structure on the newly acquired US Army Corps of Engineers' Confined Disposal Facility; a large heat exchangers installed in the Delaware River to supplement the plant's cooling water needs; or a combination of any of the above.

Commenter 32 supports the proposed requirement of a "Comprehensive Technical Feasibility and Cost Evaluation Study" to determine the efficacy of alternative cooling methods for the project. Commenter 32 is particularly interested in the social costs of the operations, particularly with respect to lost opportunities for commercial and recreational fishing and the associated financial losses for local businesses, and contends that these impacts should be better quantified for the public.

(Commenter 29, 30, 32)

Response 15

As part of the development of the Section 316(b) regulations, EPA did extensive research on intake protection technologies prior to establishing impingement BTA and entrainment BTA on a national level. This analysis included an engineering evaluation of technologies and the associated costs for the following categories: flow reduction technologies and control measures (including closed-cycle recirculating systems); screening technologies; barrier nets; aquatic filter barrier; offshore intakes; and other technologies and operational measures. Please refer to the "Technical Development Document for the Final Section 316(b) Existing Facilities Rule" (EPA-21-R-14-002), May 2014 as available at http://www2.epa.gov/sites/production/files/2015-04/documents/cooling-water_phase-4_tdd_2014.pdf. Given the fact that EPA did not mandate one specific technology for impingement or entrainment to be applied on a nationwide basis, permittees are not limited in choosing intake protection technologies and can evaluate any technology for application at cooling water intake structures.

The application of alternate intake protection technologies is highly dependent on site-specific factors. For PSEG-Salem this includes consideration of the original plant design, piping systems, and flow needs to ensure safe operation of this nuclear fueled power plant. The characteristics of the receiving water such as turbidity, temperature and salinity are also factored into this consideration. As described previously, EPA set a national impingement mortality standard as premised on the effectiveness of modified traveling screens and a fish return system. However, EPA did not set a national entrainment mortality standard due in part to the largely site-specific nature of entrainment technologies. While EPA did not rule out any specific technologies such as those referenced in this comment, it is clear that the entrainment technology determination is subject to a complex engineering analysis that must consider many environmental and cost factors. While flow reduction could have applications at PSEG-Salem, it is worth noting that PSEG-Salem already performs refueling outages which generally coincide with periods of high biological productivity in the spring.

The 2006 NJPDES renewal application included an extensive analysis of intake protection technologies, as did the 1998 NJPDES renewal application. As described in the 2006 NJPDES application, over 30 alternatives were considered by PSEG after a comprehensive review of the currently available literature and contacts with regulatory, water-user, and utility personnel. The permittee performed an exhaustive and extensive analysis of then-available intake protection technologies in the 1998 and 2006 NJPDES renewal applications (as described on pages 20-24 and 34-38 of the draft permit Fact Sheet). Please refer to Fact Sheet pages 20-24 for a discussion of the results of PSEG's evaluation of multi-sensory hybrid intake protection technology, which included sound deterrents, air bubble screens, and strobe lights. PSEG

previously studied the effectiveness of barrier nets and other physical barriers, as described in the Fact Sheet at page 35. Offshore intakes are precluded by PSEG-Salem's location on the Delaware River.

The body of evidence does not support the use of an aquatic filter barrier (i.e. Gunderboom) in a marine system such as PSEG-Salem where turbidity levels are high and intake flows are significant. Aquatic filter barriers have a very small mesh size, which is effective for minimizing entrainment but does result in frequent clogging due to debris. Other entrainment technologies such as wedgewire screens would pose similar clogging challenges. Sound deterrents have been studied at PSEG-Salem but while there was some evidence of sound deterring certain species, there was also evidence of sound attracting certain other species.

The Section 316(b) regulations do not require permittees to evaluate every conceivable alternative technology, only those that, in PSEG's or the Department's estimation, may be reasonably available for use at the plant. The Department will not require PSEG to conduct analysis of heat exchangers mounted in open waters that have not, to the Department's knowledge, ever been implemented for a plant the size of PSEG-Salem. However, the Department is willing to consider this alternative in future permits if evidence is presented that such controls are reasonably available at PSEG-Salem. .Similarly, given the volume of cooling water used on a daily basis, the Department does not believe that an impoundment of sufficient volume and surface area to satisfy the cooling needs of the plant could be constructed in the area of the US Army Corps of Engineers Confined Disposal Facility.

Consistent with the Section 316(b) regulations, this permit requires PSEG to build upon the body of feasibility studies developed in support of previous permits by continuing to evaluate emerging technologies and certain previously studied technologies like closed-cycle cooling for implementation at PSEG-Salem. The Comprehensive Technical Feasibility and Cost Evaluation Study requirements of 40 CFR 122.21(r)(10) are included in this permit at Part IV.G.8.a as follows:

> "a. Comprehensive Technical Feasibility and Cost Evaluation Study (40 CFR 122.21(r)(10)) – The permittee shall submit an engineering study of the technical feasibility and incremental costs of candidate entrainment control technologies. This includes an evaluation of the technical feasibility of closed-cycle recirculating systems as defined at 40 CFR 125.92(c), fine mesh screens with a mesh size of 2 millimeters or smaller, and water reuse or alternate sources of cooling water. In addition, this study shall include:
>
> i. A description of all technologies and operational measures considered (including alternate designs of closed-cycle recirculating systems such as natural draft cooling towers, mechanical draft cooling towers, hybrid designs, and compact or multi-cell arrangements);.
>
> ii. A discussion of land availability, including an evaluation of adjacent land and acres potentially available due to generating unit retirements, other buildings and equipment retirements, and potential for repurposing of areas developed for transmission yards, and parking lots;.
>
> iii. A discussion of available sources of process water, grey water, waste water, reclaimed water, or other waters of appropriate quantity and quality for use as some or all of the cooling water needs of the facility;.

iv. Documentation of factors other than costs that may make a candidate technology impractical or infeasible for further evaluation; and.

v. The study must include engineering cost estimates of all technologies considered in Part IV.G.8.a(i)-(iv) above. Facility costs must also be adjusted to estimate social costs. All costs must be presented as the net present value (NPV) and the corresponding annual value. Costs must be clearly labeled as compliance costs or social costs. The permittee must separately discuss facility level compliance costs and social costs, and provide documentation as described at 40 CFR 122.21(r)(10)(iii).

vi. The Comprehensive Technical Feasibility and Cost Evaluation study shall be completed by [effective date of the permit] EDP +3 years and is then subjected to peer review as per Part IV.G.8.d below."

For these reasons, this comment is addressed by the robust analysis of alternative impingement and entrainment controls required as part of the final permit action.

Comment 16

Commenter 36 states that the Clean Water Act requires that NPDES permits include effluent limits based on the performance achievable through the use of statutorily-prescribed levels of technology through the application of "Best Available Technology" limits. These technology-based effluent limitations constitute a minimum level of controls that must be included in a NPDES permit "regardless of a discharge's effect on water quality" that "will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants." Additionally, Commenter 36 states that the water quality analysis required under Section 301 and Section 316(a) of the Clean Water Act lead independently to the conclusion that a closed-cycle cooling retrofit must be required.

(Commenter 36)

Response 16

The Department agrees that the Clean Water Act requires technology based limits, which can include "Best Available Technology" limits (or BAT). However, BAT limits are a type of limit that is set forth in federal effluent guidelines and are typically applied to industrial wastewater streams.

BAT limits are separate and distinct from the BTA determination required by Section 316(b) for cooling water intake structures. Simply put the term "Best Available Technology" and "Best Technology Available" mean two different things and are founded on different sections of the Clean Water Act. See Entergy Corp. v. Riverkeeper, Inc., 556 U.S. 208, 217-22, 129 S. Ct. 1498, 1505-08 (2009). This relationship between BAT limits (based on Section 301) and BTA limits (based on Section 316(b)) is described in the Technical Development Document for the Final Section 316(b) Phase II Existing Facilities Rule (see http://www2.epa.gov/cooling-water-intakes/cooling-water-intakes-final-2014-rule-existing-electric-generating-plants-and) as follows:

> Section 316(b) expressly refers to section 301, and the phrase "best technology available" is very similar to the phrases "best available technology economically achievable " and "best practicable control technology currently available" in that section. Thus, Section 316(b), section

> 301(b)(1)(A) -- the BPT provision-- and section 301(b)(1)(B) -- the BAT provision -- all include the terms "best," "technology," and "available," but neither BPT nor BAT goes on to consider minimizing adverse environmental impacts, as BTA does. See 33 U.S.C. 1311(b)(1)(A) and (2)(A). These facts, coupled with the brevity of section 316(b) itself, prompts EPA to look to section 301 and, ultimately, section 304 for further guidance in determining the "best technology available to minimize adverse environmental impact" of cooling water intake structures for existing 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* (2nd Cir. Feb. 3, 2004) ("not every statutory directive contained [in Sections 301 and 306] is applicable" to a section 316(b) rulemaking). Moreover, as the Supreme Court recognized, while the provisions governing the discharge of toxic pollutants must require the elimination of discharges if technically and economically achievable, section 316(b) has the less ambitious goal of "minimizing adverse environmental impact." 129 S.Ct. 1498, 1506. 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…"

With respect to the commenter's reference to Section 301 of the Clean Water Act, this section requires that any discharge of a pollutant by any person shall be unlawful unless it is authorized through a permit. This is not the case for PSEG-Salem as a NJPDES permit has been in place for decades. Regarding the commenter's contention that an analysis under Section 316(a) would independently result in a closed-cycle cooling finding, please refer to **Response 53** where the rationale for a continued Section 316(a) variance is described.

Comment 17

Commenter 33 contends that the Department should include verifiable and enforceable performance measures in the permit. Specifically, the Department should ask for a minimum of a 90% reduction in cooling water intake and/or a 90% reduction in fish impingement and entrainment.

(Commenter 33)

Response 17

The Department does not have the legal authority to adopt the suggested performance measures for intake flow or for impingement and entrainment as this is not required by the Section 316(b) regulations. The commenter appears to conflate the regulations governing new and existing units. New units must either install closed-cycle cooling or demonstrate alternative controls capable of entrainment reduction "equivalent to 90 percent or greater of the reduction that can be achieved through" a closed-cycle system. 40 CFR 125.94(e)(1) and (2). The commenter may also be confusing the 2014 regulations with the repealed 2004 Phase II regulations, which included performance standards for existing facilities based on percent reduction of mortality compared to the baseline. See 79 Fed. Reg. 48316-17 for EPA's discussion of the repealed 2004 Phase II regulations.

Unlike the repealed Phase II regulations and the standards for new units, the 2014 Section 316(b) regulations do not prescribe specific fish mortality percent reduction standards for existing facilities. Rather, the

Department is required to implement the Section 316(b) regulations as described in **Response 10**. Whether the reductions suggested by the commenter are feasible at PSEG-Salem remains to be determined.

Impingement mortality performance standards are one of the allowable alternatives at 40 CFR 125.94(b)(7), although the values are different than those suggested in this comment. Specifically, one of the options is for the facility to "achieve a 12-month impingement mortality performance standard of all life stages of fish and shellfish of no more than 24 percent mortality, including latent mortality, for all nonfragile species together that are collected or retained in a sieve with maximum opening dimension of 0.56 inches and kept for a holding period of 18 to 96 hours."

Comment 18

Several commenters raise the issue of the useful life of PSEG-Salem being extended through the USNRC operating licenses. Commenter 31 states that because the USNRC extended PSEG-Salem's license for 21 to 25 years, this increases the importance of minimizing its fish kills today. Commenter 19 states that the Department should require PSEG to invest in the facility for the future by building cooling towers since the Station is expected to run for twenty-plus more years.

Commenter 30 requests that the Department assess whether past compensatory efforts by PSEG (e.g., conservation easements, wetlands restored, fish ladders, and artificial reef construction) continue to offset the adverse effects on the aquatic environment, especially in light of the USNRC extending their operating licenses for Units 1 and 2 to 2036 and 2040, respectively.

Commenter 35 notes that the useful life of PSEG-Salem has been extended to 2036 and 2040 for Units 1 and 2, respectively. Given the length of time that the facility has to still operate, the commenter believes it is important that the Department requires PSEG to take all actions to avoid the adverse environmental impacts from PSEG-Salem through impingement and entrainment, fish kills, and thermal pollution. Because the draft permit allows the continued use of once-through cooling, the commenter argues that the draft permit fails to meet the Department's obligation to use its BPJ to ensure that the location, design, construction and capacity of cooling water intake structures reflect the BTA for minimizing adverse environmental impacts as mandated by Section 316(b).

(Commenter 19, 30, 31, 35, 42)

Response 18

The Department agrees that the useful life of PSEG-Salem is relevant to the Section 316(b) analysis. Specifically, the Section 316(b) regulations at 40 CFR 122.21(r)(10) require submission of a Comprehensive Technical Feasibility and Cost Evaluation Study. Useful life is a consideration under cost evaluations at 40 CFR 122.21(r)(10)(iii)(B) which is excerpted as follows:

> "(B) Costs and explanation of any additional facility modifications necessary to support construction and operation of technologies considered in paragraphs (r)(10)(i) and (ii) of this section, including but not limited to relocation of existing buildings or equipment, reinforcement or upgrading of existing equipment, and additional construction and operating permits. Assumptions regarding depreciation schedules, interest rates, discount rates, useful life of the technology considered, and any related assumptions must be identified; …"

This requirement is included as Part IV.G.8.a. as described in **Response 15**. However, the permittee is not required to complete the Comprehensive Technical Feasibility and Cost Evaluation Study until EDP + 3 years. The study shall then be sent to the selected peer reviewers to be evaluated, revised as necessary, and submitted to the Department by EDP + 4 years. The Department will consider the useful life of the Station in accordance with the framework and process as established in the Section 316(b) regulations.

Regarding the suggestion that mitigation requirements be reevaluated based on the useful life of the Station being extended by the USNRC, note that the mitigation requirements are outside the requisite Section 316(b) BTA determination and these actions were not required in lieu of cooling towers. The Department incorporated this plan, as a Special Condition to the permit because of its environmental benefits and because it would continue to help minimize the potential for adverse impact from the cooling water intake structure. Aspects of the Estuary Enhancement Program (EEP) are discussed in greater detail in **Response 40.** In summary, the Department does not agree that it can require additional mitigation requirements based on an extension of the operating licenses.

Comment 19

Some commenters raise issues relating to costs of cooling towers or closed-cycle cooling. Commenter 31 states that it will cost PSEG $850 million to install closed-cycle cooling, which the commenter believes is a small investment relative to PSEG's profits to protect the ecological, economic and future generation benefits of the fish of the Delaware Estuary. Commenter 36 states that economic concerns over the cost of installing closed-cycle cooling at PSEG-Salem has continually been put ahead of the public trust and the health of the Delaware River watershed. Instead of requiring PSEG to build cooling towers, the Department is effectively shifting the costs of those towers onto the public and the increasingly fragile and deteriorating ecosystem.

Commenter 35 notes that the Fact Sheet asserts the cost of retrofitting to natural draft cooling towers is an estimated $852,440,200 and that the capital cost for retrofitting with mechanical draft cooling towers is an estimated $814,844,200. Commenter 35 continues that these costs are not wholly disproportionate to or significantly greater than their resulting environmental benefits as demonstrated in the report prepared by ECONorthwest and included as an attachment to the comments. The ECONorthwest report concludes that closed-cycle cooling is affordable to PSEG and Exelon, the owners of PSEG-Salem, through the following examples:

- "for the fiscal year ending December 31, 2014, PSEG's annual operating revenues were $5.4 billion…for the fiscal year ending December 31, 2014, Exelon's operating revenues were $17.4 billion." And so, the annual amortized cost of closed cycle cooling at Salem would represent a mere 0.3 percent of PSEG and Exelon's combined annual operating revenues.

- "The total installed cost of [closed cycle cooling at Salem] ($852 million) represents about 31 percent of the companies [PSEG and Exelon, Salem's owners] combined annual capital expenditure, and the annual loan payment just 2 percent."

Additionally, Commenter 35 asserts that the costs that PSEG and Exelon would pass on to the public are quite low considering the high level of benefits to be achieved.

- Installing closed cycle cooling at Salem "would increase electricity rates by $0.0036 per kWh."

- If the costs of closed cycle cooling were passed on to residential customers of Salem the potential increase in electricity costs is only about $26 per customer per year (for NJ customers it is likely to be lower given deregulation of NJ's energy market).

The commenter asserts that these costs are small compared to the benefits the public will receive, and in comparison to the public's willingness to pay for environmentally beneficial and protective energy options as discussed in the ECONorthwest report.

(Commenter 31, 35, 36)

Response 19

For the reasons discussed at length in the Fact Sheet and in this Response to Comments document, the Department has implemented EPA's standards for impingement mortality, and will comply with the 40 CFR 122.21(r) procedures for determining BTA for entrainment at PSEG-Salem. The Department will not require installation of cooling towers based on the one-sided presentation of evidence in the commenters' studies without the benefit of data and analysis that will be collected and peer-reviewed during this permit cycle.

The Department has followed EPA's lead in determining not to require closed-cycle cooling at PSEG-Salem in this permit cycle. Faced with a choice of requiring closed-cycle cooling or equivalent technology versus other available technologies, EPA "decided not to establish a performance standard for impingement and entrainment based on closed-cycle recirculating systems for existing facilities." "After fully considering all comments and data, EPA still finds closed-cycle cooling is not the 'best technology available for minimizing adverse environmental impact' required by section 316(b)." EPA explained that, "because of a combination of concerns over feasibility/availability, air emissions, and remaining useful life of the facility, EPA has rejected closed-cycle recirculating systems as the basis for national impingement and/or entrainment controls." Instead, "EPA finds the entrainment standards framework in [40 CFR 122.21(r), 125.94(d), and 125.98(f)] will provide a consistent, more efficient, and more effective approach" than a national, one-size-fits-all prescription for entrainment. 79 Fed. Reg. 48343 (emphasis added).

Despite this, the commenters still insist that the Department require closed-cycle cooling before PSEG has the opportunity to comply with 122.21(r). As described at **Response 12**, the Department has exercised its discretion under 40 CFR 125.98(b)(6) to issue an interim BTA finding for entrainment pending completion of the exhaustive studies required by 122.21(r) to be submitted for consideration in PSEG-Salem's subsequent permit. It is premature for the Department to conduct a conclusive review of the ECONorthwest study, and to impose the significant costs of a closed-cycle cooling retrofit based on the commenter's analysis, without the benefit of PSEG's entrainment study and peer-reviewed conclusions.

The Department has complied with EPA's impingement mortality standard, which "is based on modified traveling screens with fish returns," such as those already installed at PSEG-Salem. 79 Fed. Reg. 48303; see 125.94(c)(5). The Department has twice found that this technology is BTA at PSEG-Salem, and does so again today subject to PSEG's continuing responsibility to demonstrate "the technology is or will be optimized to minimize impingement mortality of all non-fragile species." 40 CFR 125.94(c)(5). Of course, this finding is subject to review and modification in subsequent permits if PSEG's submissions under 40 CFR 122.21(r) and 125.98(e) demonstrate that alternative improved controls are achievable.

The commenter cites a comparison of costs and benefits including the terms "wholly disproportionate" and "significantly greater." The consideration of costs and benefits has been a frequent topic of case law as it

relates to Section 316(b) determinations given the absence of regulations for significant periods of time since the enactment of the 1972 Clean Water Act. As a result, relevant case law and legal challenges have helped to form the framework of the basis for costs and benefits for the 2014 Section 316(b) regulations. Additionally, costs and benefits have been extensively addressed throughout the development of both the 2004 Section 316(b) Phase II regulations (since remanded) and the 2014 Section 316(b) regulations.

In contrast to the significant periods of time where permitting authorities were resigned to using relevant case law and BPJ in the absence of Section 316(b) regulations, the Department is now required to address costs and benefits in accordance with the process set forth in the 2014 Section 316(b) regulations. Prior to the release of the 2014 Section 316(b) regulations, the Department historically issued findings with respect to costs and benefits as part of its BTA determination. The "wholly disproportionate" standard originated from case law where the costs of an intake protection technology are not wholly disproportionate to the environmental benefits. See, e.g., *In re Central Hudson Gas and Electric Corporation, et al.,* Opinion No. 63, July 29,1977, 1977 WL 28250, *8 (E.P.A.G.C.), *In The Matter of Public Service Company Of New Hampshire, et al. (Seabrook Station, Units 1 and 2) National Pollutant Discharge Elimination System Permit,* 1978 WL 21140, 1 E.A.D. 455 (E.P.A., Aug 04, 1978) (No. APPLICATION NH 00203, 76-7).

Regardless of past practice, the 2014 Section 316(b) regulations set a new playing field with respect to costs and benefits. The permittee is required to conduct studies and analysis within the 40 CFR 122.21(r) requirements as required in this final permit action. Without pre-judging PSEG's anticipated submissions under 40 CFR 122.21(r), the Department offers the following observations on the commenters' BTA analysis. Contrary to the commenter's assertion, operating revenues for the permittee and estimated costs to the consumer for the installation of cooling towers are not specific factors explicitly listed in the required regulatory analysis. Nonetheless, direct costs to consumers may potentially be accounted for in the broader calculation of social costs. While past Section 316(b) demonstrations have traditionally focused on the facility's compliance costs, the 2014 rule extends the analysis to social costs. As described in **Response 15**, the permittee is required to submit a technical study entitled Comprehensive Technical Feasibility and Cost Evaluation Study to provide the technical feasibility and incremental costs of candidate entrainment technologies as required by 40 CFR 122.21(r)(10). This study must include engineering cost estimates of all technologies considered including cooling towers and must address social costs. Social costs are inherently complex as they calculate "the value lost to society of all goods and services that will not be produced and consumed if firms comply with the regulation and reallocate resources away from production activities and towards pollution abatement" and can include multiple factors. See 8-2 Chapter 8 of EPA's 2010 Guidelines for Preparing Economic Analyses (DCN 10-3258). Such costs may account for a long list of factors including non-water quality costs such as changes to energy consumption, estimates of air emissions, noise, etc. As stated on page 48367 of the 2014 rule Preamble:

> "The final rule requires that the cost information be presented as both the facility's compliance costs and the social costs, and in net present value (NPV) terms and the corresponding annual value. Social costs are the costs estimated from the viewpoint of society, rather than individual stakeholders. Social cost represents the total burden imposed on the economy; it is the sum of all opportunity costs incurred. See Chapter 8 of EPA's 2010 Guidelines for Preparing Economic Analyses (DCN 10– 3258)."
>
> [79 Fed. Reg. 48367.]

Similarly, the 2014 rule contains specific elements for a benefits valuation study at 40 CFR 122.21(r)(11) including an analysis of social benefits. Social benefits are also complex and can be difficult to quantify as

they may entail monetizing non-market benefits such as improvements for mammals, birds, other organisms and aquatic habitats. Furthermore, the dollar value of the benefit is based on a household's "willingness to pay" for the protection of fish and wildlife. As described on page 48367 of the rule Preamble:

> "The dollar values in the social benefits analysis should be based on the principle of willingness-to-pay (WTP), which captures monetary benefits by measuring what individuals are willing to forgo in order to enjoy a particular benefit. While the Director must consider benefit and cost information, the Director will also determine if this information is of sufficient rigor to make a decision on entrainment controls on the basis of this information. For instance, the Director may decide not to rely on benefit-cost information in establishing the entrainment controls when the benefits analysis includes only a qualitative discussion of nonuse benefits. Willingness-to-pay for nonuse benefits can be measured using benefits transfer or a stated preference survey. However, the rule does not require the Director to require a facility owner or operator to conduct or submit a stated preference survey to assess benefits."

In summary, the Department will comply with the Section 316(b) regulations by implementing the national impingement standards, and by issuing an interim BTA determination for entrainment pending further study required by 40 CFR 122.21(r). This subject permit renewal action requires the permittee to conduct the appropriate studies so that the requisite analysis can be performed by the Department.

Comment 20

Some commenters state that the Department considered requiring cooling towers in its 1990 draft NJPDES permit for PSEG-Salem. Commenter 22 states that the Department should require PSEG to install closed-cycle cooling technology that was considered by the Department as BTA in 1990 since it would reduce fish deaths by 95%. Commenter 23 states that the Department should reconsider and adopt its own findings from 25 years ago and support a closed-cycle cooling system that would reduce fish deaths by 95%. Commenter 35 states that closed-cycle cooling is clearly available since the Department required application of this technology 25 years ago. Commenter 14 states that the Department issued a draft permit that called for cooling towers in 1990 which was modern technology then as it is today. Commenter 2 states that the Department required cooling towers in 1990 but the requirement was removed since politics came into play.

Commenter 35 cites a 1989 report by Versar, titled "Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Salem Nuclear Generating Station: Revised final Report" (Versar report), for consideration in the 1990 draft permit. The Versar report found that "entrainment of early life stages of fish, including recreationally and commercially important species was projected to result in high population losses…" at PSEG-Salem. "Entrainment, and to a lesser degree impingement, losses are projected to: 1) adversely affect important spawning and nursery functions, 2) result in adverse changes to the food web of the Delaware Estuary, and 3) adversely affect beneficial uses (i.e. fishing) of the receiving water body." The Versar report determined PSEG-Salem to be a threat to the protection and propagation of the balanced indigenous populations of fish inhabiting the Delaware Estuary unless significant reductions in impingement and entrainment were achieved.

Commenter 35 contends that impingement and entrainment levels at PSEG-Salem since Versar's analysis remain similarly extreme and that PSEG-Salem has the second largest cooling water intake structure take of fish in the nation, as noted in a report commissioned by Commenter 35 from the ECONorthwest firm. The commenter contends that, while there has been some reduction in impingement impacts, entrainment impacts remain historically high and, according to the Versar report, it is the entrainment impacts that have always

been the biggest harm and threat inflicted by PSEG-Salem. As such, Versar's findings regarding PSEG-Salem's adverse impacts on the fisheries of the Delaware River are still valid and applicable. According to Versar, it is essential that the entrainment impacts at PSEG-Salem be reduced and that closed-cycle cooling is a demonstrated technology that can accomplish intake reductions necessary for a facility with large intake flow volumes and would reduce fish kills by 95%. Additionally, Versar's assessment is repeated by a line of other expert reports and analyses in the years since it was completed for the Department. Commenter 35 states that the Department must issue a permit that will reduce PSEG-Salem's fish kills by 99% through the installation of dry cooling technology.

(Commenter 2, 14, 22, 23, 35, 36)

Response 20

The Department issued a draft NJPDES permit in October 1990 that proposed the retrofit of the existing once-through cooling system at PSEG-Salem with a closed-cycle cooling system. In response to the draft permit, PSEG submitted comments that contained extensive new information and analysis relating to PSEG-Salem's intake and its environmental effects, including supplements to the permittee's 1984 Section 316(b) Demonstration. Most notably, the supplement included a detailed analysis of the engineering feasibility, construction requirements, and costs for retrofitting PSEG-Salem with closed-cycle cooling. Additionally, the application supplement included a cost/benefit analysis which concluded that the costs, of retrofitting PSEG-Salem to closed-cycle cooling would be wholly disproportionate to the environmental benefits which a retrofit might achieve.

After reviewing PSEG's submissions and comments by EPA, in 1993 the Department issued a revised draft permit and determined that the cost of cooling towers would be wholly disproportionate to the incremental benefits of towers compared to the controls already installed at the Station. As part of the July 20, 1994 final permit action, the Department issued a June 24, 1993 Fact Sheet which included an evaluation of various potential intake protection technologies in consideration of the site-specific factors at PSEG-Salem. The Department determined in the 1994 permit action that the existing once-through cooling water system and associated intake structure, in conjunction with a limitation to intake flow, intake screen modifications, and a sound deterrent study, constituted BTA under Section 316(b) of the Clean Water Act.

The Department fully considered the Versar report before issuing the 1994 permit to PSEG-Salem, and in light of additional information submitted after the Versar report, the Department properly reconsidered and reversed its 1990 BTA determination. As described in **Response 19**, it is not appropriate at this time to make a BTA determination based on the ECONorthwest analysis commissioned by Commenter 35 without affording PSEG the opportunity to comply with the 40 CFR 122.21(r) submittal requirements.

Without pre-judging PSEG's anticipated submissions under 40 CFR 122.21(r), the Department offers the following observations on the commenter's BTA analysis which suggests the implementation of dry cooling technology. The Department does not agree that retrofitting the PSEG-Salem facility with dry cooling technology is feasible given that the fuel source is nuclear and given the high megawatt electric (Mwe) output (1,244 Mwe for Unit 1 and 1,205 Mwe for Unit 2). It is true that dry cooling systems virtually eliminate the need for cooling water withdrawals since waste heat is transferred through convection and radiation and the system is completely closed to the atmosphere. As described on page 48333 of the Preamble, dry cooling systems are much larger and therefore more expensive than wet cooling systems for a given cooling load and have typically been built at smaller generating units or in areas with limited water

supplies. As stated on page 48334, "Dry cooling has not been used for circulating water cooling at nuclear facilities."

Comment 21

Commenter 2 states that a closed-loop system would resolve safety issues relating to closure of the intakes as there have been incidents where the plant was shut down due to grass in the river and estuary (one incident four years ago and another three years ago) as well as another incident (two years ago) where a radioactive leak caused plant shutdown. Commenter 2 states that a closed-loop system would ensure the use of less radioactive water so that less radioactive water can leak.

Commenter 2 states that a closed-loop system would resolve depleted use problems with water quantity since the current system robs the river of clean water. This plant, along with the Delaware City Refinery and the Mercer Generating Station, can be pulling half the flow of the river at certain times of the year resulting in cumulative ecological impacts as well as water quality impacts.

(Commenter 2)

Response 21

Issues related to nuclear plant safety are more appropriately addressed through the operating license administered by the USNRC. The Department recognizes that the frequency of plant shutdowns due to clogging of the cooling water intake with vegetative debris may be reduced with a closed-loop system. However, a closed-cycle cooling system is not being required at this time as described in **Response 10.** The Department does not agree with the assertion that a closed-loop system would ensure the use of less radioactive water. There is no relationship between the main condenser cooling water flow and the amount of radioactive water produced at the plant. The main condenser cooling system is a non-radioactive system that is used to condense non-radioactive steam exhausted from the turbine, which is also a non-radioactive system.

The Department acknowledges that this commenter is asserting that a once-through cooling system has an effect on water quantity for the intake water source. However, the opposite is generally true as a once-through cooling system results in the majority of water that is withdrawn being returned to the waterbody after a short time. While there are several variables such as discharge temperature (e.g. ambient water temperature, air temperature, humidity, thermal plume mixing and distribution in the water column) that affect consumptive loss (i.e. water that is consumed and not returned to the river), a closed-cycle cooling system generally has greater consumptive loss as compared to a once-through cooling system. The consumptive loss in the closed-cycle cooling system is due to evaporation of water through the cooling towers.

Regarding any concerns that relate to cooling water intake structures associated with other facilities on the Delaware River, these facilities are also subject to Section 316(b) of the Clean Water Act which addresses impacts relating to impingement and entrainment. Note that DNREC administers the NPDES permit for the Delaware City Refinery where additional information can be found at: http://www.dnrec.delaware.gov/wr/Information/SWDInfo/Pages/SWDSNPDES.aspx. While the Section 316(b) regulations do acknowledge that there are cumulative effects associated with multiple intakes, these regulations do not contain explicit requirements in addressing such. In addition, while not required by the Section 316(b) regulations, baywide biological monitoring does offer an assessment of overall effects from multiple intakes where this data shows

stable or increasing trends for most RIS as described in **Response 31**. Baywide biological monitoring has been conducted by PSEG for more than two decades.

Comment 22

Some commenters express concern regarding the location of PSEG-Salem. Commenter 39 states that PSEG-Salem is located within a major nursery area for estuarine and marine fisheries resources. Commenter 32 states that the project is located within a major nursery area for estuarine, marine, and migratory fisheries. Commenter 35 states that PSEG-Salem is located in a sensitive and important ecosystem.

(Commenter 32, 35, 39)

Response 22

Due to the geography of PSEG-Salem's location, the permittee has no practical options for relocating the intake to reduce its impacts on aquatic life. Alternatives such as moving the intake structure offshore are not an option on the Delaware River. Although it is not feasible for PSEG to change the location of the facility, the effect of the cooling water intake structure on this sensitive environment will be taken into account. The 2014 316(b) regulations require that the Benefits Valuation Study submitted describe the basis for monetized values to changes to ecosystem or non-use benefits and discuss the benefits expected to accrue to the environment. See 40 CFR 122.21(r)(11).

Comment 23

Many commenters (represented as Commenter 22 and 23) contend that PSEG-Salem has significant impacts on the fish populations, water quality and communities of the Delaware River, Estuary and Bay. These commenters state that they oppose the draft permit proposal that allows PSEG-Salem to continue using once through cooling and killing over 3 billion fish a year, and state that closed-cycle cooling technology would reduce fish kills by over 95%.

Commenter 2 states that since the bottom of the food chain serves as sustenance for other creatures in the bay, this destruction at the cooling water intake structure contributes to major problems in the bay. Commenters 31, 33 and 36 state that the removal of essential organisms from the food chain through the loss of larvae that would survive into adulthood destroys the many ecological and human values they would otherwise provide. Commenter 34 states that the Delaware Estuary has experienced declines in marine species many of which are of ecological significance and economic importance to local and regional communities. Commenter 35 expresses concern about the impacts from the plant given the importance of commercial and recreational fishing to the region. Commenter 32 states that large numbers of priority and forage species are impinged where these losses reduce the food resources available and impacts fish communities in a highly productive section of the Delaware River. Commenter 32 states that the impingement data suggests that impacts may be occurring on striped bass and weakfish populations, which reduces fish available for commercial and recreational fishing. Commenter 27 states that in the past 35 years of fishing he has never witnessed such a reduction in the quality of fishing as that which exists today.

Commenter 39 states that as a consequence of plant operation and design, the Delaware River Estuary has been impacted for nearly half a century due to the entrainment and impingement of fish and invertebrates. Commenter 39 states that it differs from PSEG on the significance of environmental impact from the cooling water intake since PSEG claims in its previous and current permit applications that such losses did not have a

significant environmental impact. However, an independent review as conducted by Dr. Phillip Goodyear in 2001 for Commenter 39 found that these losses are characterized as "high" or "substantial."

Some commenters cite specific numbers of impinged and entrained aquatic organisms. Commenter 19 states that the present cooling system is responsible for killing three billion fish per year. Commenter 2 states that the plant impinges more than three billion fish and fish larvae a year and that the annual fish kill encompasses two billion anchovy, over 450 million striped bass, 412 million perch, 124 million Atlantic croaker, over 77 million weakfish and 59 million blue herring all of which are an important part of the ecosystem.

(Commenter 2, 19, 22, 23, 27, 31, 32, 33, 34, 35, 36, 39)

Response 23

The Department agrees that there are documented losses of fish and other aquatic life at the PSEG-Salem cooling water intake. While there are losses across all life stages (eggs, larvae, juvenile and adult), the vast majority of these losses are eggs and larvae which are generally not as biologically significant as adults. Losses are described in the 2006 NJPDES application where page 49 of the draft permit Fact Sheet contains a detailed summary of impingement losses and page 51 contains a detailed summary of entrainment losses. As required by the NJPDES permit, the permittee also enumerates impingement and entrainment losses as part of its Biological Monitoring Program Annual Report. Please refer to **Response 24** regarding loss estimates and to **Response 31** for information regarding long term trends.

As described in **Response 13**, this NJPDES permit meets the final Section 316(b) regulations for impingement because state of the art traveling screens and a fish return system have been in operation at PSEG-Salem since 1995. The commenters overstate the benefits of closed-cycle cooling when they claim that such systems would reduce fish mortality by 95%. This may be accurate if the plant operated with no controls at all, but current application data shows that impingement mortality is reduced by 88% via the intake screens across all representative important species (RIS). Thus, the incremental benefits of cooling towers compared to modified traveling screens and a fish return system may be quite small for impingement mortality relative to the significant costs of retrofitting the plant with a closed-cycle cooling system.

The Department is also proactively requiring an analysis of traveling screens for the service water intake (85 MGD) as part of this permit action. The recently issued Section 316(b) regulations require extensive technical studies regarding entrainment for facilities with an actual intake flow greater than 125 MGD where such studies are required in this subject permit renewal as described in **Response 13**. The Department will perform a complete evaluation of all available intake protection technologies (including cooling towers) and will issue a NJPDES permit that is in compliance with the federal rule.

As a NJPDES permit requirement, an extensive wetlands restoration program was required by the Department since basic science supports that wetlands increase fish production. PSEG undertook a comprehensive review and published numerous peer reviewed studies on the link between wetlands and fish production. For additional information regarding these studies, please refer to the 1999 PSEG-Salem renewal application appendices. To implement these requirements, as well as other required "Special Conditions" of the NJPDES permit, PSEG established the Estuary Enhancement Program (EEP). These wetland restoration requirements were established outside the requisite BTA determination under Section 316(b) and these actions were not required in lieu of cooling towers. The Department incorporated this plan, as a Special Condition to the permit, because of its environmental benefits and because it would continue to

help minimize the potential for adverse impact from the cooling water intake structure. Aspects of the EEP are discussed in greater detail in **Response 40.**

Comment 24

Some commenters cite loss estimates as provided by the USFWS as well as other sources. Commenter 14 states that the Department should review the ecological impacts that USFWS has provided as part of the renewal of the 2001 NJPDES permit. Commenter 40 states that the USFWS estimated in 2000 that PSEG-Salem kills over 3 billion fish each year including: 59 million blueback herring, 77 million weakfish, 134 million Atlantic croaker, 412 million white perch, 448 million striped bass and 2 billion bay anchovy. Commenter 41 states that the USFWS provided loss numbers of 22,600,000,000 fish in twenty years' time which includes 63,000,000,000 bay anchovy. Commenters 31 and 33 state that the USFWS determined that PSEG-Salem kills over 3 billion fish a year when only considering 12 species (including alewife, American shad, Atlantic croaker, bay anchovy, blueback herring, spot, striped bass, weakfish, white perch, blue crab). Commenter 31 states that even PSEG reports impingement and entrainment losses in the 2 to 3 billion range when considering up to 12 species.

Commenters 31 and 36 state that EPA estimated in 2002 that the PSEG-Salem/Hope Creek intakes kill the equivalent of 14.7 billion fish and aquatic species of all types when fry and larvae are counted as juveniles and adults. Commenter 36 states that this estimate fails to calculate the billions of other organisms killed in this process. Commenter 33 states that EPA determined that PSEG-Salem entrains 14.7 billion fish a year and impinges an additional 6 billion a year which removes them from the food chain and the ability to survive into adulthood. Commenter 35 states that PSEG-Salem impinges and entrains over 14 billion fish, egg, and larvae in a given year many of which are at depressed population levels in the Delaware River population/system and some of which are endangered. Commenter 35 expresses concern regarding the high level of age-one equivalent fish that are lost from the Delaware River fish population as a result of impingement, entrainment and thermal impacts.

Commenter 32 cites loss totals from the June 30, 2015 draft permit that indicates that large numbers of fish, including eggs and larvae, are being impinged or entrained due to project operations. Annual totals for impinged fish from 2002 to 2004 ranged from 160,000 to 1.3 million river herring (alewife and blueback herring) and 5,800 to 227,000 American shad where mortality rates for impinged shad and river herring ranged from 25% to nearly 40%. Additionally, hundreds of millions of eggs and larvae from important recreational species, such as striped bass, as well as a similar number for forage species, such as bay anchovy (*Anchoa mitchilli*) and Atlantic menhaden (*Brevoortia tyrannus*), are entrained annually. Mortality from entrainment is assumed to be 100% due to the physical harm undertaken during the process of entrainment and fluctuations in temperature that occur due to the cooling process.

(Commenter 14, 31, 32, 33, 35, 36, 40, 41)

Response 24

The mortality estimates presented in these comments overstate the impact of PSEG-Salem on the river and the bay. First, the estimates of mortality vary widely and not all are supported by the sources cited by the commenters, as explained below. Second, some commenters generalize these figures to represent adult fish, whereas only a fraction of the organisms impinged or entrained would be classified as juveniles or adults. Third, as a simple matter of reproductive biology, the overwhelming majority of eggs, larvae and juveniles will not survive into adulthood in the natural system, so there is not a one-to-one relationship between

mortality of eggs, fry, and juveniles and reductions in adult populations and commercial fisheries. Fourth, as stated in **Response 23**, above, some commenters mistakenly suggest that closed cycle cooling would result in a 95% reduction in mortality compared to existing conditions at the plant. This is not accurate because it does not account for the effectiveness of the controls in place at the plant.

But, more importantly, mortality statistics alone cannot be used to prescribe one control technology over another. Section 316(b)'s mandate to implement the "best technology available for minimizing adverse environmental impacts" does not require permittees to install the most effective technology when the costs of doing so outweigh the benefits relative to other alternatives. See *Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208 (2009) (upholding EPA's discretion to pick between different technologies to "avoid extreme disparities between costs and benefits" when determining BTA). As EPA has acknowledged, even if closed-cycle cooling is the most effective technology for reducing entrainment and impingement mortality, it is not BTA for all existing units, or even for a subcategory of units, considering all of the other factors that must be weighed in a decision to require costly retrofitting of cooling towers. 79 Fed. Reg. 48343. For this reason, the Department has made an interim BTA finding for entrainment in this permit, and will revisit whether closed-cycle cooling is BTA for PSEG-Salem once PSEG has provided the Department with the necessary analysis of costs and benefits to put accurate mortality figures in the appropriate context.

As described in **Response 23**, the Department acknowledges that there are losses at the cooling water intake structure that are required to be addressed within the context of the Section 316(b) regulations. The Department acknowledges a letter from USFWS dated June 30, 2000 as addressed to Dennis Hart of the Department from Clifford Day of the USFWS Pleasantville Office which was intended to provide technical comments to the Department in preparation of issuance of the 2001 NJPDES permit. The values provided with the letter represent specific fish mortality in terms of abundance by year as included in Volumes 14 and 35 of the 1998 NJPDES application. The letter states that "The combined total of finfish and blue crab losses as a result of the SNGS [Salem Nuclear Generating Station] is 2.9 million kilograms per year. These estimates also include commercial and recreational non-Representative Important Fish (RIS) and non-RIS forage fish." While several commenters generalize losses as 3 billion fish per year, note that USFWS included losses in 2000 in units of kilograms per year. Additionally, it is worth noting that impingement and entrainment losses vary from year to year and cannot be generalized or oversimplified as a static annual number such as 3 billion fish a year or 14 billion fish a year. The Department is unclear as to the source of the contention that USFWS provided loss numbers of 22,600,000,000 fish in twenty years' time which includes 63,000,000,000 bay anchovy as this estimate is not included in the June 30, 2000 letter.

Regarding the assertion that the EPA case study includes a loss of 14.7 billion, the source of this number is unclear. In May 2002, EPA did provide a case study, namely the Regional Analysis Document, for the Final Section 316(b) Phase II Existing Facilities Rule (EPA-821-R-02-003) dated February 12, 2004 (available at https://www.epa.gov/sites/production/files/2015-04/documents/cooling-water_phase-2_regional-benefits_2004.pdf). This case study does not present entrainment and impingement data for PSEG-Salem's circulating water intake structure that can be averaged at 14.7 billion fish per year. Rather, the case study presents data in three forms: in adult equivalents, also referred to as age-1 equivalents; as yield lost to fisheries, and as production foregone.

As described in the EPA Section 316(b) regulations, age-one equivalent losses (A1Es) are the number of individual organisms of different ages impinged and entrained by facility intakes, standardized to equivalent numbers of 1-year-old fish. A conversion rate between all life history stages and age 1 can be calculated using species-specific survival tables based on life history schedule and age-specific mortality rates. An individual younger than age 1 is a fraction of an age-one equivalent; an individual older than age 1 represents

more than one age-one equivalent. EPA used an A1E measure in its regulations for certain analyses since an overwhelming majority of eggs, larvae and juveniles do not survive into adulthood and the A1E calculations adjust for differences in survivorship based on species and age-specific mortality rates. EPA recognizes that using A1Es simplifies a complex ecological situation, because some of the smaller fish would provide an ecological benefit to other species as food even if they would not survive to adulthood.

Finally, the Department notes that loss totals from 2002 to 2004 were summarized in the June 30, 2015 Fact Sheet on pages 49 and 51. This includes entrainment losses as well as impingement losses after adjusting for impingement mortality as broken down by month for the years 2002 to 2004. PSEG has one of the most robust data sets in the nation since the Department has been requiring this data collection for over 20 years. Nonetheless, the Department requires the ongoing collection of impingement and entrainment data and losses must be analyzed again within the context of the Section 316(b) regulations.

Comment 25

Commenter 35 states that PSEG minimizes the perception of its impingement, entrainment and fish kill impacts by limiting its impingement and entrainment analyses to just a 10 or so species it has determined to be RIS. But according to EPA's 316(b) Case Study, there are over 100 different kinds of fish vulnerable to impingement and entrainment by PSEG-Salem and other cooling water intake structures in the Delaware River. According to a review by the USFWS of PSEG-Salem's impingement and entrainment impacts on the 10 identified RIS species, PSEG-Salem kills 5.5 million weakfish, striped bass, white perch, blueback herring, spot and other fish as the result of impingement with an additional 3,327.9 million fish lost to entrainment. This translates to over 3.3 billion killed due to impingement and entrainment a year at PSEG-Salem when simply considering the 10 RIS species PSEG has identified.

Commenter 35 points out that consultants hired by the Department in previous reviews of PSEG data have questioned and challenged the accuracy of PSEG's reported fish kills and figures. The level of fish mortality is so high that PSEG cannot mask the significance of its impingement and entrainment takes. The highest take for each RIS species from the three years of data (2002 to 2004) in the draft permit Fact Sheet demonstrates this point. Commenter 35 states that PSEG uses averaging to try to reduce the perception of its annual impingement and entrainment levels but the annual take in a given year is significant and should not be masked by averaging. This includes a number of species that are already in decline or only holding steady at significantly low levels.

Commenter 35 states that since the construction of PSEG-Salem there have been significant water quality improvements in the Delaware Estuary due to increased water quality regulations and technological advancements in discharging industries including effects to dissolved oxygen levels. Improvements are such that fish propagation and other population benefits have been documented and the DRBC is studying the need for upgrading the estuary's designated uses in order to comply with anti-degradation requirements of the Clean Water Act. The fact that these improvements in Delaware Estuary conditions have provided benefits to the fish populations should not translate into an argument that PSEG-Salem's destruction of over 14 billion fish a year has not depressed fish populations and prevented even further enhancements and benefits to the Delaware Estuary's fish populations and the biological, recreational, commercial, economic, cultural and aesthetic values they provide.

(Commenter 35)

Response 25

To assess compliance with Section 316(a) and relevant regulations, facilities often use a RIS approach which originated with the Clean Water Act Section 316(a) regulations at 40 CFR Part 125.71. RIS means species which are representative, in terms of their biological needs, of a balanced, indigenous community of shellfish, fish, and wildlife in the body of water into which the discharge of heat is made. EPA recognized the difficulty of evaluating the entire community and all the members of it and thus established RIS. The assumption is that if the RIS are doing well, then the entire community should also be doing well. RIS for PSEG-Salem represent the vast majority of all species impinged and entrained as supported by decades of historical data. As described in **Response 24**, data is presented in the Fact Sheet as monthly values so the Department does not agree with the contention that this data is masked by averaging. Note that entrainment data in the 2006 NJPDES application is broken down by life stage namely egg, yolk sac larvae, post yolk sac larvae and juvenile.

While PSEG does utilize an RIS approach for the detailed application analysis, PSEG does collect and enumerate impingement and entrainment data for all species. The Department also agrees that the impacts extend to species beyond the RIS as documented in the Regional Analysis Document for the Final Section 316(b) Phase II Existing Facilities Rule (EPA-821-R-02-003) dated February 12, 2004. This document is available at http://www2.epa.gov/sites/production/files/2015-04/documents/cooling-water_phase-2_regional-benefits_2004.pdf. The Department also acknowledges that the collection of impingement and entrainment data as well as data analysis requirements as included in this subject permit renewal shall be conducted for all species as indicated in Part IV.G.6.a (entrainment); Part IV.G.6.b (impingement) and Part IV.G.7 (application components). In other words, data and study requirements as required by this subject renewal permit will not be limited to RIS.

Regarding the findings of previous reviews by consultants hired by the Department in relation to impacts, please refer to **Response 27**. Please refer to **Responses 23** and **24** for additional information regarding losses.

With respect to comments regarding improvements to water quality, the Department acknowledges that there have been improvements as addressed in ongoing work by DRBC in relation to potential changes to designated uses of the waterbody. Please refer to **Response 58** for additional information.

Comment 26

Several commenters state that PSEG-Salem is not having an adverse impact on the ecology of the Delaware Estuary. Commenter 4 states that numerous studies performed by PSEG Nuclear as well as state and federal government agencies have shown conclusively that the health of the estuary has been improving for over 30 years. Commenter 12 states that PSEG-Salem's current cooling water intake technology has minimized any potential adverse environmental and ecological impact on the Delaware River through a combination of intake-related technologies and operational measures.

Commenter 10 states that the aquatic fauna of the Delaware Estuary is affected by many factors, including variation in weather among years; long-term trends in climate; fishing; contamination; and predator-prey relationships among different species and life stages. Commenter 10 further states that long-term trends of various fish populations in the estuary can be attributed to improved spawning success of anadromous species; changes in fishing mortality; climate trends; and possibly increased predation by other species, so a comparison of potential impacts needs to be done in the context of the dynamics of fish populations.

Mortality at early life stages (which have very high natural mortality rates) has less effect than mortality on adults since the early stage mortality essentially replaces natural mortality on these stages. Commenter 10 states that PSEG has used accepted fisheries analyses to evaluate various impacts on Delaware Estuary fish populations and these did not show entrainment and impingement by PSEG-Salem as causing significant adverse impacts.

(Commenter 4, 10, 12, 28)

Response 26

Section 316(b) of the Clean Water Act requires that NPDES permits for facilities with cooling water intake structures ensure that the location, design, construction, and capacity of the structures reflect the best technology available to minimize harmful impacts on the environment. Because cooling water intake structures withdraw from receiving waterbodies, there are associated impingement and entrainment effects. These effects constitute an environmental impact that must be addressed under the Section 316(b) regulations. Please refer to **Response 24** for specific details regarding early life-stage mortality.

The Department does agree that fish populations are subject to many variables (i.e., weather, fishing mortality); however, directly regulating these other impacts to fish populations are outside of the jurisdiction of this permit. While the focus of the Section 316(b) regulations is the impingement and entrainment losses at the plant, the NJPDES permit does require biological monitoring to assist in understanding any environmental impacts as well as long term trends. Biological monitoring conditions have been included in the NJPDES permit since 1994 and were required outside of the BTA determination. Specifically, the Department requires PSEG-Salem to conduct an extensive biological monitoring program including bay sampling with a focus on RIS as described in **Response 25**. Plant related impingement and entrainment sampling also focuses on RIS.

As described on pages 29 through 32 of the Fact Sheet, abundance data is collected by the following surveys:

- PSEG Baywide Beach Seine Survey
- PSEG Baywide Bottom Trawl Survey
- PSEG River Ichthyoplankton Survey
- PSEG River Pelagic Trawl Survey
- Delaware River Striped Bass Recruitment Survey

The abundance data collected by these surveys is used in conjunction with historical studies to characterize, or update prior information on, the biological conditions in the vicinity of the Station. PSEG's abundance data is also used in conjunction with survey data collected by the Delaware Department of Natural Resources and Environmental Control (DNREC) and the Department's New Jersey Division of Fish and Wildlife (NJFW) to characterize long-terms trends in the abundance of juvenile fish species in the estuary during the historical period of PSEG-Salem operations. Long-term trends in juvenile abundance can reflect the cumulative effects of all potential stressors in the estuary (e.g. fishing, pollution, environmental conditions, multiple cooling water intakes) on the fishery resources. An evaluation of long term trend data conducted by PSEG as well as trend data conducted by the State of New Jersey, State of Delaware shows that there is an increasing trend in populations for many RIS as described in **Response 31**.

Comment 27

Commenter 35 points out that past expert reviews commissioned by the Department have determined that PSEG has underestimated its impacts and, even with this undercounting, there have been significant concerns regarding the impact of PSEG-Salem on fish populations in the estuary. Throughout the 2000 analysis provided by ESSA Technologies (ESSA) to the Department, ESSA found the PSEG analyses to include a variety of data gaps; biases; failure to substantiate analyses and/or findings; problems with sampling and PSEG research; misrepresentations and/or unsubstantiated assertions by PSEG; concerns about PSEG analyses, assertions and/or findings. ESSA's report clearly articulates not just a concern about the misrepresentation of data by PSEG, but a concern regarding the impacts of PSEG-Salem on Delaware Estuary fish populations where ESSA states, "It is often concluded that the impact of Salem is "trivial" despite the evidence that there is an impact." Examples of ESSA findings regarding PSEG's information, data and analyses:

1) PSEG underestimates biomass lost from the ecosystem "…the actual total biomass of fish lost to the ecosystem (including fisheries, station losses, and losses of food to predators, summed over all species) is at least 2.2 times greater than that listed in the Application.

2) PSEG's estimates exclude "a) actual biomass of fish lost at the station for all species including bay anchovy; b) lost prey production other than bay anchovy thereby underestimating catch foregone; and c) the projected increases in RIS abundance in the Application that should be included in estimates of catch and production foregone. The largest under-estimates are for bay anchovy, spot, striped bass, Atlantic croaker and weakfish. Problems with the estimates of natural mortality rates contribute to the underestimation of lost biomass. The difficulties with production foregone imply redoing all dependent and related analyses."

3) "The monitoring programs that collected these data often changed in location, timing and methods of sampling. The Application does not include sufficient caveats regarding the impact of these changes, the many assumptions made to transform field measures into model inputs, and the inherent uncertainty in original abundance estimates. We recommend that the current application: 1) list all assumptions made; 2) acknowledge and estimate uncertainty in the data; 3) perform sensitivity analyses to identify what uncertainties have the greatest influence on modeling results; and 4) adjust the conclusions to reflect uncertainties in data, analytical methods, and confounding factors."

4) ESSA states, "It is judged, however, that the estimated impingement mortality rates are not representative of actual mortality rates of impinged fishes after they are returned to the Delaware River via the fish return system of the station."

5) ESSA concluded that "documentation of the uncertainty and potential bias associated with the impingement and entrainment loss estimates, and with the Conditional Mortality Rate (CMR) estimates, is important because the results of these analyses provide key input to subsequent analyses of the effects of the station, such as fish stock jeopardy, lost fish production and biomass, assessment of the Base Case Future station operations scenario, and ultimately, the cost/benefit analyses of BTA to reduce entrainment and impingement."

6) Referring to PSEG's discussion and presentation of entrainment conditional mortality rate, ESSA found PSEG's "discussion in this section of the Application to be misleading."

7) "Thus, it is judged that the mortality of impinged fish returning to the Delaware River is likely not accurately described by the mortality estimates determined with the sampling pool and holding tanks."

8) "In summary, all the natural mortalities (M) for young fishes are likely overestimated, which has direct implications to conditional mortality rates if estimated with the Extended Empirical Impingement Model (EEIM). The conditional mortality rates of pre-juvenile 1 stages would be underestimated. The elevated Ms would result in underestimation of production foregone of growing populations, which would directly affect the fisheries benefit analyses of the cost/benefit assessment of alternative technologies to reduce entrainment and impingement."

9) "In particular, there is a tendency to draw subjective and unsupported conclusions about the importance of Salem's impact on RIS finfish species."

In addition, while there have been enhancements in the health of the Delaware Estuary, species that are adversely impacted by PSEG-Salem are continuing to suffer. The adverse impacts to these species that are in decline or at depressed population levels gets lost from view in the characterizations provided by PSEG and the Department in the draft permit. Commenter 35 states that PSEG-Salem is clearly having an adverse environmental impact, regardless of PSEG's self-serving claims based on faulty scientific studies.

(Commenter 35)

Response 27

As noted in this comment, the Department did hire ESSA to perform a detailed review of discrete components of PSEG's 1998 NJPDES application. As identified in the Scope of Work as included in the final report, ESSA's review of application components included impingement and entrainment impacts, available intake protection technologies, cost/benefit analysis and the status of fish populations (e.g. predictive and retrospective assessments of power plant impacts to fisheries, biostatistics, fish population dynamics, and fisheries economics) in the Delaware Estuary. While ESSA performed a review of certain fish population modeling as included by PSEG in its 1998 application, the Department has always maintained that an adverse environmental impact (i.e. population level impact) need not be proven in order to require a reduction of mortality at the cooling water intake structure or to conduct the requisite BTA analysis under Section 316(b).

ESSA made a number of recommendations in its 2000 report for which the Department included the majority of ESSA's recommendations regarding fisheries data and analyses (i.e., impingement and entrainment loss estimates) in the 2001 NJPDES permit. Examples of studies that the Department required based on ESSA's suggestions include strobe light technology, air bubble technology and sound deterrent studies as well as an evaluation of the fish mortality from the fish return system independent from the mortality of the Ristroph screens. The Department conducted a review of these studies which were considered a part of this 2015 permit decision.

These same comments were raised during the 2000 draft NJPDES permit comment period. A detailed response on each of these issues as well as responses to ESSA recommendations were included in the 2001 final permit. Please refer to Responses 91, 92, 102-104, 108, 110, 112, and 113 of the 2001 final NJPDES permit for additional detail.

In sum, given that the Department incorporated most all of ESSA's recommendations into the 2001 NJPDES permit renewal as permit conditions and given that criticisms of population level analyses are not relevant to plant related impingement and entrainment losses, the Department maintains that it considered ESSA's input appropriately.

Comment 28

Commenter 30 requests that the permittee provide documentation that the current BTA for fish screening cannot further be modified to reduce impingement impacts.

Commenter 33 states that only two studies evaluate the impingement mortality of the Ristroph-style Hydrolox Modified Traveling Screens that are being used at the facility. This first study was conducted by Alden Research Laboratory (2006) at an intake velocity of 1 or 2 feet per second (fps) velocity with screen rotations at 5 feet/minute or 10 feet/minute utilizing fish freshwater species: golden shiner, common carp, bluegill, striped bass, and channel catfish. The second study was prepared by ASA Analysis and Communication (2008) and compared fish impingement mortality for 33 species at the E.F. Barrett Generating Station in New York before and after installation of Hydrolox screens. Commenter 33 contends that the two studies demonstrate that impingement mortality is associated with the Hydrolox screens and raises concerns about the impact of screen rotation speed and intake velocity on fish impingement. Commenter 33 expresses concern about the ability for injured striped bass to survive the conditions of the existing fish return system after sustaining injuries such as bruising, fin damage, scrapes, and lacerations. Screen rotation and intake velocity are likely to impact other species of fish differently and these conditions may lead to reduced impingement for striped bass, but may cause greater harm to other target species. Although mortality rates are affected by rotation speed and intake velocity, screen rotation speed and intake velocity are not specified in the permit and are not an enforceable permit condition.

(Commenter 30, 33)

Response 28

The circulating water intake structure at PSEG-Salem is equipped with a modified Ristroph traveling screen design which the EPA has recognized is a proven and effective technology to minimize impingement mortality. In fact, modified traveling screens are considered to be the national standard for impingement mortality in the Section 316(b) regulations. 79 Fed. Reg. 48303 ("The impingement mortality standard is based on modified traveling screens with fish returns."); 40 CFR 125.92 ("Examples of modified traveling screens include, but are not limited to: Modified Ristroph screens with a fish handling and return system . . . ."). Constant screen rotation and low pressure washes serve to reduce impingement mortality by assisting organisms into the fish return system. The draft permit Fact Sheet includes a summary of initial and latent mortality rates (presented as annual averages by taxon) across RIS measured by PSEG at Salem from 2002 to 2003 as follows:

Initial and Latent Impingement Mortality		
	Initial Mortality (annual average)	**Latent Mortality (annual average)**
Atlantic croaker	15.88%	19.76%
Atlantic menhaden	4.01%	--
Atlantic silverside	3.86%	--
Bay anchovy	8.19%	47.13%

Blue crab	7.36%	--
Blueback herring	10.53%	--
Bluefish	6.42%	--
Mummichog	3.39%	--
Naked goby	2.77%	--
Sheepshead goby	15.00%	--
Striped bass	--	5.92%
Weakfish	4.11%	36.09%
White perch	4.33%	10.61%
Alosids	--	42.11%
Spot	--	30.13%

These data show the effectiveness of the modified Ristroph screens and fish return system in operation at PSEG-Salem. Initial mortality is measured immediately upon collection, whereas latent mortality requires a holding time of up to 48 hours. Only those species were included for which a sample size was greater than or equal to 20 individuals.

While modified Ristroph traveling screens have been in place since 1995, the Department has required a number of permit conditions to ensure that they are operated in the most effective manner possible. For example, Part IV.G.2.a.i requires the permittee to ensure proper operation and maintenance of its Ristroph Traveling Screens at all times to minimize impingement effects on aquatic life. Part IV.G.2.a.ii requires the permittee to post a sign in each of the two intake bays to describe the basic function of the traveling screens and how they reduce impingement mortality. These signs serve to remind screen operators of the benefits of the proper operation and maintenance of the screens.

With respect to the concerns raised by Commenter 33 regarding Hydrolox screens, note that PSEG is not equipped with Hydrolox screens at the circulating water intake structure. Hydrolox screens are a relatively recent screen design whereas modified Ristroph traveling screens have been in place at many facilities for decades. There is much more extensive literature available on the performance of modified Ristroph traveling screens as compared to Hydrolox. It is not appropriate to compare Hydrolox performance at a different site given the significant differences in materials and screen size as well as site-specific factors such as flow rate, receiving waterbody etc. Nonetheless, the responses above should serve to address the concerns raised regarding optimal operation of the traveling screens to minimize bruising, fin damage, scrapes, and lacerations.

Comment 29

Commenter 33 states that although much of the impact of PSEG-Salem on fish populations is from entrainment, the draft permit fails to specifically address entrainment and is therefore unable to correct 93.8% of the fisheries impact from the cooling water intake structure. Hydrolox, the company which markets its Hydrolox screens markets its technology for impingement only and makes no claims about its impact on entrainment.

(Commenter 33)

Response 29

The Department acknowledges that screens have a minimal effect on entrainment. However, the draft permit Fact Sheet does address entrainment in that it has a separate interim BTA determination for entrainment on

page 64. Please see **Response 10**, which describes how the Department will determine BTA for entrainment at PSEG-Salem. As described in **Response 28** the screens at the circulating water intake screens are not Hydrolox screens.

Comment 30

Commenter 33 cites issues that relate to coast-wide cumulative impacts. Specifically, Commenter 33 states that the Atlantic States Marine Fisheries Commission (ASMFC), which provides interstate management of migratory coastal species, has expressed concern about the coast-wide cumulative impacts of impingement and entrainment in cooling water intake structures on fish stocks, particularly managed anadromous species (e.g., striped bass, sturgeon, shad and river herring). Commenter 33 states that ASMFC has explained that food webs can be disrupted when some species and/or life stages incur a larger mortality impact from cooling water intake structures than other species. In addition, cooling water intake structures can modify food webs by converting live organisms to organic matter thereby increasing food for scavengers and decomposers and decreasing food for consumers of living organisms. This can lead to disruption of nutrient, carbon, and energy flows between living organisms and the physical environment; modify aquatic habitat; and alter species composition and biodiversity.

(Commenter 33)

Response 30

The Section 316(b) regulations are the regulatory control for impacts from cooling water intake structures that are applicable on a nationwide basis. In developing the Section 316(b) regulations, EPA considered the disruption in food webs and cumulative impacts as caused by impingement and entrainment effects. An excerpt as included on page 48319 of the Preamble is as follows:

> "…Rates of I&E depend on species characteristics, the facility's environmental setting, and the location, design, construction and capacity of the facility's CWIS [cooling water intake structure]. In addition to direct losses of aquatic organisms from I&E, a number of indirect, ecosystem-level effects may also occur, including (1) disruption of aquatic food webs resulting from the loss of impinged and entrained organisms that provide food for other species, (2) disruption of nutrient cycling and other biochemical processes, (3) alteration of species composition and overall levels of biodiversity, and (4) degradation of the overall aquatic environment. In addition to the impacts of a single CWIS on currents and other local habitat features, environmental degradation can result from the cumulative impact of multiple intake structures operating in the same watershed or intakes located within an area where intake effects interact with other environmental stressors. Finally, although it is difficult to measure, the compensatory ability of an aquatic population, which is the capacity for a species to increase survival, growth, or reproduction rates in response to decreased population, is likely compromised by I&E and the cumulative impact of other stressors in the environment over extended periods of time…

In sum, these effects were considered by EPA in the development of the rule. By applying the rule in developing the NJPDES permit and the requisite BTA determination, the Department is addressing these issues and concerns within the scope of its authority.

Comment 31

Some commenters cite examples of impacts to specific species. Commenters 31 and 35 cite the following:

- The ASMFC has determined that the American shad stock in the Delaware River is considered stable but at low levels compared to the historic population.

- Weakfish populations in our region are in a depleted state.

- Blueback herring and Alewife have been identified by National Oceanic Atmospheric Association (NOAA) as a species of concern and are species that have been experiencing declines throughout their range, including the Delaware River. Commenter 35 cites that among the reason for decline are fishing, and increased predation where PSEG-Salem takes over 7 million of these two fish combined per year.

- The bay anchovy is a species whose numbers have been decreasing at an alarming rate (www.state.nj.us/dep/fgw/pdf/delriver/artdel_sp_bayanchovy.pdf).

- The Atlantic Sturgeon of the Delaware River are listed as endangered as part of the New York Bight distinct population segment (DPS). Of the two known spawning populations in the NY Bight DPS, the Hudson is presumably the largest extant reproducing Atlantic sturgeon population whereas the Delaware is presumably very small and extremely vulnerable to any source of anthropogenic mortality. Commenter 35 states that the Delaware River population of Atlantic sturgeon is estimated to have 300 spawning adults left so even small takes have significant population impacts.

Commenter 33 asks that the Department consider the "depleted" status of many commercial and recreational species known to be impinged and entrained at the facility and the impact of once-through cooling systems on fishing-related activities and livelihoods. Similarly, the Department should evaluate target species for special protections of "fragile" species based upon the status of the stock according to the ASFMC where this target list should be used to assist in the selection of technological remedies for impingement. Commenter 33 states that the first recommendation in the Delaware River Basin Anadromous Fish Restoration Plan (as prepared by the Delaware River Shad Fishermen's Association in 2014) was for permitting authorities to require PSEG-Salem and the Delaware City Refinery to install closed-cycle cooling given the estimated 900 million to 3 billion organisms affected by the existing withdrawal and cooling practices.

Similarly, Commenter 33 states that commercial and recreational fishermen have had to restrict or eliminate fishing for numerous species along the Atlantic coast and in the Delaware Estuary through moratoriums, yet the impact from PSEG on the fishery remains unmanaged. The ASMFC management status of fish known to be impinged at PSEG–Salem is: Alewife (depleted, moratorium on fishing established in 2012); American shad (depleted, moratorium on fishing established in 2013); Atlantic croaker (unknown, benchmark assessment scheduled for 2016); blueback herring (depleted, moratorium on fishing established in 2012); spot (unknown, benchmark assessment scheduled for 2016); striped bass (rebuilt, harvest reductions adopted in 2014); and weakfish (depleted, harvest restrictions adopted in 2009). Commenter 33 states that the current status of striped bass is of particular concern where steps are being taken throughout Atlantic coastal states to improve spawning stock biomass to prevent a future reduction in the fishery. The State of Delaware has reduced the striped bass recreational and commercial harvests by 25% to comply with the ASMFC Interstate Fishery Management Plan yet the commenter contends that PSEG-Salem will be able to continue to kill striped bass without limit or restriction under the NJPDES permit.

Commenter 35 expresses concern about the use of once-through cooling that will enable PSEG-Salem's continuing high level of bay anchovy impingement and entrainment mortality. Commenter 35 states that bay anchovy is an important forage fish that is a target of commercial and recreational fisheries. The bay anchovy is usually one of the most abundant species in the Delaware Estuary and is a primary food source for many fish inhabiting the river including weakfish, bluefish and striped bass; however, the average number caught per seine haul has been declining since 2000. Bay anchovy data correlates well with data from the NJ Fish and Wildlife finfish trawl survey in the Delaware Bay which also indicates a bay anchovy decline since 1998. Commenter 35 states that it is estimated that the Delaware City Refinery kills 19% of bay anchovy in the Delaware Bay and River stock in 1998 through impingement and entrainment. In comparison PSEG-Salem takes over 2 billion bay anchovy which is well more than 100 times the level of take at Delaware City Refinery. It is most certain that PSEG-Salem would have a more noticeable impact on the total productivity of the bay and river.

Commenter 35 states that, according to the draft permit, PSEG-Salem has killed up to 72,846 American shad in a single year. The annual take of the shad population in the Delaware River is in the range of 23% to 45% of the entire population using the 2000 to 2006 average. The commenter believes it is arbitrary, capricious and not justifiable to allow these levels of take for a species of recreational, cultural and historic importance to the Delaware River ecology, economy and community given that the population is already at low levels. Although fishermen are required to limit their take in efforts to preserve and restore the population of the species, PSEG-Salem is allowed to take them indiscriminately.

Commenter 35 states that PSEG-Salem has an estimated mortality rate for weakfish of 17% which means that PSEG-Salem kills one out of every six weakfish in the Delaware River. This is contributing to the pressure on an already depleted population that needs a reduction in take in order to maximize its ability to rebound. The population abundance is so low that in 2009 the ASMFC considered eliminating the harvest of weakfish. Commenter 35 argues that allowing PSEG-Salem to continue take in the range of 50 to 80 million weakfish a year cannot be supported by sound science.

(Commenter 31, 33, 35)

Response 31

Fish populations are subject to a wide array of variables. While impingement and entrainment from cooling water intake structures do have an impact, there are also a variety of other factors such as fishing mortality, weather variability, climate trends, predation by other species, water quality, and available food sources that affect the overall population. While fishery restrictions apply to fishermen, the Section 316(b) regulations are the relevant regulation for facilities that withdraw surface water through cooling water intake structures as applied on a nationwide basis. The new Section 316(b) regulations now make it clear that the intake flow threshold for cooling water intake structures is 2 MGD, a level which allows the regulations to cover 99.8 percent of the total water withdrawals by utilities and other industrial sources. This intake flow threshold includes not only power plants, but also industrial and manufacturing facilities such as the Delaware City Refinery located in Delaware City, Delaware.

The Department acknowledges that there is variability in the status of fish populations that are impacted by PSEG-Salem.

As described in additional detail in **Response 48**, PSEG conducts baywide biological monitoring as required by the NJPDES permit, which compliments other biological monitoring data collected by States. PSEG

provided an update of Baywide Juvenile Abundance Long-Term Trends for 2014 which PSEG presented at a web conference meeting of the Estuary Enhancement Program Advisory Committee (EEPAC) on December 17, 2015. The following table utilizes annual data from four sampling programs, including the DNREC Juvenile Trawl Survey, the NJDEP Beach Seine Survey, the PSEG Beach Seine Survey, and the PSEG Bottom Trawl Survey. The trends analyses presented in the table focus on age-0 fish (also referred to as juveniles) because year-class strengths of fish populations are generally established by the end of this life stage and one of the first signs of a decline in population abundance is a downward trend in recruitment. Additionally, most effects of the Station are expected to occur during the first year of life.

Species	DNREC Juvenile Trawl	NJDEP Beach Seine	PSEG Beach Seine	PSEG Bottom Trawl
Alewife	⇧	⇩	⇧	NS
American Shad	NA	⇧	⇧[NS]	NS
Atlantic Croaker	⇧	⇧	NS	NS
Atlantic Menhaden	NS	⇩	NS	NS
Atlantic Silverside	NS	⇩	⇩	NA
Bay Anchovy	⇩	⇩[NS]	NS	⇩
Blue Crab	NS [⇧]	NA	⇧	NA
Blueback Herring	⇩	⇩	⇩	NS
Spot	⇩	⇩	⇧	⇧
Striped Bass	⇧	⇧	NS	NS [⇧]
Weakfish	⇧	⇩	⇩	⇧
White Perch	⇧	NS	NS	NS

↑ = statistically significant increase
↓ = statistically significant decrease
NA = not analyzed for trend
NS = no statistically significant trend

Note: Parenthetical values indicate previous year's value when it differs from current year. Fish other than striped bass in NJDEP Beach Seine Survey are "all ages" as these species were not measured for length. Shaded cells denote best gear(s)/program for trending of juvenile abundance of a particular species based on life history, sampling region, and duration of program.

The trend data from PSEG indicates that juvenile American Shad, Atlantic Croaker, Blue Crab, Striped Bass, and White Perch increased in abundance in 2014. Conversely, the abundance of juvenile Atlantic Silverside, Bay Anchovy, and Blueback Herring decreased in 2014. Trends indicated by the four surveys were conflicting for three species, including Alewife, Spot, and Weakfish. Nearly all of the species indicated a

trend similar to the previous year. Overall, this data presented by PSEG is consistent with data from other sources described above.

The Department also reviewed the 2012 State of the Delaware Estuary report (see http://www.delawareestuary.org/state-of-the-estuary) in order to provide background on the status of certain species specified in this comment to fully respond to this comment. The State of the Delaware Estuary report is prepared by the nonprofit Partnership for the Delaware Estuary and is published every three to five years. The report is described as a scientific health exam of the tidal Delaware River and Bay, as well as the land draining to them in coastal Delaware, southern New Jersey, and Southeast Pennsylvania. Excerpts from the report regarding the status for the American shad, juvenile weakfish, striped bass and white perch (as represented in this comment) are as follows:

American Shad
"…the current condition of the American shad population in the Delaware River is low when compared to the original condition of the stock, but relative to other extant populations, the Delaware stock is fairly healthy with numerous indices of relative abundance indicating at least a temporal trend of population increase."

Juvenile Weakfish
"Weakfish relative abundance in the 30-foot (9.1 m) trawl survey has generally followed a declining trend since 1996 (Fig. 6.6.1) and total mortality estimates have correspondingly increased. The age structure of weakfish has become truncated back to the same level it had been in the early 1990s, with age three the oldest fish detected. In contrast, the age structure in the survey catches in 1999 and 2000 contained weakfish up to age eight. Over 95% of the 2010 catch was less than age two. On the other hand, weakfish was the most abundant finfish species in the survey. …

Currently, weakfish reproduction continues at moderate levels. Survivorship to catchable size, however, has declined greatly, to the point that catches of legal-size weakfish are uncommon in Delaware Bay. The cause of this decline has been determined to be an increase in natural mortality due to predation by, or competition with striped bass and spiny dogfish, possibly mediated by Atlantic menhaden abundance to a greater or lesser extent."

Striped Bass
"The fishery is under fairly conservative restrictions. The abundance coastwide has declined in the last two to three years, reflected in the recreational catch per trip in the Delaware Estuary waters in Delaware…

Once considered extirpated by some biologists, the Delaware River population is now one of the major spawning stocks on the Atlantic coast. This stock was declared restored by the Atlantic States Marine Fisheries Commission in 1998. The key to its recovery was the reduction in sewage pollution in the River due, in part to the federal Clean Water Act. Annual surveys by the Delaware Division of Fish and Wildlife, the New Jersey Division of Fish and Wildlife and the Pennsylvania Fish and Boat commission monitor abundance changes."

White Perch
"The white perch YOY [young of the year] index was above the time series median YOY index value during 2009 and 2010, which suggested the Delaware Estuary white perch spawning population was large and spawning success was good. Delaware white perch commercial landings exceeded 100,000 lbs.

(45,360 kg) in both 2009 and 2010; the first time landings exceeded 100,000 lbs. for two consecutive years in the 1951 through 2010 time series, which also suggested the Delaware Estuary white perch population was large…

White perch are one of the most abundant and widespread fish in the Delaware Estuary. The species supports important commercial and recreational fisheries."

Regarding bay anchovy, the Department recognizes the importance of this forage based species. According to http://www.state.nj.us/dep/fgw/pdf/delriver/artdel_sp_bayanchovy.pdf, the potential impact from this decrease has yet to be recognized, but the recent decline in the Delaware Bay's weakfish population may be an indication of a food chain imbalance for bay anchovy within the estuary. Continued monitoring is important.

Regarding blueback herring and alewife, the Department acknowledges that there has been a coast wide decline of river herring stocks. As stated in http://www.njfishandwildlife.com/news/2012/herring-tog_regchange.htm, the exact cause for these coast wide declines remains uncertain, but numerous factors such as loss of spawning habitat, impediments to fish passage (i.e. dams), water quality degradation and fishing all likely played a role.

The most current stock assessment of Atlantic croaker is discussed in a 2015 Review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for Atlantic croaker 2014 Fishing Year (see http://www.asmfc.org/uploads/file/55d65a662015AtlCroakerFMPReview.pdf). In this review, it was determined that based on the 2010 stock assessment, Atlantic croaker is not experiencing overfishing. "According to the 2010 stock assessment, biomass has been increasing and fishing mortality decreasing since the late 1980s. Biomass conclusions are based on information from the data compiled for the assessment, namely increasing indices of relative abundance and expanding age structure in the catch and indices."

Regarding spot, the Department recognizes a decline in abundance since the inception of the Delaware River Seine Survey in 1980. While it is not completely certain why these species populations are decreasing, the Department plans to conduct future research to determine the underlying causes.

While ASMFC did not comment on the PSEG-Salem NJPDES permit, a portion of this comment references a summary of ASMFC fishery status for species impacted by PSEG-Salem. The Department maintains that the wealth of information and site-specific data summarized above is more relevant as it pertains specifically to Delaware Bay and not the entire Atlantic coast. The ASMFC status is a regional assessment and is not specific to the Delaware Estuary.

Please refer to **Response 26** for additional information on overall population trends for these and other species. Please refer to **Response 35** for information regarding endangered and threatened species.

Comment 32

Commenter 33 states that the Delaware River and Estuary are important for commercial and recreational fishing. The Delaware River's recreational fishery is important to quality of life locally and is also an economic engine and driver for local tourism. Commenter 33 states that the Delaware River once supported a robust commercial fishery, particularly for American shad and Atlantic sturgeon, yet upstream industrial pollution and dissolved oxygen levels contributed to a decline in fish populations. Commenter 33 states that the value of Delaware River fishing is emphasized by the existence of several recreational fishing

organizations such as the Delaware River Shad Fishermen's Association. Commenter 32 states that impingement data for other important fisheries in addition to American shad suggests that impacts may be occurring on striped bass and weakfish (*Cynoscion regalis*) populations, reducing the number of fish that would later be available for recreational and commercial fishing.

Commenter 33 states that commercial and recreational fishing contributes $368 million annually to the regional economy based on a study conducted at the University of Delaware regarding the socioeconomic value of the Delaware River Basin. Specifically, commercial fish landings account for $36 million/year and angler fishing accounts for $334 million a year. Fishing contributes an annual cumulative recreational value of $51,754,595 or 24% of the total recreational value of the watershed. To provide the basis for these figures, Commenter 33 provides an attachment to its comments that displays Fish Landings and Landed Values in the Delaware Estuary; Value of Commercial Fish Harvests in Delaware; Values of Fishing, Hunting and Wildlife Recreation in Delaware Estuary Watershed; and the Total Annual Value of Recreational Benefits in Delaware Watersheds. Commenter 33 notes that the economic value of fish landings in the Delaware River Estuary surpasses $25 million per year and includes many of the same species that are listed as impinged and entrained at PSEG-Salem such as striped bass, weakfish and white perch.

Commenter 35 notes that according to a 2006 National Survey by the USFWS, recreational fishing is popular and that money generated from recreational fishing activities in the Delaware River basin is significant. Commenter 35 notes that according to Gerald Kaufman in a report entitled "Socioeconomic Value of the Delaware River Basin in Delaware, New Jersey, New York, and Pennsylvania" the annual economic value of the Delaware River basin is nearly $22 billion with $1.54 billion of that being ascribed to fish and wildlife activities. Specifically, fishing, hunting, and bird watching/wildlife associated recreation employ 44,941 jobs with $1.5 billion in wages in the Delaware Basin including: Delaware (4,080 jobs earning $134 million in wages); New Jersey (17,477 jobs earning $574 million in wages); New York (4,872 jobs earning $160 million in wages); and Pennsylvania (18,512 jobs earning $608 million in wages). The annual value of fish landings in the tidal Delaware River and Bay is $25.4 million in 2000 dollars or $34.1 million in 2010 dollars.

Commenter 35 goes on to say that according to a 2007 report by NMFS as discussed in the Gerald Kaufman economic valuation study of the Delaware River, the following benefits were obtained from the Delaware River in a given year:

- 752,882 pounds of striped bass at a year 2000 economic value of $1,717,372 and a year 2010 economic value of $2,301,278
- 189,110 pounds of weakfish at a year 2000 economic value of $261,228 and a year 2010 economic value of $350,046
- 88,060 pounds of white perch at a year 2000 economic value of $84,500 and a year 2010 economic value of $113,230

Commenter 35 states that healthy fish populations are important ecologically but also economically to the Delaware River region yet the takes by PSEG-Salem significantly diminish these values. The reduced impingement and entrainment that would result from installation of closed-cycle cooling at PSEG-Salem would result in as much as $577 million in economic benefit, considering just a 20 year time frame, which is far greater than the misleading figure of $8 million put forth by PSEG.

(Commenter 32, 33, 35)

Response 32

The benefits described by the commenters fall within the rubric of social costs and benefits that will be fully considered in the Department's subsequent BTA determination once the permittee has opportunity to prepare and present all of the required 40 CFR 122.21(r) analyses. As described in **Response 10**, the Department is issuing this permit with an interim entrainment BTA finding, and it is premature for the Department to consider the commenter's cost-benefit analysis without affording the permittee the opportunity to develop the cost evaluation study required by 40 CFR 122.21(r)(10) and the benefits valuation study required by 122.21(r)(11).

The Section 316(b) rule is intended to address impacts from cooling water intake structures and takes recreational and commercial fishing into account. As noted on page 48303:

> "The beneficiaries of fish protection at cooling water intakes include fisherm[e]n, both recreational and commercial, and people interested in well-functioning and healthy aquatic ecosystems. While most people consume electricity, they consume electricity in differing amounts, and may not be uniformly interested in, or willing to pay for, fish protection. Thus, there is imperfect overlap between those who could be required to pay for fish protection and those who would benefit from fish protection. Those who desire more fish protection have extremely limited opportunities in which they can express their willingness to pay for fish protection in market transactions that result in fish protection. In addition, deregulation in the electric industry has made it more difficult for merchant power producers to both remain competitive and pass along to consumers costs associated with fish protection, relative to rate-regulated electric utilities that are vertically integrated."

As noted above, commercial and recreational fishing is considered in the willingness to pay survey. The 2014 Section 316(b) regulations contain specific elements for a Benefits Valuation Study including an analysis of social benefits. 40 CFR 122.21(r)(11) is stated as follows:

> "(11) *Benefits Valuation Study.* The owner or operator of an existing facility that withdraws greater than 125 mgd AIF must develop for submission to the Director an evaluation of the benefits of the candidate entrainment reduction technologies and operational measures evaluated in paragraph (r)(10) of this section including using the Entrainment Characterization Study completed in paragraph (r)(9) of this section. Each category of benefits must be described narratively, and when possible, benefits should be quantified in physical or biological units and monetized using appropriate economic valuation methods. The benefits valuation study must include, but is not limited to, the following elements:
>
> (i) Incremental changes in the numbers of individual fish and shellfish lost due to impingement mortality and entrainment as defined in 40 CFR 125.92, for all life stages of each exposed species;
>
> (ii) Description of basis for any estimates of changes in the stock sizes or harvest levels of commercial and recreational fish or shellfish species or forage fish species;
>
> (iii) Description of basis for any monetized values assigned to changes in the stock size or harvest levels of commercial and recreational fish or shellfish species, forage fish, and to any other ecosystem or nonuse benefits;

(iv) A discussion of mitigation efforts completed prior to October 14, 2014 including how long they have been in effect and how effective they have been;

(v) Discussion, with quantification and monetization, where possible, of any other benefits expected to accrue to the environment and local communities, including but not limited to improvements for mammals, birds, and other organisms and aquatic habitats;

(vi) Discussion, with quantification and monetization, where possible, of any benefits expected to result from any reductions in thermal discharges from entrainment technologies."

As described in further detail in **Response 19**, the dollar values in the social benefits analysis should be based on the principle of willingness-to-pay, which captures monetary benefits by measuring what individuals are willing to forgo in order to enjoy a particular benefit. Willingness-to-pay for nonuse benefits can be measured using benefits transfer or a stated preference survey.

In summary, the Section 316(b) regulations consider the economics of recreational and commercial fishing through rule development as well as in the required Benefits Valuation Study, which is required to be developed by PSEG by EDP + 3 years and peer-reviewed and submitted to the Department by EDP + 4 years.

Comment 33

Commenter 39 states that the Delaware River Estuary is considered a significant spawning ground for Atlantic striped bass (*Morone saxatilis*), particularly the Chesapeake and Delaware Canal and the lower Delaware River. Most individual fish produced in this area remain within the estuary for a period of years and eventually migrate to the coastal Atlantic Ocean to contribute to the coastal migratory stock. From 2002 through 2004, eggs, yolk sac larvae, post yolk sac larvae and juvenile fish have all been entrained at PSEG-Salem and individuals from age 0 through age 2 have been impinged. To estimate the adult losses of the Atlantic striped bass, Commenter 39 extrapolated the entrainment and impingement losses using a forward projection approach Equivalent Adult Model with an adjusted survival fraction of each life history stage. The estimate represents the value of the total age 4 losses resulting from PSEG-Salem operation based on fish survival after incorporating stage specific natural and fishery mortality rates. Commenter 39 states that details regarding various inputs to this extrapolation are included as an attachment to its comments.

Commenter 39 contends that the mean annual adult equivalent biomass lost to the operation of PSEG-Salem exceeds Delaware's annual commercial striped bass quota. Specifically, the mean equivalent adult biomass lost during 2002 through 2004 was 278,576 pounds per year while Delaware's annual commercial striped bass quota as set by the Interstate Fishery Management Plan for Atlantic Striped Bass is 145,085 pounds. The replacement value of Atlantic striped bass was $11.32 per pound in the northeast region resulting in the annual value of the adult equivalent Atlantic striped bass lost during 2002 through 2004 ranging from $745,218 to $5,903,482 for a three year total of $9,460,452. Commenter 39 states that this estimate of equivalent adult losses represents a single representative iconic species, with additional similar substantial impacts occurring for other ecologically and economically important species. The abundance of ecologically and economically important species such as alewife, American shad, Atlantic croaker, Atlantic menhaden, Atlantic silversides, bay anchovy, blue crab, blueback herring, spot, weakfish and white perch have all been reduced by the continued operation of the once-through cooling system.

Several commenters cite estimates from DNREC staff. Commenter 32 states that estimates from DNREC staff suggests that losses of early life stages of striped bass translates into losses of Adult Equivalents that rivals or even exceeds current commercial harvest in Delaware. Commenter 35 notes that Dr. Kahn of DNREC reviewed 1998 data and determined that PSEG-Salem, together with the Delaware City Refinery, are killing more striped bass than what is left in the Delaware River. Commenter 35 explains that striped bass are the most valuable finfish produced in the Delaware River yet PSEG-Salem kills over 400 million striped bass per year. Commenter 35 notes that these impacts to the iconic striped bass population demonstrates the substantial losses PSEG–Salem will continue to have on the striped bass population (which is not the species with the highest level of take) with similar high level losses for other species.

(Commenter 32, 35, 39)

Response 33

The benefits described by the commenters fall within the rubric of social costs and benefits that will be fully considered in the Department's subsequent BTA determination once the permittee has the opportunity to prepare and present all of the required 40 CFR 122.21(r) analyses. As described in **Response 10**, the Department is issuing this permit with an interim entrainment BTA finding, and it is premature for the Department to consider the commenter's cost-benefit analysis without affording the permittee opportunity to develop the cost evaluation study required by 40 CFR 122.21(r)(10) and the benefits valuation study required by 122.21(r)(11).

Without pre-judging PSEG's anticipated submissions under 40 CFR 122.21(r), the Department offers the following observations on the commenters' analysis of the costs to the regional fishery of PSEG-Salem's cooling water intake structure. The Department agrees that the Delaware River Estuary is considered a significant spawning ground for striped bass. Striped bass are an RIS and are therefore the focus of plant related impingement and entrainment monitoring as well as biological monitoring as described in **Response 26**. While the Department acknowledges the commenter's concern regarding losses at PSEG-Salem in comparison to the commercial striped bass quota, data collected by the ASMFC, the Pennsylvania Fish and Boat Commission (PFBC), and the NJFW indicate that the stock of Atlantic striped bass, as well as the Delaware stock of striped bass, indicates stable species abundance. As summarized in **Response 31**, data collected as part of the DNREC Juvenile Trawl Survey and NJDEP Beach Seine Survey indicates an increasing trend for striped bass abundance in the Delaware Bay.

The ASMFC is composed of representatives from the Atlantic coastal states from Maine to Virginia who are responsible for managing shared migratory fishery resources by promoting and protecting these resources. The ASMFC published a "2015 Atlantic Striped Bass Stock Assessment Update," available at http://www.asmfc.org/species/atlantic-striped-bass. In the memorandum accompanying this report, the ASMFC states that, "In 2014, the Atlantic striped bass stock was not overfished or experiencing overfishing based on the point estimates of fully-recruited fishing mortality (F) and spawning stock biomass (SSB) relative to the reference points defined in this assessment." At the same link listed above, the ASMFC discussed its "2013 Atlantic Striped Bass Benchmark Assessment" which indicates that "the resource is not overfished or experiencing overfishing relative to the proposed new reference points." The ASMFC reached the conclusion that the striped bass resource is not overfished and the population is stable.
A similar assessment is conducted in the Delaware Estuary by the PFBC, available at http://fishandboat.com/images/reports/2013bio/6x06_27_dela_stripers.pdf The PFBC assessed the striped bass spawning stock in the Delaware Estuary in May 2013. The survey spanned 21 index sites ranging from the mouth of the Rancocas Creek, NJ (river mile 109) downriver to the mouth of Raccoon Creek, NJ (river

mile 80). This survey determined that "the 2013 catch rates were very similar to their corresponding long-term averages computed from 1996 to 2012." In other words, there is no apparent trend regarding an increase or decrease in abundance for the striped bass spawning stock in the portion of the Delaware Estuary that is surveyed by the PFBC.

The NJFW conducts its own surveys of the Delaware River, including the Delaware River seine survey discussed at http://www.state.nj.us/dep/fgw/artdelstudy13.htm In 2012, striped bass was the thirteenth most abundant fish caught. Out of the 477 individual striped bass caught, 271 individuals comprising 57% of the catch were less than 1 year old, while nearly 40% were age 1. In 2013, of the 846 striped bass that were caught, 802 of those were less than 1 year old (www.njfishandwildlife.com/pdf/delriver/artdel_sp_ strbass.pdf). In general, the ratio of the young of the year fish in relation to adult fish is a measure of spawning success. Simply put, these results are a positive reflection of the spawning success of striped bass in the Delaware Estuary.

According to Chapter 6 - Living Resources, in the Technical Report for the Delaware Estuary & Basin, as published by the Partnership for the Delaware Estuary (see https://s3.amazonaws.com/delawareestuary/pdf/TREB/Chap6.pdf), the Delaware River striped bass population was nearly extinct in the mid-1900s yet upgrades to sewage treatment plants in the late 1980s lead to improved oxygen levels in downstream striped bass nursery grounds. As stated in Chapter 6, "The stock was declared restored by the Atlantic States Marine Fisheries Commission in 1998, based on a report by Kahn et al. (1998)… The Delaware River population (of striped bass) is now one of the major spawning stocks on the Atlantic coast, along with the Hudson River and Chesapeake Bay stocks." It is worth noting that the Delaware River population of striped bass rebounded after PSEG-Salem had begun operation in the 1970s. The Station operates under relatively constant constraints, where intake and discharge flow are in the same general range, as is discharge temperature, from one year to the next. While Station conditions have remained constant, the population rebounded. Nonetheless, the costs and benefits of different control technologies will be fully explored when the 40 CFR Part 122.21(r)(10) and (r)(11) studies are prepared and peer reviewed. A complete analysis of this information will be included in the subsequent NJPDES permit cycle.

Comment 34

Commenter 32 offers a specific example to put the American Shad impingement rates into perspective. Commenter 32 states that the PFBC's State Fish Hatcheries released nearly 45,000 American shad fry into the Delaware River Basin in 2015 at a cost of approximately $89,500. Considering additional mortality between the fry and juvenile stage, the impingement rate at PSEG-Salem is likely equivalent to resource agency stocking efforts to protect and restore American shad to the Delaware River.

Commenter 35 states that shad fishing is important economically, recreationally and culturally. The American shad are celebrated in several cities throughout the watershed during their spring spawn including Philadelphia, Easton, PA and Lambertville, NJ. These festivals are widely attended by visitors who learn about shad and the Delaware River, enjoy festival offerings, and spend money in the host cities, thereby providing another source of economic revenue. The annual shad fishing tournament held each year following the Easton Shadfest has raised over $20,000 in proceeds in 2006. Lambertville's Shadfest has occurred annually for nearly 30 years, attracting 30,000 to 35,000 visitors during the two day event.

(Commenter 32, 35)

Response 34

The costs and benefits described by the commenters fall within the rubric of social costs and benefits that will be fully considered in the Department's subsequent BTA determination once the permittee has opportunity to prepare and present all of the required 40 CFR 122.21(r) analyses. As described in **Response 10**, the Department is issuing this permit with an interim entrainment BTA finding, and it is premature for the Department to consider the commenter's cost-benefit analysis without affording the permittee opportunity to develop the cost evaluation study required by 40 CFR 122.21(r)(10) and the benefits valuation study required by 122.21(r)(11).

Without pre-judging PSEG's anticipated submissions under 40 CFR 122.21(r), the Department offers the following observations on the comments relating to the regional shad fishery. The total annual impingement numbers by species for the years 2002 through 2004 are listed on page 49 of the draft permit Fact Sheet. The Department acknowledges that the total number of American shad impinged is in the range of the quantity of American shad fry that are stocked by the PFBC's State Fish Hatcheries.

The Department recognizes the importance of shad fishing economically, recreationally and culturally.

Comment 35

Some of the commenters represented collectively as Commenter 22 express concern about the impacts of the plant on Atlantic sturgeon and/or bottlenose sturgeon. Commenter 2 states that PSEG is violating the federal endangered species law as well as the New Jersey endangered species statutes by "taking" Atlantic sturgeon and bottlenose sturgeon (also known as shortnose sturgeon). Commenter 35 states that the heated discharge of 3 billion gallons per day from PSEG-Salem harms the sensitive ecosystem of the estuary and significantly impacts threatened and endangered species which have little capacity to absorb additional harms. This could be avoidable with a technology upgrade to closed-cycle cooling. Commenter 35 argues that not only are there ecological benefits in avoiding the unnecessary adverse impacts to threatened and endangered species inflicted by PSEG-Salem, but there are also economic benefits. Commenter 35 asserts that the federal government spends nearly $22 million a year to benefit and protect the endangered species of fish and turtles that PSEG-Salem is legally allowed to kill every year.

Commenter 32 states that the Lower Delaware River is an important nursery and summering habitat for Atlantic Sturgeon. Young of year sturgeon are present nearly year round at the Marcus Hook anchorage upstream of PSEG-Salem and sub-adults are relatively abundant near Artificial Island. Because Atlantic Sturgeon using the Artificial Island area are from several different distinct population segments, there may be impacts to Atlantic Sturgeon populations outside of the Delaware River Basin.

Commenter 30 states that because the project may affect federally listed marine turtles or the Atlantic (*Acipenser oxyrinchus*) or Short-nosed (*Acipenser brevirostrum*) sturgeons (both of which are endangered), principal responsibility for threatened and endangered marine species is vested with the National Marine Fisheries Service (NMFS). While the USNRC completed Section 7 consultation with the NMFS in 2014 when Units 1 and 2 licenses were extended, NMFS should be contacted to determine if their 2014 findings remain valid.

Commenter 32 states that several species are under federal protection of the Endangered Species Act of 1973. Atlantic and shortnose sturgeon are currently listed as "endangered"; alewife and blueback herring are "species of concern"; and the American eel is currently being considered for listing. Continued water

withdrawal by PSEG-Salem is impacting early life stages of all four species via impingement or entrainment. Based on a recent April 2015 report submitted by PSEG to the USNRC, 17 Atlantic sturgeon and 7 shortnose sturgeon were impinged on the trash racks between January 1, 2014 and December 31, 2014. Six of the recovered sturgeon were recently deceased when recovered, and their mortality may have been caused by injuries related to impingement on the trash racks. Although river herring and American eel are not currently under federal protection, their depleted stock status requires special consideration to reduce mortality on these species to preclude them from being listed under the Endangered Species Act (ESA).

Commenter 35 says that shortnose sturgeon, Atlantic sturgeon, Kemp's Ridley sea turtle, leatherback sea turtle, and green sea turtle are listed as endangered by the USFWS while the loggerhead sea turtle is listed as threatened by the USFWS. The following takes of Atlantic sturgeon have been documented for 2014 and 2015 as discovered through online searches and information requests:

Date Found	Length	Weight	Location	Condition
3/25/2015	812.8 mm	1.59 kg	PSEG-Salem, Unit 1	Live with damage to fins; released live
12/22/2014	701 mm	1.3 kg	PSEG-Salem, Unit 1	Deceased, cause of death unknown
8/5/2014	76.0 cm	19.8 kg	PSEG-Salem, Unit 1	Deceased, missing head and tail
4/18/2014	67.3 cm	1.20 kg	Not available	Deceased, cause of death unknown
4/9/2014	69.3 cm	1.30 kg	Not available	Deceased, cause of death impingement
4/7/2014	70.2 cm	1.48 kg	Not available	Deceased, cause of death unknown
4/7/2014	70.2 cm	1.69 kg	Not available	Live
4/7/2014	67.6 cm	1.37 kg	Not available	Live
4/3/2014	63.0 cm	1.14 kg	Not available	Live, damaged
3/31/2014	77.0 cm	Not available	Not available	Live
3/27/2014	67.2 cm	1.35 kg	Not available	Live
2/20/2014	66.4 cm	1.31 kg	Not available	Deceased, cause of death impingement
2/19/2014	68.4 cm	1.37 kg	Not available	Deceased, cause of death impingement
2/12/2014	70.2 cm	Not available	Not available	Alive
1/27/2014	64.7 cm	Not available	Not available	Alive
1/27/2014	66.0 cm	Not available	Not available	Alive
1/8/2014	62.2 cm	1.2 kg	Not available	Alive
1/6/2014	61.1 cm	0.927 kg	Not available	Deceased, cause of death impingement

In addition to the 18 Atlantic Sturgeon found in the PSEG-Salem intakes, there were at least 7 shortnose sturgeon found on: March 13, 2014, March 20, 2014, April 15, 2014, November 20, 2014, and November 21, 2014 and two on December 10, 2014. At least 2 Kemp's Ridley turtle takes occurred on July 9, 2014 and September 3, 2014.

(Commenter 2, 19, 22, 30, 32, 35)

Response 35

Principal responsibility for threatened and endangered marine species is vested with NMFS. Under the ESA it is the responsibility of the federal action agency to initiate consultation with USFWS or NMFS (collectively the Services) when their action "may affect" a listed species. With respect to consultation for PSEG-Salem, this occurred in two ways: as part of the rule development by EPA as well as a condition of the USNRC operating license.

First, EPA consulted with the Services (USFWS and NMFS) in a programmatic consultation on the Section 316(b) rule, and the Services jointly issued a Biological Opinion covering the Section 316(b) rule generally. The input that both agencies provided to the Section 316(b) rule is in the Biological Opinion as available at http://www.nmfs.noaa.gov/pr/consultaton/opinions/biop_epa_cwa316b_2014.pdf. Both the NMFS and the USFWS agreed that EPA's rule allowing use of modified traveling screens and fish return systems at existing plants like PSEG-Salem, and a site-specific entrainment BTA determination, is "not likely to jeopardize the continued existence of ESA-listed species" under their jurisdiction, including sturgeon and sea turtles. Biological Opinion at page 71. "[I]t is our opinion that this Rule has built in a sufficient process to insure that it is not likely to result in an appreciable reduction in the likelihood of both the survival and recovery of any listed species by reducing the reproduction, numbers or distribution of that species." Id. at 72.

Among the recommendations that may be made by the Services to the facility and the Director (i.e. permitting authority) are measures to minimize incidental take. EPA expects that any measures the Services recommend to minimize incidental take will be consistent with ESA regulations and guidance, which state at 50 CFR 402.14(i)(2), "Reasonable and prudent measures, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes." EPA does not expect that installation of closed-cycle cooling would be specified as a measure solely for the purposes of minimizing incidental take.

The process that the Services approved includes a provision at 40 CFR 125.95(f) that requires a facility in its permit application to identify all Federally-listed threatened and endangered species and designated critical habitat that are or may be present in the action area. Further, the rule requires that the NPDES permitting authority transmit all permit applications to the Services to allow a 60 day review, which takes place prior to the public notice of the State's draft permit. The Services are expected to respond within 60 days and provide any corrections to the list of Federally-listed threatened and endangered species and critical habitat included in the permit application, and any measures that the Services recommend (including monitoring and reporting) for the protection of listed species. In addition, the State must copy the Services on the issuance of the draft permit, giving the Services an opportunity to review the draft permit and provide additional input or suggested control measures to address effects to listed species or critical habitat.

To comply with this process, the Department shared the 2006 PSEG NJPDES renewal application with USFWS as well as the NMFS. Specifically, the Department sent electronic copies of the application to Christine Vaccaro, Fisheries Biologist for NMFS on February 2, 2015 and to Eric Schrading of the USFWS on January 21, 2015. The Department also provided copies of the draft NJPDES permit to the USFWS as well as the NMFS in accordance with NJAC 7:14A-15.10(e)2. USFWS submitted comments on September 17, 2015, noting that "the proposed project would not adversely affect federally listed species under [USFWS] jurisdiction" and that no further consultation with USFWS is required for issuance of the permit. NMFS also submitted comments on September 17, 2015, which noted that NMFS has already issued an incidental take permit to PSEG-Salem that exempts the take of sturgeon and sea turtles by impingement and entrainment at the Station. Although NMFS would support closed-cycle cooling at the Station, "in the absence of closed-cycle cooling, we agree with and support the special conditions included in the proposed permit to further monitor, evaluate, and reduce the impacts of the Salem NGS on the aquatic resources of the Delaware River."

Secondly, NMFS also issued a biological opinion for the continued operation of the Station when the USNRC extended the PSEG-Salem Unit 1 and Unit 2 operating licenses in 2014 (see www.greateratlantic.fisheries.noaa.gov/protected/section7/bo/actbiops/salemhcnmfsfinalbiopjuly172014.pdf. This biological opinion was required by Section 7 of the ESA, which directs federal agencies to consult with

the Services before approving an action that will affect an ESA-listed species. In its July 2014 biological opinion, NMFS concluded that license extension by the USNRC to permit the Station to continue operating with once-through cooling "may adversely affect but is not likely to jeopardize the continued existence of any [ESA] listed species." As a condition to exempting "incidental takes" of ESA listed species by the PSEG-Salem cooling water intake structure, particularly sea turtles and sturgeon, NMFS is requiring PSEG-Salem to undertake certain Reasonable and Prudent Measures (RPMs) to minimize and monitor incidental takes. These RPMs are described in NMFS's biological opinion and compliance will be ensured by USNRC.

The Department acknowledges that there have been documented losses of certain endangered species at the cooling water intake structure. However, the Department disagrees with the contention that PSEG-Salem does not comply with the ESA. The Clean Water Act does not address endangered species, nor does this NJPDES permit authorize take, as defined by the ESA, 16 U.S.C. 1532(19). Any impingement (including entrapment) or entrainment of Federally-listed species constitutes take which may only be authorized pursuant to the conditions of a permit issued under 16 U.S.C. 1539(a) or where consistent with an Incidental Take Statement (ITS) contained in a Biological Opinion pursuant to 16 U.S.C. 1536(o). See 40 CFR 125.98(j). The Department and the permittee have complied with the necessary consultation requirements.

Comment 36

Commenter 30 states that no federally listed or proposed threatened or endangered species in the USFWS' jurisdiction are known to occur within the project area; therefore, federally listed species under the USFWS jurisdiction would not be adversely affected. As a result, no further consultation pursuant to Section 7(a)(2) is required with the USFWS at this time. However, Commenter 30 notes that on January 12, 2015, the red knot (*Calidris canutus rufa*) became listed (threatened) pursuant to the ESA of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). While the project site is not known for providing habitat for the red knot, the principle food source for the red knot in the Delaware Bay region is the egg of the horseshoe crab (*Limulus polyphemus*). Commenter 30 requests that the permittee assess the effects of the project's cooling water use on the larval stages of the horseshoe crab (unless such information is already being collected) and, if entrainment/impingement impacts are observed, notification should be provided to the USFWS, the Department, and NOAA. Should impacts of the horseshoe crab be observed, further consultation for the red knot may be required.

Commenters 30 and 35 express concern that increases in entrainment of the larval form of the horseshoe crab may occur as sea level is predicted to rise in the estuary which could impact the red knot given that horseshoe crab larvae is a primary food source of the red knot. Commenter 36 states that PSEG-Salem has come to dominate the ecology of the Delaware River, Estuary and Bay rather than the annual horseshoe crab spawning and coordinated migration of shorebirds which had defined the watershed for millennia.

(Commenter 30, 35, 36)

Response 36

Horseshoe crabs typically spawn on sandy beaches which are protected from wave action with the most spawning occurring at the mouths of creeks (see https://www.fws.gov/northeast/pdf/horseshoe.fs.pdf).
In the late spring and early summer, horseshoe crabs arrive on the beaches en masse to lay their eggs with the peak of spawning on the Atlantic coast occurring in Delaware Bay in May and June. Delaware Bay provides an excellent spawning area for crabs because the sandy beaches are protected from harsh wave action and because the beaches' sand and pebble mixture is excellent for incubating horseshoe crab eggs. Horseshoe

crab eggs and crab larvae would not be expected in the vicinity of PSEG-Salem since they spend their first couple of years in and on the bottom near their spawning habitat and generally prefer higher salinity. Specifically, egg development typically requires 10 to 15 parts per thousand (ppt) with optimal levels for development are reportedly 20 to 30 ppt. (see http://www.fws.gov/r5gomp/gom/habitatstudy/metadata /horseshoe_crab_model.htm).

Spawning typically occurs downriver of the PSEG-Salem intake structure. For example, in consideration of a spawning survey that has been conducted since 1999, the northernmost sampling location is at Gandy's Beach which is approximately 30 miles downriver of PSEG-Salem. More detailed information regarding this spawning survey is available at http://horseshoecrabsurvey.com/spawningsurveys.htm.

PSEG conducts entrainment abundance sampling at the circulating water intake structure by pumping river water out of the intake bay of Circulating Water Pumps 12B or 22A into a plankton net having a 0.5-mm mesh. For each fish species collected, the life stage is determined, the total number counted, and the lengths of a subsample are measured; therefore, entrainment data represents all individual species. While horseshoe crab larvae is not expected to be present at the PSEG-Salem intake structure, the Department agrees that expansion of the sampling program to include horseshoe crab eggs and larvae is appropriate where Part IV.G.6 has been modified to reflect this change.

The Department acknowledges that sea level rise may impact future entrainment data. Entrainment sampling has been continued in this subject renewal permit with continued reporting of data in Biological Monitoring Program Annual Reports so ongoing data collection will occur.

Comment 37

Commenter 13 states that it is pleased that PSEG is implementing the conservation recommendations of the NMFS in order to avoid or minimize any adverse effects of the Station on Atlantic Sea Turtles and sturgeons.

(Commenter 13)

Response 37

While the Department acknowledges these comments, issues relating to conservation recommendations of NMFS are under a separate regulatory jurisdiction from NJPDES as described in **Response 35**.

Comment 38

Commenter 35 states that the NMFS Biological Opinion requires PSEG-Salem to undertake certain RPMs to minimize and monitor sturgeon takes but does not take into account the cumulative impact of vessel strikes estimated annually at 28.3. Considering cumulative effects, by combining the permitted lethal adult take of the Delaware population from all NMFS Biological Opinions, annual adult anthropogenic mortality is estimated to be 33.8. With a Delaware River adult population estimated to be <300 individuals, the predicted mortality is F=0.11. This level of take mortality exceeds the level specified by J. Boreman in an article titled, "Sensitivity of North American sturgeons and paddlefish to fishing mortality", in the journal Environmental Biology of Fishes, published in 1997. This analysis suggests that permitted lethal take of Delaware Atlantic sturgeon is currently not being managed for restoration and PSEG-Salem is contributing significantly to Atlantic sturgeon mortality through impingement which is not considered in the NMFS Biological Opinion.

(Commenter 35)

Response 38

The NMFS Biological Opinion (see www.greateratlantic.fisheries.noaa.gov/protected/section7/bo/actbiops/salemhcnmfsfinalbiopjuly172014.pdf) is outside the jurisdiction of the NJPDES program. For more information regarding the Biological Opinion please refer to **Response 35.** NMFS is the appropriate agency to be contacted regarding concerns about cumulative impacts including vessel strikes or other aspects of the Biological Opinion.

Comment 39

Many commenters express support for PSEG's EEP. Commenter 1 states that PSEG is an industry leader in practicing responsible environmental stewardship and embarked on unprecedented efforts to help restore a portion of the Delaware Estuary by establishing the EEP in 1994. Commenter 13 states that the EEP represents an ecological approach towards mitigation that is innovative and will provide benefits to the estuary even after the Station is retired. Commenter 3 states that the natural areas restored by the EEP provide habitat for hundreds of species, from fish to songbirds to raptors and waterfowl, while providing public access to the estuary for current and future New Jersey and Delaware citizens. Commenter 3 states that the undeveloped land and restoration sites and adjoining uplands are protected by law and will benefit fish, wildlife and people after the generating station is retired. Commenter 10 states that the EEP provides significant benefits to local communities by increasing public access, education, local recreation and ecotourism. Commenter 10 states that the restored wetlands are part of an important bird area of global importance.

Some commenters state that they have been involved with the design and/or management of the EEP sites or express support for the design. Commenter 13 entered into an agreement with PSEG to help manage some EEP sites. Commenter 37 states that they advised PSEG on the design parameters regarding wetland restoration and rare species concerns; made suggestions regarding land management and acquisition; and have toured the sites consistently over the years. Commenter 10 states that the restoration's activities are notable for using engineering to provide conditions for natural processes to develop the hydrology, geomorphology and vegetation of natural estuarine wetlands.

(Commenter 1, 3, 4, 10, 11, 12, 13, 16, 20, 28, 37)

Response 39

The Department acknowledges these comments indicating general support for the EEP. Please refer to **Response 40** for additional detail regarding the basis and background for the EEP, the objectives of the EEP, and status.

Comment 40

Some commenters contend that the EEP mitigates for losses. Commenter 10 states that the measures taken by PSEG to reduce and mitigate fish losses due to plant operations are already paying dividends and are providing benefits to fish and wildlife populations in excess of those anticipated when the program was initiated. Commenter 10 states that the EEP has demonstrated positive results with long-term benefits for the ecology, environment, fisheries and wildlife in the Delaware Estuary region. Commenter 10 states that

studies to date indicate that populations of fish in the Delaware Estuary are either increasing or stable and that the restoration of salt marshes is a success in progress. Commenter 37 states that, based on a review of the voluminous data and publications that demonstrate the EEP has resulted in significant enhancements to the biological productivity of the estuary, the overall population age structure of the bay's aquatic organisms (particularly the fish species impacted during small life stages) experience no overall detriment when the survival to older age classes is considered.

Some commenters express support for the continuation of the EEP in the NJPDES permit. Commenter 37 expresses support for continuing the EEP as a permit condition. Commenter 10 states that the draft permit recognizes attainment of the basic objectives of the EEP and that the permit requires continued management of these areas.

Some commenters describe specific aspects of the EEP and demonstrated success. Commenters 10 and 13 state that most of the EEP restored marshes have either met the success criteria or are at least on a trajectory to achieve success. Commenter 10 states that the restoration process uses targets for restoration of marsh structure and function and that PSEG has conducted detailed monitoring to assess restoration success. Commenter 10 states that monitoring has demonstrated the importance of these restored wetlands for supporting the typical salt marsh food web including production of important estuarine fishes. Commenter 10 states that PSEG's restoration work to reduce *Phragmites* and to restore natural hydrology and salt marsh vegetation are directed at important threats identified for those wetlands. The draft permit recognizes attainment of the basic objectives of the EEP and the permit includes continued management of these areas. Commenter 16 states that the restoration of degraded marsh wetlands to their natural conditions provides an expanded spawning and nursery habitat of the food sources needed by fish and other aquatic life which in turn promotes increased productivity and biodiversity.

(Commenter 10, 13, 16, 37)

Response 40

The Department acknowledges these comments in support of the EEP for the purpose of the Administrative Record. By way of background, the 1994 and 2001 NJPDES permits contain extensive requirements with respect to wetland restoration, land preservation, fish ladders and biological monitoring. As stated in **Response 23**, the Department did not designate these supplemental measures as BTA under Section 316(b), nor were these actions required in lieu of retrofitting the Station with closed-cycle cooling. The Department incorporated this plan, after it was proposed by PSEG outside of what was required under Section 316(b), as a special condition to the permit because of its environmental benefits and because it would continue to help minimize the potential for adverse impact from the cooling water intake structure.

Most significantly, the permittee was required to restore an aggregate of no less than 10,000 acres of diked wetlands to normal tidal inundation to become functional salt marsh; restoration of wetlands dominated by common reed (*Phragmites australis* or *Phragmites*) to primarily *Spartina alterniflora (Spartina)* species and other desirable vegetation; and/or upland buffer. Upland buffer is creditable at a 3:1 ratio towards these requirements where 3 acres of upland buffer counts as one acre towards the restoration total. To implement these requirements, as well as other requirements, the permittee established the EEP. The objective of the wetlands restoration program was intended to increase fish productivity in the Delaware Estuary. The amount of acreage originally selected for the program was determined and mandated in the July 20, 1994 permit by determining the amount of *Spartina* and other associated plants that would be produced each year

and the resulting detrital plant biomass available in Delaware Bay by decomposition by fungi, bacteria and other micro-organisms.

To date, PSEG's EEP has preserved and/or restored more than 20,000 acres (approximately 32 square miles) of Delaware Bay tidal wetlands and adjoining upland buffer areas. The wetland restoration sites provide a variety of benefits to the biological community of the Delaware Estuary. Wetland systems provide foraging and refuge habitat, serve as nursery areas for early life stages and juveniles, and provide direct food resources for consumer organisms in the Delaware Estuary food web. An increase in the area of saltmarsh leads to increased growth in marsh grasses which then increases the food supply. Additionally, an increase of saltmarshes also results in an increase in the amount of living space (habitat) available for the various species. For all these reasons, wetlands restoration and enhancement contributes directly to the increased abundance of these species. Wetlands restoration undertaken by the permittee has contributed to the diverse and robust assemblage of marine life in the bay. If these lands were to return to their pre-restoration conditions, valuable fish habitat could be lost or degraded and the biological community may be affected or threatened.

As represented as an analysis in the NJPDES application, PSEG contends that the production from just three of the seven primary wetland restoration sites exceeds the biomass lost due to impingement and entrainment by a factor of four times. The EEP is nonetheless not a component of the Section 316(b) determination in this permit action. A detailed justification for the retention of these permit requirements is included on pages 65 to 68 of the June 30, 2015 draft permit Fact Sheet.

Comment 41

Some commenters state that they do not support the EEP and that the EEP does not compensate for losses. Commenter 2 claims that EPA and the court have stated that restoration doesn't work and that there is no biological or legal connection to be able to mitigate for impingement. Commenter 2 states that planting *Spartina* along the Delaware bayshore does not mitigate for fish kills. Commenter 15 states that the permit decision that allowed the EEP to replace best available technology was flawed since best available technology is an engineering judgment that's based on engineering criteria, ecological criteria and science as opposed to economics. Commenter 15 states that the Department should identify how much money PSEG is saving by avoiding compliance with the Clean Water Act and instead implementing the EEP. Commenter 14 states that PSEG should be encouraging restoration efforts in the estuary but these improvements do not add up ecologically and compensate for the losses.

Commenter 15 states that the public testimony presented at the public hearing does not represent rigorous science that demonstrates that the EEP is sufficient in fully offsetting the aquatic impacts given the lack of a closed-loop system. Testimony that is given from parties that are compensated by PSEG should be rejected by the Department.

Commenter 2 states that the NJPDES permit has not taken into account the impacts of sea level rise and storm surge even though the Delaware Bayshore is one of the areas that is most vulnerable. Many of the mitigation projects that are being touted to enhance the estuary are going to be underwater within the next few years if not a couple of decades.

(Commenter 2, 14, 15, 31, 35)

Response 41

The Department maintains that the EEP increases biological productivity in the Delaware Estuary. While the Department acknowledges that the EEP has resulted in expenditures by PSEG, these EEP requirements were not imposed in lieu of cooling towers. As described in **Response 23**, restoration requirements are not a component of the Section 316(b) BTA determination and the permittee's compliance with Section 316(b) does not depend on a certain level of production. In other words, the permittee is not required to show that production from the wetlands restoration sites compensates for aquatic losses at the cooling water intake structure. As such, the 1994, 2001 and this subject permit renewal action do not include fish abundance indices or goals on the premise that the restoration of spawning habitat will increase production. The EEP wetlands restoration projects have either attained the established success criteria or have demonstrated progress towards compliance with the success criteria.

The Department maintains that the NJPDES Regulations do not allow the Department to eliminate public comments or testimony from entities that are compensated by PSEG.

Regarding sea level rise and storm surge, the Department acknowledges that these factors could affect portions of the wetland restoration sites and result in changes in tidal patterns. The threat of sea rise is further reason to ensure long-term conservation of tidal wetlands and adjoining uplands to provide areas for salt marshes to retreat as sea levels rise. The EEP sites conserve both tidally flowed and upland areas to support biological productivity and preserve bayshore habitat even in the face of climate change.

Comment 42

Commenter 35 asserts that for over 20 years PSEG has been allowed to comply with Section 316(b) of the Clean Water Act largely through application of a series of "Special Conditions" including wetlands restoration, construction of fish ladders and associated fish stocking and Delaware Bay abundance analysis. Such actions are contrary to the clear letter, intent and history of the Clean Water Act and were rejected by the courts as a means for achieving the Section 316(b) best technology mandate. The Clean Water Act requires application of the BTA to the design, location, construction and capacity of the cooling water intake structures to minimize adverse environmental impacts. Commenter 35 states that the Department allowed PSEG to embark on a series of mitigation experiments, studies, and modifications to their operations in 1994, rather than require PSEG to install closed-cycle cooling, or an equivalent technology. None of the actions required reflected a 95% reduction in the fish kills inflicted by PSEG-Salem's cooling water intake structure. In fact, the permit primarily relied on a wetlands mitigation experiment designed to eradicate *Phragmites* using herbicides, burning, mowing and other marsh manipulations to fulfill the requirements of Section 316(b). Commenter 35 asserts that the 2015 draft permit and its continuing emphasis on Special Conditions to mitigate the adverse impacts of PSEG-Salem perpetuates this illegal approach for compliance with Section 316(b) since mitigation measures are wholly unrelated to the PSEG-Salem cooling water intake structure.

(Commenter 35)

Response 42

As described in **Response 18**, the various mitigation requirements are outside the requisite Section 316(b) BTA determination and these actions were not required in lieu of cooling towers. The Department incorporated this plan, as a Special Condition to the permit, because of its environmental benefits and

because it would continue to help minimize the potential for adverse impact from the cooling water intake structure.

By way of background, the wetlands restoration requirements, fish ladder requirements and other Special Conditions were originally imposed in the 1994 NJPDES permit and were retained in the 2001 NJPDES permit. The 1994 and 2001 NJPDES permits were issued without the benefit of Section 316(b) regulations where the Department had to use the plain language of the Clean Water Act, BPJ, and relevant case law. EPA has issued other permit decisions that have required mitigation measures. See, e.g., In the Matter of Crystal River Power Plant Units 1, 2 and 3 (Florida Power Corporation), National Pollutant Discharge Elimination System (NPDES) Permit No. FL00000159 (revised Findings and Tentative Determinations Pursuant to 33 U.S.C. Section 1326, September 1, 1988) (hereafter "Crystal River") and Tennessee Valley Authority (John Sevier Steam Plant) NPDES No. TN0005436 (EPA 1986). In Crystal River, the EPA determined that the costs of retrofitting the Crystal River Power Plant with closed-cycle cooling were wholly disproportionate to the environmental benefits to be gained and, further, that construction of a fish hatchery, which was proposed by the permittee, would help minimize the environmental impacts of the cooling water intake structure and should be included in the plant's permit. In the John Sevier matter, EPA required a continuous fish stocking program among other requirements after finding that the costs of removal of a detention dam would be wholly disproportionate to the environmental benefits to be conferred.

Subsequent to the issuance of the 1994 and 2001 NJPDES permit actions for PSEG-Salem as well as the above referenced court cases, the 2004 Phase II Rule allowed the use of restoration as a compliance alternative for electric generating stations such as PSEG-Salem. However, as part of the appeal of those regulations, the Second Circuit Court (*Riverkeeper, Inc. v. EPA*, 475 F.3d 83 (2d Cir. 2007)) directed EPA to reconsider key provisions of the rules, including the restoration provisions which resulting in EPA suspending the Phase II Rule. The Department acknowledges that restoration is not a compliance alternative under the 2014 Section 316(b) regulations.

That being said, as stated in **Response 18**, the 1994, 2001 and this subject permit renewal action did not require the wetlands restoration requirements, fish ladder requirements and other Special Conditions as a means of compliance with Section 316(b). As a result, because the restoration requirements are outside the Section 316(b) BTA determination, this subject permit renewal as well as the 1994 and 2001 permit actions are consistent with the Second Circuit's ruling in *Riverkeeper, Inc. v. EPA*, 475 F.3d 83 (2d Cir. 2007).

Comment 43

Commenter 30 states that the USFWS has been a long-term member of the EEPAC, along with other State, Federal and local government agencies, the permittee, and other interested parties. Commenter 30 expresses appreciation for the efforts implemented by PSEG to create a compensatory, mitigation program that includes the restoration of thousands of acres of former salt hay farms to productive salt marshes; the perpetual protection of these tidelands through direct purchase by PSEG or the filing of conservation easements; the funding of finfish studies and the State's artificial reef and shellfish programs; and the construction of fish ladders throughout the Delaware River watershed.

Commenter 30 recognizes that these EEP projects were implemented in an attempt to offset the adverse effects associated with plant operations on the aquatic environment. Commenter 30 requests that a new assessment be made to determine if the production of biomass from these restoration efforts have adequately mitigated for the loss of productivity and to determine if these mitigation efforts will compensate for future impacts during the life of the project (2040). The data used in the draft permit is over ten years old, and

should be updated to reflect the most current impacts. In addition, since the permittee indicates that finfish densities and the general health of the Delaware Estuary is improving, the most recent data from their entrainment/impingement studies should also demonstrate potential increased adverse impacts which may warrant additional compensatory project features.

(Commenter 30)

Response 43

The Department acknowledges that Eric Schrading of the USFWS (Commenter 30) has been a member of the EEPAC since its inception. Establishment of the EEPAC was required in the 1994 NJPDES permit (under separate committee names but essentially performing the same function) and was continued in the 2001 NJPDES permit (as the EEPAC). The EEPAC is comprised of local, state, regional, and federal regulators as well as nationally recognized scientific experts in a variety of estuarine disciplines. The committee performs a variety of functions including the review of annual monitoring data and provides technical insights on the continued management of the restoration sites. The Department appreciates and acknowledges the level of commitment and time by the USFWS through Mr. Schrading's service in this capacity.

As described under **Response 18** the mitigation requirements are outside the requisite Section 316(b) BTA determination and a set amount of biomass was not a requirement of the previous NJPDES permits nor is a set amount of biomass a requirement of this subject renewal permit. The Department incorporated the mitigation requirements as a Special Condition to the permit, because of the environmental benefits and because it would continue to help minimize the potential for adverse impact from the cooling water intake structure. To evaluate the effectiveness of these conditions, the Department required the following condition in the 2001 final permit as Part IV.G.12.c:

> "c. Production Measurement of the Wetland Restoration Sites
>
> As part of any renewal application, the permittee shall include estimates of overall fish production from all PSEG wetland restoration sites as well as the fish ladders. The permittee shall utilize appropriate methods, which may include bioenergetics. The Department acknowledges that these "estimates" are subject to many environmental variables. Measures of productivity shall be expressed in the same units as the analysis of losses at the intake structure."

The permittee addressed these requirements in its 2006 NJPDES renewal application and estimated that the biological productivity at two of the formerly diked salt hay farm restoration sites compensate for the losses at the intake. The Department maintains that this condition has been satisfied and that restoration of most of the sites is near completion, therefore this provision was not included in the 2015 draft permit. The Department does not agree that an update of this information is required or necessary. Again, it is worth noting that mitigation is not allowable as per the Section 316(b) regulations due in part to the Second Circuit decision in *Riverkeeper, Inc. v. EPA*, 475 F.3d 83 (2d Cir. 2007).

Comment 44

Commenter 2 states that herbicides like Rodeo and Roundup have their own negative environmental impacts and *Phragmites* is a very important habitat for a lot of different species such as the redwing blackbird.

(Commenter 2)

Response 44

The Department acknowledges that PSEG has used glyphosate-based products (e.g. Rodeo, Aquaneat®, AquaPro®) for those formerly *Phragmites*-dominated restoration sites that have not yet attained vegetative success criteria. These glyphosate-based products are registered by the EPA for use in an aquatic environment; and are applied in accordance with Aquatic Use and NJPDES permits issued by the Department. Many natural resource agencies with years of experience in *Phragmites*-control use glyphosate on a regular basis since it is one of the most effective means to eradicate *Phragmites*. Glyphosate is characterized as having a short half-life and binds quickly to soils and sediments. PSEG uses a water soluble, non-ionic surfactant specifically labeled for use with glyphosate (LI-700®). LI-700® is a lecithin-based surfactant and lecithin is generally recognized as a direct food substance that can be used in food with no limitations. The Department does not advocate an open-ended perpetual herbicide spray program and the volumes of herbicide spray has declined over the years. Note that PSEG did not use glyphosate products for the formerly diked salt hay farms.

The Department agrees that small patches of *Phragmites* are sometimes useful for certain species of birds, although these species will often use other habitats as well. The Department does not agree that dense, monotypic stands of Phragmites are as beneficial for bird use or for fish production as compared to lands dominated by native vegetation such as *Spartina*.

Comment 45

Commenter 37 acknowledges that recent regulatory decisions will not allow for future habitat restoration to be considered as "best available technology" and is discouraged and dismayed that the science of ecological restoration is not considered to be a "technology". Commenter 13 supports the inclusion of the EEP even though it is not required under EPA's final rule for the Clean Water Act.

(Commenter 13, 37)

Response 45

As described in **Response 41**, the Department never considered the restoration requirements to be part of the BTA determination as part of previous permit actions. It is also worth noting that the fact that restoration was not considered an available regulatory tool under the Section 316(b) regulations stemmed from the decision by the Second Circuit in *Riverkeeper, Inc. v. EPA*, 475 F.3d 83 (2d Cir. 2007). This is discussed in further detail in **Response 10**.

Comment 46

In the absence of closed-cycle cooling, Commenter 29 agrees with and supports the Special Conditions included in the draft permit to further monitor, evaluate and reduce the impacts of PSEG-Salem on the aquatic resources of the Delaware River. These measures include the requirement to continue the EEP, biological monitoring and impingement and entrainment monitoring programs, and the continued operation and maintenance of the fish ladders. Commenter 16 states that the EEP includes the most comprehensive biological monitoring program ever undertaken in the Delaware Estuary.

Commenter 39 expresses support for conservation measures and management practices that reduce negative fisheries impacts on the Delaware Estuary. Commenter 39 states that it is clear that the EEP has made important progress towards addressing concerns from the cooling water intake structures for the once-through cooling system.

(Commenter 16, 29, 39)

Response 46

While the wetlands restoration program is the most significant component of the EEP, there are other Special Conditions in the NJPDES permit which include biological monitoring, the operation and maintenance of fish ladders and other measures. These requirements are described on pages 65 to 69 of the draft permit Fact Sheet. While the EEP has a significant biological monitoring component, other state and resource agencies also perform biological monitoring. The Department acknowledges these comments in support of the EEP for the purpose of the Administrative Record.

Comment 47

Commenter 39 states that because the construction of cooling towers may be economically prohibitive with older power plants, the identification and implementation of viable environmental protection and enhancement solutions should occur until the end of the life span of the once-through cooling units. The sustained loss of aquatic organisms that results from the withdrawal of 3024 MGD given the lack of closed-cycle cooling presents an opportunity for PSEG to maintain and improve other fisheries impact reductions at the intakes and mitigate for fisheries losses. Commenter 39 states that PSEG should maintain its full commitment to several mitigation efforts associated with the EEP at Cedar Swamp and the Rocks in Delaware. This includes the continued monitoring of coastal wetland vegetation cover as well as the management of *Phragmites* cover at acceptably low levels through the judicious use of herbicides and other means to achieve wildlife and fisheries benefits.

Commenter 39 states that opportunities should be evaluated for PSEG to expand mitigation efforts in Delaware, to include PSEG's additional purchase and protection of conservation lands and/or projects, with possible emphasis on impoundment wetlands management or protection of marshes threatened by sea-level rise. Commenter 39 states that other past EEP mitigation efforts in Delaware have involved the monitoring, management and upkeep of fish ladders to benefit anadromous fishes as well as the creation and management of artificial reefs to serve as valuable bay bottom marine life habitats with recreational value for anglers.

(Commenter 39)

Response 47

The Department agrees that the wetland restoration sites provide a variety of benefits to the biological community of the Delaware Estuary where benefits to the estuary come from both the New Jersey and Delaware sides of the estuary. Wetlands restoration undertaken by the permittee has contributed to the diverse and robust assemblage of marine life in the bay. If these lands were to return to their pre-restoration conditions, valuable fish habitat could be lost or degraded and the biological community may be affected or threatened. For these reasons the Department has retained permit conditions regarding the continued monitoring and management of these restored and/or preserved lands in order to maintain the ecological conditions. This includes the two EEP sites in Delaware, namely The Rocks and Cedar Swamp; therefore,

the permittee is required to continue in its mitigation efforts as requested by this commenter. The Department has also required the permittee to continue monitoring vegetative cover to properly manage the lands that have not yet attained success criteria. Please refer to **Response 44** for additional information regarding the use of herbicides. Note that the Department has required that existing fish ladders be properly operated and maintained where the vast majority of the 12 fish ladder sites are located in Delaware.

While the Department has maintained many of the existing EEP requirements, the Department has not imposed any new mitigation requirements in this subject permit renewal action. Existing EEP requirements were imposed in the 1994 and 2001 permit actions outside of the requisite BTA determination in consideration of case law in the absence of Section 316(b) regulations. The permittee addressed these requirements in its 2006 NJPDES renewal application and estimated that the biological productivity at two of the formerly diked salt hay farm restoration sites compensate for the losses at the intake. Therefore the Department is not requiring additional wetlands restoration, the installation of fish ladders, or funding of artificial reefs as suggested in this comment.

Comment 48

Several commenters acknowledge and/or express support for biological monitoring that is conducted as part of the EEP. Commenter 3 states that the EEP's biological monitoring efforts in Delaware Bay provide valuable information for improved, long-term decision making on regional environmental and ecological problems. Studies funded by PSEG as part of the EEP and permit renewal application are helping to advance the science of salt marsh ecology, specifically the role of the salt marsh in supporting coastal fish and wildlife species. Through its work on the EEP, PSEG has expanded exportable technology that will benefit others using ecological engineering principles to further scientific knowledge of salt marsh restoration.

Commenter 10 states that long-term sampling programs using consistent methodology are one of the best resources for evaluating temporal trends in animal populations. As such, these are a major component in assessing the effects of different stressors on those populations. PSEG has funded several monitoring programs as part of past permits and these programs will continue. These programs provide a major tool for understanding and managing the estuarine fishery resources. Commenter 10 states that PSEG has conducted a wide range of studies on ecological functions of critical portions of the estuary.

Other commenters cite support for certain aspects of the Biological Monitoring Program. Commenter 32 expresses support of the permit requirements regarding continuation of the Biological Monitoring Program, including the Bay-wide Monitoring Program and the reinitiation of the River Ichthyoplankton Survey, since long-term data sets are essential for understanding fishery stock dynamics in the lower Delaware River and Bay. These data sets are used to assess impacts of fishery regulations as well as other alterations to environmental conditions that may occur in the system.

Commenter 30 and 32 states that the reinitiation of the River Ichthyoplankton Survey will aid in further quantifying the impacts of PSEG-Salem with respect to overall fish populations and production in the lower river and upper bay as well as the overall health of spawning fish in the Delaware Estuary. Commenter 30 states that the River Ichthyoplankton Survey could include some of the added fish ladder sampling recommended by Commenter 30 in **Comment 51.**

(Commenter 3, 10, 12, 16, 30, 32)

Response 48

The Department acknowledges that biological monitoring is an important component of the NJPDES permit renewal. Biological monitoring programs are sponsored by the EEP to gather information on habitat structure, species distribution, species abundance, biological productivity, and other ecological indicators. These programs provide scientific data to the EEP and various state and federal resource management programs for the Delaware Estuary. The EEP has funded, as well as conducted, numerous studies on the estuary and the plants, fish, and shellfish that live within the ecosystem. Numerous papers have been published about the wetlands restoration process, the use of adaptive management as a tool for ensuring restoration success, and the overall success of EEP's restoration efforts. The October 2006 edition of the Journal of Ecological Engineering is dedicated entirely to EEP's wetlands program. More than 160 papers have been published in peer-reviewed journals documenting various elements of the EEP.

The commenter is correct in that the Department has reinstated the River Ichthyoplankton Survey in this subject permit renewal as this study was only previously conducted during the years 2002 through 2004.

Comment 49

Commenter 30 notes that the Department is recommending continued sampling to monitor for entrainment and impingement effects of the Station. Additional compensation for adverse effects to the aquatic environment may be needed should additional impacts be identified, including impacts to horseshoe crabs. Commenter 30 recommends that the Department require the permittee to provide notification to the Department, USFWS and NOAA if impacts are identified. A new assessment of the overall entrainment and impingement impacts must be evaluated against all compensatory efforts by PSEG for the current renewal of the NJPDES permit by the Department. This will enable review agencies like the USFWS and NOAA to determine if the original estuarine enhancements and other compensatory efforts implemented by PSEG adequately offset the demonstrated adverse impacts to the aquatic environment.

(Commenter 30)

Response 49

The Department continued requirements for impingement and entrainment sampling as suggested in this comment in order to continue the long term data set as well as to ensure compliance with the 2014 Section 316(b) regulations. However, the Department does not agree that the permittee is required to offset impingement and entrainment losses with mitigation as described in **Response 41** and therefore is not requiring an evaluation and comparison of impingement and entrainment losses against compensatory efforts. Please refer to **Response 36** regarding additional information on horseshoe crabs.

Comment 50

Commenter 39 states that environmental monitoring that is based on sound science is a key component for making determinations on environmental management decisions. To aid the State of Delaware in making those determinations, it is requested that the Department require all environmental resource-monitoring data collected be available to the public and DNREC. Commenter 32 recommends that the permit include a condition that requires provision of the annual files of the raw data collected from all fishery monitoring programs be provided to the Delaware River Basin Fish and Wildlife Management Cooperative (Commenter

32) for use for independent analyses and fishery management in the system (i.e. the Delaware River Sustainable Fishing Plan for American Shad, http://www.asmfc.org).

Commenter 30 requests that the requirement to conduct striped bass sampling during the month of November of any given year not be abandoned as is detailed in the draft permit in anticipation of sea level rise and tidal water influence in the bay during the life of the USNRC licenses.

(Commenter 30, 32, 39)

Response 50

The Department agrees that required biological monitoring studies are key for state agencies to assess long term population trends. This subject renewal permit requires several biological studies as described in **Response 26**. These annual reports and raw data are considered public information and are available by making a request through the Department's OPRA office at www.nj.gov/dep/opra. The Department did require the permittee to submit annual files of raw data collected from certain fishery monitoring programs as included in Part IV.G.5.d.ii where this raw data forms the basis for Biological Monitoring Program Annual Reports that are submitted to the Department by June 30 of each year. The Department has expanded this requirement to include the State of Delaware.

Regarding the discontinuation of the Delaware River Striped Bass Recruitment Survey for the month of November, the Department stated the following on page 74 of the Fact Sheet:

> "While the Department is continuing the requirement for PSEG to fund the Department's NJFW program regarding the Delaware River Striped Bass Recruitment Survey (Part IV G.5), the Department is amenable to one change. Specifically, rather than the NJFW conducting additional sampling at the 32 fixed stations during June, July and November, sampling shall be discontinued in November."

This change was requested by the NJFW program that performs the sampling based on issues related to safety and weather concerns.

Comment 51

Some commenters acknowledge and/or express support for fish ladders that were constructed under the EEP. Commenter 10 states that the EEP has developed fish passage facilities at a number of sites that are used by river herring and other species which provide another means of increasing fish production in the estuary.

Commenter 30 states that while the installation of fish ladders has been required since 1994, the long term effects of these ladders remain unknown. Yet, the Department is considering abandoning the monitoring of the fish ladders due to fish mortality from handling of fish that pass the ladders. Although there is merit in avoiding harm to collected fish, it is imperative that monitoring continues to determine the overall success of fish passage and, more importantly, confirmed fish spawning (at least every 3 to 5 years). The ladders were required to offset adverse effects from plant operations via the restoration of historic anadromous spawning runs; to abandon monitoring of the fish ladders and hence any demonstrated success of the applicant's compensatory efforts is not in the public's interest. Commenter 30 requests that a new component to the fish ladder monitoring be added; namely conducting young-of-the-year sampling upstream of the ladders to confirm spawning has occurred.

(Commenter 3, 10, 12, 13, 30, 39)

Response 51

The permittee was required to install fish ladders to contribute to biological productivity for migratory species as per the 1994 and 2001 NJPDES permits where a detailed list of installed fish ladders is included on page 72 of the Fact Sheet. When dams or earthen embankments are installed across rivers or streams to create lakes or ponds, they block routes for fish migration and impede fish access to and from suitable spawning habitat. Fish ladders provide a means for river herring (alewife and blueback herring) and other anadromous fish species to migrate over these barriers thus restoring access to historic spawning and nursery areas. In order to reestablish runs through the installed fish ladders, PSEG stocked the ponds and lakes with gravid adult herring to accelerate the date at which full juvenile out-migration and the return of a full complement of spawning adults could be achieved. By stocking gravid adults, juvenile herring will be produced which, upon their maturity, will follow instinctive olfactory cues back to their natal waters above the fish ladders. This instinct to return to natal waters, combined with the need for new habitat, given increasing population pressure below the dam, will lead these returning herring to use the fish ladders to reach suitable spawning areas above the dam. As evidenced by biological monitoring, the collection of juvenile herring in the impoundments demonstrated that the fish ladders installed by PSEG were allowing river herring to successfully spawn in impoundments that otherwise would be inaccessible to them. Through the operation of the fish ladders, river herring populations have been provided additional habitat to help ensure continued healthy stock.

The Department maintains that sufficient data has been collected to confirm the effectiveness of the ladders and that additional fish ladder monitoring is no longer warranted in light of the detriment it poses to fish. There can be mortality associated with monitoring which defeats the purpose of reestablishing the run. This subject permit renewal continues to require that the permittee operate and maintain the installed fish ladders in accordance with the developed operations and maintenance manuals. The permittee shall conduct routine inspections during the upstream adult migration period to ensure that the ladders are operating as designed.

Comment 52

Some commenters express support for the installation of artificial reefs. Commenter 3 encourages PSEG to join as a partner with the Department and participating conservation organizations to construct an artificial reef in Delaware Bay; thereby, further enhancing and diversifying the marine resources of the region. Studies show that reef substrates support marine communities with over one thousand times more biomass than those of surrounding substrates such as sandy sea floor.

Commenter 30 states that the USFWS was unable to determine from review of the draft permit on how the funding that PSEG provided to the Department was used in the State's Artificial Reef and Shellfish Programs and the USFWS requests an accounting on how such funds were expended in the Delaware Estuary.

(Commenter 3, 12, 30)

Response 52

As described in the draft permit Fact Sheet, artificial reefs are manmade structures that increase habitat surface area and colonization by aquatic organisms and fish. The colonization in-turn produces a more

diverse and productive forage base for predator fish. Artificial reefs improve water quality by enhancing the habitat for animals that filter algae, organic matter, and bacteria from the water column.

The 2001 NJPDES permit required the permittee to fund an escrow account in the amount of $500,000 to be made available to the Department for the construction and installation of artificial reefs. PSEG satisfied this requirement on December 19, 2001. Reef sites that benefitted from this funding included the Deepwater Reef Site, Little Egg Reef Site, Wildwood Reef Site, Ocean City Reef Site, Garden State South and Barnegat Light Reef Sites. In early 2006, the Department used some of the PSEG funding to revitalize more than 150 acres of oyster habitat within the Delaware Bay. This project was an extension of the 2003 pilot project which enhanced an oyster seedbed in the bay by planting approximately 30 million oysters. Additionally, the EEP provided funds to the Department and DNREC for their State-managed artificial reef programs which have successfully installed artificial reefs in Delaware Bay and the adjoining coastal areas.

As stated on page 66 of the draft permit Fact Sheet, the Department has not required artificial reefs or artificial reef funding in this subject permit renewal action.

Comment 53

Some commenters express concern that the plant is discharging superheated water. Commenter 2 states that the thermal discharge increases the temperature of the surrounding estuary by 8 to 10 degrees Fahrenheit which can be as high as 15 degrees Fahrenheit at times. Commenter 2 states that the discharge causes algal blooms and dissolved oxygen levels to drop. The Delaware Bay has a dissolved oxygen problem, a nutrient problem and the thermal discharge contributes to these problems. Commenter 36 states that the discharge of heated water, that is comprised of decomposing organic waste from the once living aquatic organisms from the intakes, exacerbates the dissolved oxygen impairment in the Delaware River Watershed.

Commenter 38 states that more should be done to protect sea life as they have to contend with warming water, algae blooms and plastics.

(Commenter 2, 19, 36, 38)

Response 53

The Department maintains that the renewal permit action continues comprehensive requirements to control heat and temperature that are in accordance with Section 316(a) of the Clean Water Act as well as other relevant regulations. By way of background, Section 316(a) of the Federal Clean Water Act regulates the thermal component of surface water discharges. Specifically, Section 316(a) authorizes variances from thermal SWQS where it is shown that the alternative limit proposed will "assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife" in the receiving water. In other words, the Department can deviate from the SWQS expressed for point sources and for heat dissipation dimensions provided that the conditions of Section 316(a) of the Clean Water Act are met. Section 316(a) of the Federal Clean Water Act states, in part:

> "….the Administrator (or if appropriate, the State) may impose an effluent limitation under such sections for such plant, with respect to the thermal component of such discharge (taking into account the interaction of such thermal component with other pollutants), that will assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on that body of water."

Federal regulations at 40 CFR 125.70 – 125.73 (Subpart H – Criteria for Determining Alternative Effluent Limitations Under Section 316(a) of the Act) serve to guide implementation of Section 316(a) of the Clean Water Act. The Department used these regulations in establishing the Section 316(a) determination in as described in the Fact Sheet. A Section 316(a) variance is also allowable pursuant to state federal regulations. As described in NJAC 7:9B-1.5(c)(8):

> "Temperature criteria at N.J.A.C. 7:9B-1.14(d) apply unless an alternative effluent limitation is approved in accordance with Section 316(a) of the Clean Water Act, 33 U.S.C. 1326(a)."

In making this determination, the Department considered a significant amount of data, analyses and modeling pertaining to the thermal plume and its interaction with other pollutants as well as a biothermal assessment, as described at length at pages 38 to 45 of the Fact Sheet. Therefore, the Department has determined that it appropriately considered the impacts to the receiving water as this commenter has suggested.

The Department notes that some commenters assert that the Delaware Bay has a dissolved oxygen and nutrient problem to which the thermal discharge contributes. The Department's New Jersey Integrated Water Quality Assessment Report (Integrated Report) describes the overall quality of New Jersey's surface waters based on existing and readily available data. It consists of the 305(b) Report and the 303(d) List (see http://www.nj.gov/dep/wms/bears/assessment.htm). The majority of the data used to prepare the Integrated Report is collected by the Department with contributions from various data partners. The Department evaluated the 2012 New Jersey Integrated Water Quality Assessment Report to identify any impairment to the assessment unit for the receiving stream to which PSEG-Salem discharges. As indicated on page 6 of the draft permit Fact Sheet, Zone 5 of the Delaware River is not listed as impaired for dissolved oxygen or nutrients as per the 2012 New Jersey Integrated Water Quality Assessment Report. The Department is unaware of low dissolved oxygen levels, nutrient issues, or algal blooms and no site-specific data or technical sources of information were submitted in support of this comment. In fact, the United States Geological Survey (USGS) has a station in the vicinity of the discharge (USGS 01482800) that confirms that DO levels are consistently above 5.0 mg/L which demonstrates compliance with the NJSWQS for SE1 (Saline Estuary) waters with NJSWQS. See http://waterdata.usgs.gov/nwis/uv/?site_no=01482800.

The Department is aware of pollution issues relating to plastics and trash that can impact marine life; however, these issues are outside the scope of this subject NJPDES permit. There are several other regulatory programs and initiatives that address pollution issues related to trash. This includes the national Municipal Stormwater Regulation Program under which New Jersey administers its own municipal separate storm sewer system (MS4) permit. Information regarding New Jersey's MS4 permit is available at www.state.nj.us/dep/dwq/msrp_home.htm. The Department also coordinates the statewide litter abatement program called NJ Clean Communities (see www.njclean.org). Information regarding EPA's Trash Free Waters Resource page is available at: water.epa.gov/type/oceb/marinedebris/.

Comment 54

Commenter 4 states that PSEG-Salem's thermal discharge has shown to be protective of the balanced indigenous population. Commenter 21 states that using the terminology "superheated water" is incorrect as superheated water is greater than 212 degrees Fahrenheit and is pressurized so that it doesn't boil. The NJPDES permit contains environmental limits to control heat and contaminants.

(Commenter 4, 21)

Response 54

PSEG-Salem does discharge heated effluent via DSNs 481 through 486. Heat and temperature are controlled via effluent limitations as a facility sum where monitoring point FAC A covers DSNs 481 to 483 and monitoring point FAC B covers DSNs 484 through 486. The Department maintains that this ensures a comprehensive approach to controlling temperature. The Department also agrees that limits on PSEG-Salem's thermal discharges are protective of the balanced indigenous community in the vicinity of the discharge pipes for the reasons described at pages 38-45 of the Fact Sheet.

Comment 55

Commenter 35 observes that, under Section 316(a) of the Clean Water Act, the Department may provide PSEG-Salem a water quality variance for its thermal discharges only if the variance will assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the Delaware River. Commenter 35 argues that, because PSEG and the Department failed to consider important aspects of the thermal variance issue, including (but not limited to), failing to calculate the extent of the lateral, downriver and upriver surface and subsurface temperature profiles for the modeled thermal plumes and failing to utilize the most recent (2004 to 2014) USGS temperature data, they have not sufficiently demonstrated that the balanced, indigenous population is adequately maintained. Thus, Commenter 35 concludes, the Department's grant of the thermal variance to PSEG-Salem is arbitrary, capricious and/or unreasonable. Commenter 35 asserts that the Department must withdraw its thermal variance in order to comply with its mandate to fully and properly apply DRBC regulatory mandates.

Commenter 35 states that PSEG-Salem has been allowed to operate under a variance from DRBC's temperature standards since 1977. It is inappropriate to allow PSEG-Salem to continue to operate in exceedance of DRBC's temperature standards given that:

(1) It has been over 20 years since DRBC granted this variance and conditions in the Delaware River have changed significantly;
(2) Climate change is causing, and will continue to cause, increased temperature levels in the Delaware Estuary that magnify the adverse impact of the temperature increase caused by PSEG-Salem; and
(3) The cumulative impact of PSEG-Salem, climate change and/or an anticipated new nuclear power plant on Artificial Island called Salem 4, will likely contribute to increased mortality of aquatic life in the Delaware Estuary and the variance ignores the significance of this adverse impact.

As noted in the ECONorthwest report submitted by Commenter 35:

> "the average temperature increase at the [Salem] discharge is from 8 to 10 °F (4 to 6°C). The Delaware River Basin Commission (DRBC) temperature standards for Water Quality Zone 5 of the Delaware Estuary (where the Salem discharge is located) state that the temperature in the river may not be raised above ambient by more than 4 degrees Fahrenheit (°F; 2.2 degrees Celsius [°C] during non-summer months (September through May) or 1.5°F (0.8°C) during the summer (June through August). However, Salem has received a variance and has been exempt from these temperature standards since it began operation in 1977. Salem's thermal plume under the Baseline Scenario is likely to contribute to increased mortality as water in the Delaware River increases in temperature due to climate change."

Commenter 35 contends that the temperature exceedances at PSEG-Salem have adverse impacts on a variety of fish species, as stated by ECONorthwest:

> "Effluent from Salem regularly exceeds the Delaware River Basin Commission's water quality regulations for temperature…Thermal impacts from Salem occur during seasons of particular importance for critical life stages, and temperature within the plume exceed thresholds for the spawning of federally-listed species including Shortnose sturgeon and Atlantic sturgeon. Other important species have similar potential effects of elevated water temperatures including American shad, white perch, and striped bass. Temperatures are also outside of optimal for other life stages of these fish species as well as channel catfish, bluegill and others."

(Commenter 35)

Response 55

The Department maintains that the relevant regulatory criteria were considered, including DRBC requirements. The DRBC issued Docket No. D-68-20 CP (Revision 2) on September 18, 2001 to PSEG for the Station consistent with the NJPDES permit. This docket is current as it does not expire until 2026. The purpose of the docket is to assess compliance with DRBC Water Quality Regulations where DRBC determined that a heat dissipation area must be defined. Station operations have not significantly changed since this docket was issued. The Department provided DRBC with notice of this permit action and a copy of the draft permit terms to allow DRBC to voice any objections to the Department's renewal of PSEG's 316(a) variance on the basis of DRBC's docket.

In its analysis of the heat dissipation area, DRBC fully assesses the lateral and vertical profile of the thermal plume as well as its extent upriver and downriver. When characterizing a thermal plume, the lateral and vertical profiles are considered as these are fundamental components of the plume. Compliance with a regulatory heat dissipation area is based on measurements taken at the surface since heat rises.

DRBC states the following on page 7 of the docket regarding review of the PSEG docket application material:

> "In its assessment that the characterization of the plume is appropriate and fully protective of aquatic life uses specified in the DRBC Water Quality Regulations (WQR), PSEG demonstrated that an organism's tolerance and response to temperature changes in the Salem plume are conditioned by the range, frequency, and duration of temperature fluctuations experienced. Further, plume temperatures substantially above ambient are unlikely to occupy any specific area (except for the ZIM) for more than a brief and intermittent period during any tidal cycle, and it is unlikely that organisms would actively follow portions of the plume having temperature outside of their preferred range as the plume shifts with the tide."

Additionally, the docket specifies the following with respect to temperature and thermal limitations:

"n. The thermal discharge shall be subject to temperature and thermal limitations as follows:

1) The project discharge shall not cause a temperature rise in excess of 1.5°F (24-hour average during June through August) above ambient temperatures. Such limitations may be exceeded within a heat dissipation area which shall not exceed a length of 25,300 feet upstream or

21,100 feet downstream from the end of the Station's discharge pipes not extend closer than 1320 feet to the present eastern boundary of the shipping channel of the Delaware River.

2) The project discharge shall not cause a temperature rise in excess of 4°F (24-hour average during June through August) above ambient temperatures. Such limitations may be exceeded within a heat dissipation area which shall not exceed a length of 3,300 feet upstream and 6,000 feet downstream from the end of the Station's discharge pipes nor extend closer than 3,200 feet to the present eastern boundary of the shipping channel of the Delaware River."

Issues relating to an additional reactor for PSEG-Salem are outside the scope of this NJPDES permit since this subject NJPDES permit does not authorize any water withdrawal or discharge associated with another reactor. For key documents and correspondence relating to the status of a third reactor, please refer to the USNRC's website at http://www.nrc.gov/reactors/new-reactors/esp/pseg.html.

Comment 56

Commenter 32 notes that the draft permit uses a data set from 1991 through 2011 to support that there is evidence of no prior appreciable harm. Although Commenter 32 agrees that there may have been no apparent change in trends during this 20-year time period, it only encompasses a time period while thermal impacts from the Station were already occurring. The assessment of appreciable harm does not include information prior to the initial operation nor does it encompass the impacts of thermal effluent on relative abundance (only diversity) of fish species in the vicinity of the Station. Further, it does not address the potential sub-lethal impacts to migratory fish through altered behavior and increased bioenergentic demands associated with increased water temperature over a relatively substantial cross-section of the river that would be encountered by both upstream and downstream migrating fish.

Commenters 29 and 32 request that additional studies be undertaken to evaluate the impacts of the thermal effluent on migratory fish species such as alewife, blueback herring, American shad and striped bass. Telemetry studies should be conducted to determine the impacts of elevated water temperatures from the thermal plume on upstream or downstream migration, particularly with respect to migratory delays or significant diversions in swimming pathways to avoid the thermal plume. Studies should be conducted on early life stages of resident and migratory fish to determine if the thermal effluent has a negative impact on species survival for fish that are not entrained. Commenter 32 states that similar studies should be conducted to determine the extent to which species are seasonally reduced in relative abundance or excluded from the thermal plume.

(Commenter 29, 32)

Response 56

While the Department agrees that a comprehensive review of the data set from 1991 to 2011 was utilized to support this most recent finding of no evidence of prior appreciable harm, the Department is also relying on previous regulatory decisions with respect to Section 316(a). Specifically, there have been multiple regulatory reviews of the thermal discharge and its effects, beginning with the early licensing process where AEC issued a final environmental impact statement in April 1973 which predated Station operations, as described in **Response 10**. AEC's review included an evaluation of the probable effects of the planned cooling water intake structure as well as the thermal design. Following the issuance of the environmental impact statement, the thermal effects from the Station were evaluated in NJPDES permitting decisions in

1994 and 2001 including a comprehensive data review as part of the Section 316(a) variance. The finding of "no prior appreciable harm" is a factor in the Section 316(a) determination that has been evaluated as part of the 1994 and 2001 determinations. As part of this subject permit action, the Department is approving PSEG-Salem's Section 316(a) variance consistent with the findings of these previous decisions as well as the fact that Station operations have not significantly changed.

The issuance of the 316(a) variance in the subject permit renewal is also based on a predictive and retrospective assessment of two decades of data collected between 1991 and 2011. The Department evaluated this dataset for the long-term trends described in this comment. As stated on page 44 in the Fact Sheet:

> "In order to evaluate trends of finfish with respect to the status of the population, the Department also examined data from the Department's Delaware Bay finfish trawl survey of juvenile finfish species, conducted by the Department's NJFW Program (see http://www.njfishandwildlife.com/artdelbaystudy14.htm). This survey began in 1991 and is used to develop indices for comparing the relative annual abundance of selected stocks. Sampling stations are located within the shallow, near shore waters on the New Jersey side of the bay. Data collected allows biologists to develop relative abundance estimates and length frequencies of estuarine-dependent finfish necessary for predicting future fishery trends and harvest potential. The species of focus in the Delaware Bay finfish trawl survey include bay anchovy, Atlantic croaker, weakfish, blue crab, and striped bass. In reviewing data from 1991 through 2011, there is great inter-annual variation. Species abundance has fluctuated from 1991 through 2011 with no apparent long-term trends. It is reasonable to conclude that the 20 year data set from this survey supports that there is evidence of no prior appreciable harm.
>
> PSEG's retrospective evaluation has asserted no prior appreciable harm to the balanced indigenous population. The Department recognizes that the large data set from baywide sampling programs, as conducted by resource agencies (including the Department) and PSEG, supports this conclusion as most trends are stable or increasing. The Department acknowledges that there have been no substantial changes in the thermal characteristics of the discharge, the hydrology of the waterbody, or the species composition in the area of the discharge. Specifically, the fundamental characteristics of the thermal plume have not changed in the decades that both units have been in operation. The large volume of the estuary at the discharge location as well as the positioning of the site near the edge of both the freshwater and saltwater habitats helps to minimize extended biotic exposure to the thermal discharge."

With respect to the contention that potential sub-lethal impacts to migratory fish through altered behavior and increased bioenergetic demands could occur, previous evaluations have addressed the impact of the discharge on migratory pathways as described on page 43 of the draft permit Fact Sheet:

> "The 1999 Section 316 (a) Demonstration concluded that the potential for the thermal discharge to threaten the reproduction and development of fish populations in the estuary is small since the primary spawning and nursery areas for most fish species in the Delaware Estuary are remote from the Station's discharge. Primary spawning and nursery areas are generally located either downstream in the more saline water of the lower bay and the Atlantic Ocean, or upstream in freshwater reaches of the Delaware River. The 1999 Section 316 (a) Demonstration also found that PSEG-Salem's discharge minimizes the potential for blocking fish migration or causing cold shock. Predictive evaluations on the finfish RIS confirmed that fish migration would be

> unaffected in over 95 percent of the estuary cross-section in the vicinity of PSEG-Salem. Cold shock is highly unlikely due to the unconfined location of the thermal discharge, high discharge velocity, low ΔTs beyond the ZIM, and because a tidally dynamic plume would not attract fish or allow them to acclimate to elevated plume temperatures."

The Department acknowledges that migratory fish are impacted by PSEG-Salem and that migratory species, such as alewife, blueback herring and American shad, are not generally showing positive long term population trends. However, this may be caused by other stressors including impediments to migration such as dams.

The Department maintains that the comprehensive application analysis coupled with a long term trends analysis supports continuation of a thermal variance. Continued biological monitoring by PSEG and natural resource agencies is appropriate and essential in order to assess the impacts of the Station.

With respect to the suggestion regarding additional requirements such as telemetry studies, the Department would need additional detail as to the suggested study objectives and protocol. The Department notes that NMFS has regulatory authority to require such studies where the Department would be supportive of any such requirements.

Comment 57

Commenters 29 and 32 state that the cumulative impacts from impingement and entrainment from the operation of PSEG-Salem, as well as the numerous other facilities that withdraw and discharge water into the Delaware River, should be evaluated. Commenter 32 states that cumulative impacts from impingement and entrainment of multiple facilities pose a significant burden on the ecological resources of the system and may preclude recovery of important migratory fish stocks that respective state and federal resource agencies are working to protect.

Commenter 35 states that a greater focus on the cumulative impact of other facilities along with PSEG-Salem for all impacted species is clearly warranted and has not been provided.

(Commenter 29, 32, 35)

Response 57

The Department maintains that cumulative impacts from impingement and entrainment are assessed through ongoing biological monitoring. As stated in the Fact Sheet on page 45:

> "PSEG contends that numerous studies performed by PSEG Salem as well as State and Federal Governmental agencies have demonstrated that the health of the Delaware Estuary has been improving for over thirty years. Baywide sampling includes juvenile abundance sampling as performed by PSEG since 1985 as well as long-term data on juvenile abundance in the Delaware Estuary as collected by NJDEP and DNREC for over thirty years. PSEG contends that the long term trend data shows no decline in juvenile abundance that can be attributable to PSEG-Salem; no change in the number of finfish species; and that finfish density has increased."

Cumulative impacts were also considered as part of the biothermal assessment. As stated on page 39 of the Fact Sheet:

"The Biothermal Assessment included in the 1999 application is an assessment of the effects of the thermal plume on the biological community. This assessment relies directly on the results of the thermal plume modeling. The purpose of the biothermal assessment is to identify the likelihood and magnitude of biothermal responses elicited by the Station's thermal discharge and to assess their significance to the key species and the biological community. In PSEG's 1999 316(a) Demonstration, there were five sequential steps to the biothermal assessment: (1) Review of regulatory standards and decision criteria; (2) Evaluation of biological vulnerability (critical functions, biotic categories); (3) Selection of RIS; (4) Detailed evaluation (Predictive, Retrospective - No Prior Appreciable Harm); and (5) Overall evaluation of "balanced indigenous community" (BIC).

The 1999 application contains two biothermal assessments of the PSEG-Salem plume, a predictive assessment and a retrospective assessment, as set forth in EPA guidance. The predictive assessment uses reasonable worst case assumptions to project the maximum likely extent and duration of exposure by the RIS to the elevated temperatures of the PSEG-Salem plume, and then evaluates the potential adverse effects of such exposures based on the results of laboratory tests on the effects of heat on those species. PSEG's evaluation, which also takes into account the effects on the RIS of nearby thermal discharges other than PSEG-Salem, the interaction of the heat in the plume with other pollutants, and fish losses at the Station intake, concluded that the discharge would not have an adverse effect on any RIS populations. The essential basis for this conclusion is that the area of more elevated plume temperatures in the immediate vicinity of the discharge is small and larger fish avoid it, while the less elevated temperatures in the remainder of the plume are too low to have adverse effects."

While the Section 316(b) regulations do acknowledge that there are cumulative effects associated with multiple intakes, these regulations do not contain explicit requirements in addressing such. In addition, while not required by the Section 316(b) regulations, baywide biological monitoring does offer an assessment of overall effects from multiple intakes where this data shows stable or increasing trends for most RIS. Baywide biological monitoring has been conducted by PSEG for more than two decades as described in **Responses 26** and **31**. The impacts that the existing cooling water intake structure controls have on these fisheries and the relative benefits of other control options will be evaluated as part of the applicant's forthcoming 40 CFR 122.21(r) submissions under the Section 316(b) rule.

Comment 58

Commenter 35 cites the Fact Sheet in that the following uses of Zone 5 of the Delaware River need to be protected for industrial water supplies after reasonable treatment; maintenance of resident fish and other aquatic life; propagation of resident fish from R.M. 70 to R.M. 48.2; passage of anadromous fish, wildlife, recreation, and navigation. This characterization of uses to be protected fails to recognize that existing uses in the Delaware River exceed designated uses in many ways and the level of protection required is higher as per the anti-degradation mandates of the Clean Water Act. Commenter 35 includes a petition in its comments from the Delaware Riverkeeper Network, Delaware River Shad Fishermen's Association, and the Lehigh Stocking Association. Commenter 35 states that this petition documents how the existing uses of the Delaware Estuary exceed designated uses and asserts that the level of protection required by PSEG and its PSEG-Salem facility are higher than articulated in the Fact Sheet. As recognized in the petition:

1) Designated uses of Zones 3, 4, and River Miles 78.8 to 70.0 of Zone 5 must be upgraded to include the existing use of propagation of resident fish and other aquatic life;
2) Designated uses of Zones 2 through 5 must be updated to include the existing uses of spawning and nursery habitat for anadromous fish.

Commenter 35 attaches a draft DRBC report documenting some of the specific ways that existing uses for particular species exceeds designated uses. Atlantic sturgeon, American shad, striped bass, white perch, bay anchovy, Atlantic silverside, alewife, blueback herring and menhaden are all among the species discussed in the DRBC Existing Use Evaluation and are all among the species being significantly impacted by PSEG-Salem. Pursuant to the anti-degradation mandates of the Clean Water Act, the obligation to protect these species is greater than described in the Department's documentation supporting its draft permit.

Furthermore, as noted in this petition as well as in the DRBC Draft Existing Use Evaluation, dissolved oxygen levels are a focal point for evaluation of the enhancements to estuary fish populations as well as an ongoing limitation. As noted by Dr. Danielle Kreeger of the Delaware Estuary Partnership in *The News Journal* on September 5, 2015:

> "Kreeger said that even with temporary warming of the water, that warmer water holds less oxygen so she and others are starting to see more instances in the upper estuary where dissolved oxygen in the water drops. When it gets too low, fish that can't swim away fast enough, often schooling fish like menhaden, die.
>
> And warmer, saltier water can mean outbreaks of Dermo, an oyster disease caused by the pathogen *Perkinsus marinus*, and is common in the Delaware and Chesapeake bays."

PSEG-Salem is an ongoing source of superheated water to the estuary. The discharge of heat from PSEG-Salem, individually as well as cumulatively with anticipated warming from climate change, and the implications for Atlantic Sturgeon, for estuary oysters, and for other species is not evaluated, considered or addressed in this draft permit in any meaningful way. An agency using BPJ would not allow for such a substantial oversight.

PSEG has also proposed construction of an additional plant on Artificial Island commonly referred to as Salem 4. Salem 4 will be another source of impingement, entrainment and heated cooling water discharge. The implications of Salem 4 cumulatively with Salem 1 and 2, as well as Hope Creek, in this stretch of the Delaware River, further support the BPJ determination of closed-cycle cooling at PSEG-Salem.

(Commenter 35)

Response 58

As noted on page 6 of the Fact Sheet, the Department acknowledges that the designated uses of Zone 5 of the Delaware River are specified where these uses are consistent with NJAC 7:9B-1 et seq. The Department maintains that an anti-degradation analysis was considered as noted on page 76 of the Fact Sheet as follows:

> "All permit limitations and conditions in this permit action, are equal to or more stringent than those contained in the existing permit action. As a result, this permit action satisfies the federal and state anti-degradation regulations at 40 CFR 131.12 and N.J.A.C. 7:9B-1.5(d), and no further anti-degradation analysis is necessary."

The Department considers designated uses as part of any NJPDES discharge to surface water renewal permit most notably in the implementation of effluent limitations. In the case of an electric generation station such as PSEG-Salem, the Department considered designated uses such as propagation of resident fish within the context of the Section 316(a) determination which requires the protection and propagation of the balanced indigenous population.

The Department acknowledges that there is a draft DRBC report entitled "Existing Use Evaluation for Zones 3, 4, & 5 of the Delaware Estuary Based on Spawning and Rearing of Resident and Anadromous Fishes" dated March 24, 2015. The purpose of this report is to evaluate the "propagation" use by assessing whether any evidence of successful reproduction existed for each species in each estuary zone, and the degree to which successful reproduction had been restored. Detailed reviews were included for nine fish species: Atlantic sturgeon, American shad, striped bass, white perch, bay anchovy, Atlantic silverside, alewife, blueback herring and menhaden. For all species evaluated, successful reproduction was clearly demonstrated in one or more of the estuary zones. In addition, moderate to strong reproduction was demonstrated for multiple species in each zone indicating substantial recovery in the "propagation" use for Zones 3, 4, and upper Zone 5. The Department maintains that these findings are consistent with the Section 316(a) determination.

With respect to DO levels, the Department is not aware of low dissolved oxygen concentrations in the Delaware River as described in **Response 53** where, in fact, USGS data shows DO levels consistently above 5.0 mg/L which demonstrates compliance with NJSWQS for SE1 waters.

The Department maintains that discharge effects were considered given the exhaustive application analysis for Section 316(a) as well as the Department's holistic analysis and review as included on pages 38 to 46 of the Fact Sheet.

As described previously, issues relating to an additional reactor for PSEG-Salem are outside the scope of this NJPDES permit since this subject NJPDES permit does not authorize any water withdrawal or discharge associated with another reactor. For key documents and correspondence relating to the status of a third reactor, please refer to the USNRC's website at www.nrc.gov/reactors/new-reactors/esp/pseg.html. Please refer to **Response 10** regarding issues relating to closed-cycle cooling.

Comment 59

Commenter 2 states that the plant discharges fungicides, algaecides and corrosives into the water which contributes to direct pollution impacts. Commenter 2 states that the plant discharges metals including mercury which bioaccumulates in fish and that the Delaware River Estuary is impaired for mercury.

(Commenter 2)

Response 59

The permittee does not utilize any fungicides, algaecides and corrosives in its circulating water system nor does the permittee chlorinate its circulating water system. While the Department acknowledges that the service water system (which comprises approximately 4% of the discharge for the circulating water system) does contain chlorine, there are chlorine limits imposed at the affected circulating water system discharges.

The Department is unclear as to the basis for the contention that the facility is discharging metals including mercury.

The Department does acknowledge that there is potential for the presence of priority pollutants at DSN 48C. DSN 48C is an internal, low volume waste stream that discharges treated effluent on a batch-type basis into four of the circulating water system outfalls namely DSNs 481, 482, 484 and/or 485. The NJPDES permit renewal does include a routine Waste Characterization Requirement at DSN 48C for those pollutants indicated as present in the NJPDES application namely volatile organics, sulfate, and boron.

PSEG Comments

The following comments were provided by PSEG and are therefore labeled with the preflix "PSEG Comment." Note that the first paragraph in PSEG Comment 1 was provided by Commenter 9 at the public hearing on August 5, 2015.

PSEG Comment 1

PSEG states that it understands its commitment to the environment and obligation to protect the health and safety of the public. PSEG has taken many steps to reduce environmental impacts including both day to day operational measures as well as the installation of state of the art intake technology at the cooling water intake structure. For more than 20 years PSEG has improved the environment through the EEP. This unique program has restored and forever preserved more than 21,000 acres of wetlands and adjoining buffer properties which has in turn resulted in improved aquatic habitat and increased aquatic life.

PSEG notes that during the August 5, 2015 public hearings, some commenters oppose the continued operation of PSEG-Salem and the renewal of PSEG-Salem's NJPDES Permit consistent with the terms and conditions in the draft permit. In support, they cite the estimated annual loss of finfish eggs and larvae as a primary basis for their opposition. However, they inappropriately conclude that numeric losses must equate to adverse impacts to the aquatic life of the estuary and to declines in the fish populations even though this statement is not supported by scientific facts. Multiple assessments of the effects of entrainment conducted by recognized experts and supported by decades of data, as referenced in comments provided by PSEG and in the Administrative Record for this draft permit, provide indisputable evidence that entrainment takes have not compromised any Delaware River Estuary fish populations.

Recent independent reports confirm these analyses. The 2012 State of the Delaware Estuary report by the Partnership for the Delaware Estuary concluded that the overall environmental integrity of the estuary has improved significantly in recent decades. Moreover, the 2012 Technical Report for the Delaware Estuary and Basin evaluated the status and trends for several finfish species, and found generally increasing trends in abundance for juvenile American shad and striped bass and stable populations of juvenile weakfish and white perch. The effects of entrainment and impingement on all four of these species have been studied extensively by PSEG; these species were RIS in prior assessments.

(Commenter 9, 51)

Response to PSEG Comment 1

The Department acknowledges that PSEG has implemented measures to reduce the impacts at the circulating water intake structure as well as in the surrounding environment. Most all of the measures were required in NJPDES permit actions for which PSEG has demonstrated consistent compliance.

As discussed in **Response 31**, PSEG conducts baywide biological monitoring as required by the NJPDES permit, which compliments other biological monitoring data collected by government agencies. In addition, the Department has reviewed the 2012 State of the Delaware Estuary report as published by the Partnership for the Delaware Estuary (see http://www.delawareestuary.org/state-of-the-estuary). The report is described as a scientific health exam of the tidal Delaware River and Bay, as well as the land draining to them in coastal Delaware, southern New Jersey, and Southeast Pennsylvania. The report looks at data for over 50 different indicators to answer such questions as whether natural values in the estuary are increasing or decreasing and whether water quality and fish and wildlife habitat are improving. Some excerpts regarding the health of certain indicators as well as addressing species not already discussed in **Response 31** are as follows:

Water Pollution
Water in the Delaware River is the cleanest it has been since before the Industrial Revolution, but we still have a long way to go to be fishable and swimmable, and some of the toughest problems (nonpoint source and legacy pollutants) we have yet to solve.

Horseshoe Crabs
The Delaware Bay's horseshoe crab population is a fraction of what it once was, but it is still the largest breeding population in the world. All indications are that collaborative management efforts are working and that horseshoe crabs themselves are not at risk.

Eastern Oysters
The outlook for Delaware Bay oysters is not good due to diseases, climate change, and a lack of restoration funding. Then again, we have what many do not: natural beds, a proven restoration strategy, and a management system that provides for harvests and sustainability.

Blue Crabs
The blue crab fishery continues to be the most lucrative in Delaware Bay. Management efforts are working well, and blue crabs are thriving.

Osprey
Osprey populations have rebounded, and are doing well. The outlook for them is good in and around Delaware Bay.

Freshwater Mussels
Freshwater mussels are among the most imperiled animals in the country and the estuary. They have continued to decline in streams throughout the watershed, with the exception of the main-stem Delaware River where mussels have recently been discovered in encouraging numbers and diversity.

While this report is useful in understanding the health of the Delaware Estuary, biological monitoring conducted by resource agencies and monitoring required to be conducted by PSEG through previous iterations of this permit can also be evaluated to understand the status of resident species in the Delaware Estuary. As described in **Response 26** as well as on pages 29 through 32 of the Fact Sheet, the following surveys collect abundance data:

- PSEG Baywide Beach Seine Survey
- PSEG Baywide Bottom Trawl Survey
- PSEG River Ichthyoplankton Survey
- PSEG River Pelagic Trawl Survey
- Delaware River Striped Bass Recruitment Survey

The Department's analysis of PSEG's biological monitoring data supports this permit action and the Department's interim BTA determination pending PSEG's compliance with the entrainment demonstration required by the new 316(b) regulations. Long-term monitoring programs provide evidence of increasing abundance for juvenile weakfish, white perch, striped bass, American shad, Atlantic croaker, alewife and blue crab. These species all show increases in abundance as measured by at least one of the monitoring programs. For blueback herring, all monitoring programs generally reflect the continuing decline in coastwide abundance that started in the late 1960s prior to when PSEG-Salem began operation. The remaining RIS do not show a clear trend.

The Department maintains that there are impingement and entrainment losses at the cooling water intake structures at PSEG-Salem where the Section 316(b) regulations are the appropriate regulatory mechanism to address such. However, it is useful to look at biological monitoring program data and other technical reports to understand what the long-range impacts are from the cooling water intake structure. Based on its analysis, the Department finds that continued operation of the once-through cooling system with the conditions included in this permit satisfies BTA for impingement and entrainment in the interim while further information required by the federal regulations is gathered and submitted in the upcoming permit cycle.

PSEG Comment 2

EPA's Section 316(b) Rule provides specific requirements and a schedule for making interim BPJ BTA determinations for both impingement mortality and entrainment in issuing permits for facilities like PSEG - Salem, whose permit proceeding began prior to October 14, 2014. However, in proposing an interim BTA measure for the service water intake structure, the Department should consider the totality of the requirements addressing BTA for impingement mortality in EPA's Section 316(b) Rule.

The Department's proposed interim BPJ BTA measure for PSEG-Salem's service water intake structure (i.e. modified Ristroph traveling screens and a fish handing and return system) is both premature and at odds with EPA's overall approach for establishing BTA for impingement mortality. The Department's designation of a technological measure as BTA negates the regulatory expectation and paradigm established in the Section 316(b) Rule for impingement BTA requirements. 40 CFR 125.94(c) establishes a menu of compliance options that EPA has determined meet its BTA standard for impingement. 40 CFR 122.21(r)(6) entitled "*Chosen Method(s) of Compliance with Impingement Mortality Standard,*" provides that:

> "The owner or operator of the facility must identify the chosen compliance method for the entire facility; alternatively, the applicant must identify the chosen compliance method for each cooling water intake structure at its facility."

If PSEG were to move forward and install modified traveling screens, PSEG would be precluded from exercising its right under the Section 316(b) Rule to choose its preferred BTA option for the service water intake structure given that retrofitting the service water intake structure with modified traveling screens would be a costly and long-term investment. It is true that modified traveling screens are one of the potential proven compliance options as this type of system has been installed and successfully operated at PSEG-Salem's circulating water intake structure since the mid-1990s. In contrast, the success of this technology at the circulating water intake structure neither supports factually nor requires legally that PSEG elect this option when it submits its reports on the service water intake structure pursuant to 40 CFR 122.21(r). Based upon the challenges of designing and installing modified traveling screens at the service water intake structure, other compliance options at 40 CFR 125.94(c) may ultimately be considered for operational and technical reasons.

Additionally, the Department's interim proposal for impingement controls at the service water intake structure subverts the sequencing of BTA determinations at 40 CFR 125.94(b)(1). 40 CFR 125.94(b)(1), entitled "*Aligning compliance deadlines for impingement mortality and entrainment requirements*," provides that:

> "After issuance of a final permit that establishes the entrainment requirements under § 125.94(d), the owner or operator of an existing facility must comply with the impingement mortality standard in § 125.94(c) as soon as practicable. The Director may establish interim compliance milestones in the permit."

The Department has not yet made a final BTA determination for entrainment consistent with the requirements of 40 CFR 125.94(d), which requires state agencies, including the Department, to:

> "… establish BTA standards for entrainment for each intake on a site-specific basis. These standards must reflect the Director's determination of the maximum reduction in entrainment warranted after consideration of the relevant factors as specified in § 125.98."

In the Fact Sheet, the Department rightly requires PSEG to submit the information required under 40 CFR 122.21(r) to facilitate its making a site-specific BTA determination for entrainment in PSEG-Salem's next permit renewal. Any BTA determination involving a substantial and costly engineering, procurement, fabrication, and installation effort should clearly be delayed until after a final BTA determination for entrainment is made. EPA specifically established this sequencing to address concerns raised regarding the 2011 draft rule that proposed to require installation of BTA measures for impingement while facilities conducted studies necessary to support BTA determinations for entrainment. To address this concern, EPA states on page 48356 of the Preamble that EPA:

> "…revised the impingement mortality compliance requirements to provide that after issuance of a final permit establishing the entrainment requirements under § 125.94 (d), the owner or operator of an existing facility must comply with the impingement mortality standard in paragraph § 125.94(c) as soon as practicable. When the Director establishes a compliance schedule under § 125.94(d), the schedule must provide for compliance as soon as practicable. Thus, EPA has synchronized decision making about technology requirements, avoiding

> situations where investments in IM [impingement mortality] controls would later be rendered obsolete by entrainment control requirements."

The proposed interim BTA for the service water intake structure would improperly preclude PSEG from choosing a compliance method for the entire facility. 40 CFR 122.21(r)(6) specifically authorizes an applicant to designate BTA for impingement on a facility-wide basis, contrary to the Fact Sheet at pages 64 and 70. This is further confirmed by 40 CFR 125.94(c)(7), the "*Impingement Mortality Performance Standard,"* which establishes BTA on a facility-wide basis. 40 CFR 125.94(c)(7), provides, in pertinent part that:

> "A *facility* must achieve a 12-month impingement mortality performance standard of all life stages of fish and shellfish of no more than 24 percent mortality, including latent mortality, for all non-fragile species together…"

The Section 316(b) Rule does not say a cooling water intake structure must achieve this standard. Moreover, on page 48321 of the Preamble, EPA provided a summary description of the BTA Standard for Impingement Mortality and in discussing "performance standard (7)." EPA specifically provided that:

> "A facility must choose to demonstrate compliance with this requirement for the entire facility, or for each individual cooling water intake structure."

Coupled with the clear option that 40 CFR 122.21(r)(6) provides for applicants to designate BTA for individual cooling water intakes or for the "facility," PSEG should be allowed to select BTA on a facility-wide basis for PSEG-Salem, if it so chooses.

Response to PSEG Comment 2

The service water intake structure has six pumps for each unit and each service water service pump is rated at 10,875 gpm. While the Fact Sheet describes the service water intake structure as having an intake flow of 60.48 MGD, information provided in PSEG's comments as Attachment 1 – Table 1 demonstrates that more recent data demonstrates an estimated flow of 85 MGD as summarized in **PSEG Comment 3** below. Note that monitoring of the service water intake flow is required in the final permit as per Part III for DSN 486. While the service water intake structure operates with traveling screens, these screens do not have a Ristroph traveling screen design and there is no fish handling system or return. As a result, there is 100% impingement mortality at this structure. Because the service water system is chlorinated, there is likely 100% entrainment mortality as well. Regardless of whether the flow is 60.48 MGD or 85 MGD, the service water system is a non-contact cooling water system that utilizes an intake flow rate well above the eligibility threshold of 2 MGD. Therefore, the permittee is required to comply with one of the 40 CFR 122.21(r)(6) impingement compliance options for the service water system.

On pages 48302-48303 of the 2014 rule Preamble, EPA provides the following summary:

> "This rule includes a national performance standard as the BTA to address impingement mortality (IM) at existing CWIS [cooling water intake structure]. This national standard for impingement reflects EPA's assessment that impingement reduction technology is available, feasible and demonstrated, and thus BTA for existing facilities. The impingement mortality standard is based on modified traveling screens with fish returns and includes a performance

standard as one compliance alternative, but also offers six other compliance alternatives that are equivalent or better in performance…"

Because EPA has established a national performance standard to address impingement mortality, prescriptive alternatives are defined at 40 CFR 125.94(c) where existing facilities such as PSEG-Salem can select one of the following seven alternatives for meeting the BTA impingement standard:

1. Operate a closed-cycle recirculating system;
2. Operate a cooling water intake structure that has a maximum design through-screen velocity of 0.5 fps;
3. Operate a cooling water intake structure that has a maximum actual through-screen velocity of 0.5 fps;
4. Operate an existing offshore velocity cap that is a minimum of 800 feet offshore and has bar screens or otherwise excludes marine mammals, sea turtles, and other large aquatic organisms;
5. Operate a modified traveling screen system such as modified Ristroph screens with a fish handling and return system, dual flow screens with smooth mesh, or rotary screens with fish returns or vacuum returns that the Director determines is the BTA for impingement reduction;
6. Operate any combination of technologies management practices and operational measures that the Director determines is the BTA for reducing impingement; or
7. Achieve a 12-month performance standard of no more than 24% mortality including latent mortality for all non-fragile species.

40 CFR 125.98(b)(6) requires that "The Director must establish interim BTA requirements in the permit on a site-specific basis based on the Director's best professional judgment in accordance with § 125.90(b) and 40 CFR 401.14." In accordance with this authority to exercise BPJ the Department is proactively requiring compliance with one of the alternatives at 40 CFR 125.94(c) at the service water intake structure on or before EDP + 4 years. While this subject renewal permit action allows the permittee to install any of the options at 40 CFR 125.94(c), the Department maintains that modified traveling screens are a readily available and effective technology. Modified traveling screens have been proactively required at a number of other New Jersey facilities with cooling water intake structures where flow values are less than the intake flows at the PSEG-Salem service water intake structure, namely 85 MGD.

The Department acknowledges that the permittee can choose any of these seven options. It is reasonable to conclude that an offshore velocity cap (alternative 4) is not a viable technology for the service water intake structure given the safety related nature of the service water cooling system. While PSEG is speculating that the actual through-screen velocity at the service water intake structure could be less than 0.5 fps (alternative 3), the Department is unaware of data that demonstrates such. Nonetheless, PSEG could choose to follow alternative 3 to comply with this requirement.

Although the Department is requiring implementation of a compliance alternative by EDP + 4 years, it was not the Department's intent to mandate a particular requirement. While this is clear in some sections of the Fact Sheet, the Department recognizes that the interim BTA determination may not be clear in other areas where it is suggested that modified traveling screens and a fish return are the required component. To clarify the Department's intent and incorporate recent flow data, Fact Sheet language on page 64 is hereby modified for the purposes of the Administrative Record (additions shown with underline, deletions shown with strikethrough):

"For the **service water system**, the permittee operates traveling screens that do not have a modified traveling screen design and there is no fish handling system or return. Because the service water system is a non-contact cooling water system that is estimated at 85 MGD ~~uses 60.48 MGD~~, it is well above the eligibility threshold of 2 MGD. As a result, the permittee shall comply with 40 CFR 122.21(r)(6) for the service water system. The installation of modified traveling screens is one of the allowable options where ~~In addition,~~ the Department has repeatedly gone on record through its comments on EPA's rule making effort as well as through individual permit actions that modified traveling screens are a proven and effective technology to minimize impingement mortality that are readily available. Constant rotation and screen washes serve to reduce impingement mortality by assisting organisms into the fish return system, which should discharge below the tide level. Modified traveling screens are particularly effective in reducing impingement mortality for blue crab, a species which has one of the highest impingement rates. ~~Given the fact that modified traveling screens are a readily available technology and in~~ In consideration of the size of the service water flow, the Department is requiring that compliance with 40 CFR 125.94(c) ~~installation of modified traveling screens~~ be expedited. As a result, compliance with ~~installation of~~ one of the alternatives at 40 CFR 125.94(c) shall be completed by **EDP + 4 years**.

The Department is hereby designating compliance with 40 CFR 122.21(r)(6) and the installation of control measures as specified at 40 CFR 125.94(c) as **interim BTA for impingement mortality for the service water system**. ~~Most notably, modified traveling screens and a fish return or other allowable control measures under 40 CFR 125.95(c) shall be installed within **EDP + 4 years**~~."

Similarly, to clarify this issue, incorporate changes to the estimated flow, and to correct an error as described in more detail in **Response to PSEG Comment 8**, the Department is hereby incorporating the following changes to page 70 of the Fact Sheet:

"Modified traveling screens were not required in the 2001 NJPDES permit for the Service Water System. However, Part IV.G.2 has been included in this renewal permit which requires the permittee to comply with 40 CFR 125.94(c) ~~install modified traveling screens~~ at the service water system. The service water intake is considered eligible under the 2014 rule as per the definition of cooling water at 40 CFR 125.92(e). As described further under the Section 316(b) determination for the Service Water System, modified traveling screens (one of the allowable compliance alternatives) are proven, effective and readily available and the Department routinely requires the installation of modified traveling screens on many cooling water intakes including for CWIS that are far smaller than 85 MGD ~~60.48 MGD~~.

The permittee is required to evaluate allowable impingement compliance alternatives as per 40 CFR 125.94(c) ~~and install modified traveling screens~~ during this permit cycle which could include modified traveling screens. Specifically, the permittee shall evaluate available options in order to comply with 40 CFR 122.21(r)(6) by EDP + 3 ~~2~~ years. Installation of modified traveling screens or another allowable technology as per 40 CFR 125.94(c) shall be completed by **EDP + 4 years**."

With respect to the timing of the selection of the intended method of impingement compliance, EPA states at page 48358 of the final rule publication:

> "While EPA expects that many facilities will already comply with § 125.94(c), in some cases the facility will need to choose one of the compliance alternatives for IM [impingement mortality] in their subsequent permit cycle. In particular, EPA expects the facility would submit the information required in § 122.21(r), and the Director would make a determination of BTA for entrainment for that facility. Only after the Director has established site-specific BTA

> requirements for entrainment reduction will the facility have to select the compliance alternative on which it will rely to meet the IM requirements of today's rule. The Director may either amend the permit to include the IM requirements or include them in a subsequent permit if the Director determines the proposed controls are consistent with § 125.94(c). The Director would establish a schedule incorporating each of these sequential actions…."

The Department acknowledges that the Section 316(b) regulations state that an entrainment determination should be followed by an impingement determination. However, the Department maintains that the specific circumstances at PSEG-Salem require a proactive determination in accordance with BPJ regarding the service water intake structure. It is premature to ascertain if the Department will require the retrofit of a closed-cycle cooling system in a subsequent permit action given that the required studies from the relatively recent Section 316(b) Rule have not yet been prepared or submitted. However, in the event that the Department does require retrofit of a closed-cycle cooling system, it would take many years to install such a technology. In the interim, pursuant to its authority at 40 CFR 125.94(h), the Department is requiring that impingement mortality be addressed at the service water intake structure in accordance with the specified alternatives at 40 CFR 125.94(c).

PSEG Comment 3

The impingement mortality at the service water intake structure is already low as the service water intake structure has a through-screen velocity that approaches EPA's BTA standard of 0.5 fps (40 CFR 125.94(c)(2)) for a significant portion of each tidal cycle. PSEG has consistently included losses due to the service water intake structure operations in its estimates and discussions of impingement mortality for the Station, including in its January 2006 NJPDES permit renewal application. As the data indicates, the overall impingement mortality rate for PSEG-Salem, the circulating water intake structure and service water intake structure combined, is in conformance with EPA's numeric impingement mortality standard at 40 CFR 125.94(c)(7).

As demonstrated by data presented in Attachment 1 – Table 1 to the PSEG comments, the annual average intake flow for the service water intake structure for the last five years is 85 MGD as based on pump hours and rated pump capacity. The calculated flow data are conservative since the actual flow per pump will be less than the rated capacity due to the dynamic system head losses created by strainers and other system characteristics. The data demonstrate that AIF at the service water intake structure does not exceed the EPA criterion of 125 MGD for requiring additional studies. Additionally, the service water intake structure withdraws about four percent of the facility's total volume of water when compared to the circulating water intake structure. EPA has recognized that the numeric losses due to impingement and entrainment may be correlated or proportional to flow rates. Therefore, assuming other factors are equal, the numbers of organisms impinged at the service water intake structure would be no more than approximately four percent of the numbers of organisms impinged at the circulating water intake structure.

However, as EPA notes in the Preamble on page 48331, unlike entrainment rates "[i]mpingement rates are related to intake flow, intake velocity and the swimming ability of the fish subject to impingement." The service water intake structure has substantially lower approach and through-screen velocities in comparison to the circulating water intake structure, where these aspects were not considered in the prior, more simplistic numerical analyses of the service water intake structure. Based on historical data, the service water intake structure has approach and through-screen velocities less than 50% of those at the circulating water intake structure, under all assumed water surface elevations. Therefore, it is reasonable to assume that the service water intake structure impingement rate would be considerably lower, perhaps by as much as half, of the

previously provided impingement mortality (which was based on a straight linear relationship to flow only). The four percent estimate does not consider the fact that the intake velocity is below the 0.5 fps criterion for the compliance standard established by 40 CFR 125.94(c)(2) for a substantial portion of each tidal cycle, based on actual Station water surface elevation data from 2011 to 2015 to-date. EPA assumes that most if not all fish can avoid being impinged by a cooling water intake structure when the through-screen velocity is at or below 0.5 fps.

Response to PSEG Comment 3

The Department respectfully disagrees with PSEG's contention in this comment that the impingement mortality at the service water intake structure is already low. As described in **PSEG Comment 3**, there is no site-specific data available at the service water intake structure to support this contention since losses at the service water intake structure have historically been extrapolated from the circulating water intake structure using the service water intake structure flow. Additionally, EPA clearly intended for intake structures of this size to be considered as part of the rule. As described on page 48309:

> "Raising the applicability threshold to 50 mgd would have meant that 476 facilities, almost half of the 1,065 facilities subject to the national standards set by today's rule, would not be subject to the rule. Ignoring so many facilities when setting national standards fails to apply the common sense approaches set forth in this rule for minimizing adverse environmental impacts from cooling water intake structures..."

In other words, while EPA considered not addressing facilities with intake structures of less than 50 MGD, EPA did finalize the rule with a cooling water intake structure threshold of greater than 2 MGD as opposed to 50 MGD. The service water intake structure at PSEG-Salem is estimated to have a flow of approximately 85 MGD which is 70% greater than the flow category of less than 50 MGD as considered in the rule.

While the permittee asserts that the through-screen velocity at the service water intake structure may be less than 0.5 fps, it is the Department's understanding that there is no physical data to support this contention at this time. Similarly, while PSEG speculates that impingement rates may be lower at the service water intake structure as compared to the circulating water intake structure, there is no actual impingement data to support this assertion.

Finally, the Department disagrees that the entrainment studies at 40 CFR 122.21(r) that apply to facilities with an AIF of greater than 125 MGD would not apply to the service water intake structure as described in **PSEG Comment 14**. 40 CFR 122.21(r)(1)(ii)(B) makes clear that the AIF is measured at a facility level, not by individual CWIS. See also 40 CFR 125.92(a). Therefore, the Department expects that the service water intake structure entrainment losses will be addressed as part of 40 CFR 122.21(r) as specified in Part IV.G.8.

PSEG Comment 4

The Department must follow EPA's BPJ BTA guidance when making interim determinations where 40 CFR 125.98(b)(6) states:

> "…The Director must establish interim BTA requirements in the permit on a site-specific basis, based on the Director's best professional judgment in accordance with § 125.90(b) and 40 CFR 401.14."

Subsection 125.90(b) reiterates the requirement for a site-specific approach consistent with EPA's regulations and 40 CFR 401.14 repeats the statutory language of Section 316(b). Site-specific BPJ BTA determinations have consistently been made by EPA and state permitting agencies, including the Department, following EPA's 1977 guidance for making such determinations. This is the guidance EPA identified as applicable upon the suspension of the 2004 Phase II Rule and is referred to extensively throughout the Preamble in connection with site-specific BTA determinations. In making Section 316(b) BPJ BTA determinations, the Department has consistently applied EPA's 1977 guidance, which requires an evaluation of the effects of the intake on aquatic organisms, the feasibility of the technology, and other adverse environmental effects associated with the installation of the technology. In addition, the Department has also consistently weighed costs and benefits, as was first deemed appropriate with the "wholly disproportionate to the costs" test in 1977 and as was upheld by the United States Supreme Court in 2009.

The Fact Sheet notes that modified traveling screens are an available technology and references its successful operation at PSEG-Salem. It does not present any assessment of the impingement mortality specifically associated with the service water intake structure or the technological feasibility of modified traveling screens for the service water intake structure. Assuming that modified traveling screens could be installed and operated at the service water intake structure, PSEG believes that if such an analysis were completed, it would demonstrate that the costs for the modified traveling screens would be wholly disproportionate to the benefits. In this instance, it appears that the Department has deviated from its administrative precedent in prior Section 316(b) determinations for PSEG-Salem of balancing these factors and providing its rationale in the Fact Sheet.

Response to PSEG Comment 4

With respect to the contention that the Department did not follow the 1977 EPA guidance document, the Department does not agree that this guidance is still applicable given that Section 316(b) standards for impingement mortality reduction are now effective. By way of background, 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) Public Law 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 BTA for minimizing adverse environmental impact but does not describe a formal cost-benefit analysis.

The concept of permitting agencies considering the relationship of costs and benefits in Section 316(b) decision making originated from relevant case law as described in **Response 19**. EPA has interpreted the BTA standard to require use of the BTA commercially available at an economically practicable cost. A cooling water intake structure technology is not BTA if its costs are "wholly disproportionate" to its environmental benefits. *In re Pub. Serv. Co. of New Hampshire*, 1 E.A.D. 332, 340 (EPA Final Decision, June 10, 1977). EPA issued final regulations under Section 316(b) for Phase II existing facilities (such as PSEG-Salem) which became effective September 7, 2004. As described at length on pages 11 to 12 of the draft permit Fact Sheet, the Phase II Rule was challenged by environmental plaintiffs and was overturned in part by the Second Circuit in *Riverkeeper, Inc. v. EPA*, 475 F.3d 83 (2d Cir. 2007). The Second Circuit held that EPA could not consider costs to establish BTA and directed EPA to reconsider key provisions of the rules. The Second Circuit decision was appealed to the Supreme Court, which agreed to consider "whether 316(b) of the Clean Water Act, 33 United States Code (U.S.C.) 1326(b), authorizes the EPA to compare costs with benefits when determining the 'best technology available for minimizing adverse environmental impacts' at cooling water intake structures?" *Entergy Corp. v. EPA*, 552 U.S. 1309 (2008). In 2009 the Supreme Court reversed and remanded the case, holding that EPA may use cost-benefit analysis in

determining BTA. *Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208 (2009) (finding the "wholly disproportionate" test consistent with EPA's discretion under Section 316(b) to "avoid extreme disparities between costs and benefits" when determining BTA). On remand the Second Circuit granted EPA's request to return the rules to the Agency for further consideration. *Riverkeeper, Inc. v. EPA*, No. 04-6692 (2d. Cir. Sept. 29, 2009) (order remanding to EPA). After several delays, EPA published final regulations in the Federal Register on August 15, 2014 to become effective October 14, 2015. In summary, the Department maintains that the Section 316(b) rules set a new playing field with respect to costs and benefits and permitting agencies no longer have to rely on the wholly disproportionate standard. Rather, costs and benefits of a particular technology were evaluated in the development of the Section 316(b) regulations.

Additionally, as clarified in **Response to PSEG Comment 2**, the Department is not mandating the installation of modified traveling screens and a fish return system, rather the permittee can choose an allowable compliance option as per 40 CFR 125.94(c). Therefore, the permittee will have the opportunity to assess impingement mortality associated with the service water intake structure as well as the technological feasibility of modified traveling screens.

PSEG Comment 5

The installation of any technology for impingement reduction at the service water intake structure would be an extremely complicated and challenging project. Because the service water intake structure provides cooling water or "service water" to safety-related equipment at the Station, the design and operation of the service water system is subject to the jurisdiction of the USNRC. There are specific operational requirements included in PSEG-Salem's Technical Specifications, which are in essence the conditions of the USNRC-approved Operating License for PSEG-Salem. The Technical Specification conditions and requirements for the service water system are extremely complex, and describe interactions with other nuclear safety systems as well. Because the service water intake structure is part of a safety-related system, a very explicit series of USNRC-mandated engineering technical evaluations and reviews would be required prior to installing new equipment.

USNRC's design criterion and the technical specifications impose requirements and processes that are based upon the specific safety systems that are cooled by the service water intake structure. For example, the service water intake structure must remain operable under extreme environmental conditions, including high water (severe flooding events) and low water emergencies. The service water intake structure building must remain waterproof to the design basis flood event elevation of approximately 22 feet above site grade, including wave action. Any proposed modifications must be reviewed to assure that they would not compromise these requirements. The Technical Specifications also require certain portions of the service water intake structure to be "operable" which would make any effort to retrofit the service water intake structure more complicated and would result in a more protracted construction schedule due to the required sequencing of work. PSEG-Salem operates with four service water cooling loops (two per Unit); each loop consists of an intake bay equipped with three traveling screens and three service water pumps. When PSEG-Salem is in service and producing energy, both independent service water loops for each unit must remain in service, or a Technical Specification Limiting Condition requiring the Station to be shut down within a prescribed timeframe would be triggered. Additionally, there are specific requirements for service water system pump operability and further requirements for the source and availability of emergency power for the operable pumps.

The Technical Specifications and their implementing procedures require that a service water intake structure pump be considered inoperable if its traveling screen is out of service. To illustrate the scheduling and

implementation complexity, a component of the service water system Technical Specification requirements is provided as an attachment to the PSEG comments where this attachment comprises just two of the 36 page operability requirements portion of the 147 page operating procedure for the service water system. Because the service water system remains in service during outages, the operating procedures contain specific "cooled" system and piping configurations (for which the service water system must be operable and available) including ventilation systems, component cooling systems, containment fan coil cooling, various containment isolation valves, emergency diesel generator coolers, etc. The service water system is analyzed as part of the various design basis accident scenarios as well. An individual service water system loop may be taken out of service for a short period of time during an outage in order to perform maintenance on components associated with that loop so any required screen modifications would need to be performed during these limited windows of time. Moreover, the engineering design process would be more complicated and costly because of the host of additional factors would have to be addressed to comply with USNRC standards. This includes the ability of certain equipment that is part of the service water system and service water intake structure to withstand specific operating and design basis earthquakes, physical and/or environmental challenges, such as grassing, floating debris, and biological influences.

There are specific nuclear-safety engineering criteria that would impact the design of any modifications to the service water intake structure at the Station. As noted above, the Technical Specifications place stringent requirements on the number of service water intake structure pumps in service. The existing traveling screens are designed to withstand earthquake forces, and the screen motors are powered from the Station's emergency power system. Other engineering factors and design data that would have to be evaluated during the design phase for modified traveling screens include screen wash water supply pressure and volumes; hardware mounting for pipe, equipment and electrical conduits that are appropriate for a safety related structure; adequate electric supply for screen motors and spray wash pumps; structures or mounting locations for electrical equipment instruments, and controls; and routing of electrical and control wiring from the new equipment to the Station Control Rooms. Finally, one other consideration that cannot be determined until specific equipment and design details are established is whether USNRC's prior review and approval would be required for the potential modifications.

In summary, retrofitting the service water intake structure would entail a far more complicated process than it appears the Department anticipated in proposing this requirement. PSEG respectfully requests that the Department reconsider this proposed requirement in light of the detailed planning, and additional design and engineering considerations that the modification at the nuclear-safety related service water intake structure would require.

Response to PSEG Comment 5

As clarified in **Response to PSEG Comment 2**, the Department is not mandating the installation of modified traveling screens and a fish return system, rather the permittee can choose an allowable compliance option as per 40 CFR 125.94(c). The Department acknowledges that the schedule to install a compliance alternative could be influenced by USNRC requirements. The Department also acknowledges that the Section 316(b) regulations speak to the unique issues associated with nuclear facilities at 40 CFR 125.94(f):

> "(f) *Nuclear facilities.* If the owner or operator of a nuclear facility demonstrates to the Director, upon the Director's consultation with the Nuclear Regulatory Commission, the Department of Energy, or the Naval Nuclear Propulsion Program, that compliance with this subpart would result in a conflict with a safety requirement established by the Commission, the Department, or the Program, the Director must make a site-specific determination of best technology available for

minimizing adverse environmental impact that would not result in a conflict with the Commission's, the Department's, or the Program's safety requirement."

The Department anticipates that these factors will be considered by PSEG in the context of choosing a compliance alternative under 40 CFR 125.94(c). Please refer to **Response to PSEG Comment 9** for specific permit language regarding Part IV.G.2.b.iii. that is related to this issue.

PSEG Comment 6

The overall timeline and installation schedule for the service water intake structure as proposed in the draft permit could not be met. The USNRC Technical Specifications and other engineering considerations would make any retrofit of the service water intake structure far more complicated and costly than what would be necessary for a non-safety related system, such as the circulating water intake structure. It therefore, would far exceed both the scope and duration of what PSEG was required to do for the installation of the modified traveling screens at the PSEG-Salem circulating water intake structure in the 1994 to 1995 timeframe. Since construction scheduling and sequencing will be driven by USNRC operability requirements imposed through the Station Technical Specifications, the schedule to retrofit the service water intake structure with a modified traveling screen could not be accomplished on the highly aggressive schedule as included in the previously issued 1994 NJPDES permit. From the initiation and approval of an intake modification for the service water intake structure, well over seven years would be necessary just to complete the installation of modified traveling screen modifications. This duration does not include all of the upfront engineering design, permitting, procurement, and fabrication activities that would precede installation.

Conceptual engineering and planning activities would first determine the appropriate technology and then allow PSEG to develop the detailed schedule for implementation. After submitting its 40 CFR 122.21(r)(6) report to the Department, PSEG would initiate the detailed engineering and planning effort. PSEG estimates that it would take from 24 to 30 months to complete the design and outage planning, and obtain the necessary technical and regulatory approvals if the technology chosen would trigger regulatory review. PSEG estimates that non-USNRC regulatory permitting for any modifications could take approximately nine to fifteen months after submittal of applications. It is expected that PSEG would be required to obtain permits and/or approvals from other agencies and/or divisions within the Department to retrofit the service water intake structure to operate with a fish return system as well as a requirement for an additional electric structure in the proximity to the service water intake structure. While PSEG would attempt to undertake the permitting process in parallel with the detailed engineering, the success of such a strategy cannot be guaranteed. As indicated by PSEG's experience with implementing requirements in prior PSEG-Salem permits, the fact that a construction project is required by a NJPDES permit does not guarantee an expedited permitting process within other parts of the Department or with other regulatory agencies. The in-water scope associated with either screen foundations or footings/piers for the fish return system would likely require a United States Army Corps of Engineers Section 10 or Nationwide permit; a Department Waterfront Development and Coastal Area Facility Review Act permit; and a DRBC docket modification. There is also the potential for a review of the anticipated design by the USNRC. Local building, zoning and/or planning approvals may be necessary. Over and above the standard building permits required for land use, certain plumbing and electrical work, the final design may require Lower Alloways Creek Township Zoning and/or Planning Board approval.

Installation of the modified traveling screens may require certain service water system loops to be out of service with specific Station Technical Specification requirements and allowable durations for taking these components out of service. Planning for an outage at a nuclear facility is initiated multiple years in advance

and continues up to the initiation of the outage. There are certain pre-outage milestones and deadlines that are required to ensure that all operational and maintenance activities can be safely and efficiently performed, with specific sequencing requirements. Because the installation of a large service water intake structure modification during an outage would require that all planning, procurement, parts and equipment delivery and staging, installation procedures, plans and sequencing, post-installation testing plans, and installation contingency planning be completed approximately six months prior to the initiation of the outage, all engineering, procurement and other activities, including any regulatory permits or authorizations, would have to be in hand six months prior to the start of the outage.

As such, the installation of any modifications would require multiple outages. The Station maintenance and refueling outages are nominally scheduled every 18 months over a 3 to 4 week window. At this time, the best estimate is that the installation of the modified traveling screens would require up to four outages per unit to ensure compliance with the USNRC Technical Specifications for ultimate heat sink availability. The total installation duration would therefore be approximately 60 months for the first unit with an additional 6 to 12 months for the second unit (depending on specific outage scheduling and sequencing) for a total of 66 to 72 months.

In sum, the time it would take to have the modified traveling screens operational at the service water intake structure for both PSEG-Salem units is currently believed to range, at a minimum, from 90 to 102 months after Department approval (24 to 30 months for design and outage planning, and 66 to 72 months for four installation outages at each unit). This time frame is well beyond that which is contemplated by the draft permit.

Response to PSEG Comment 6

Please refer to **Response to PSEG Comment 5** and **Response to PSEG Comment 9**. At this time no modification of the compliance milestones will be made in the final permit. As PSEG may elect to pursue alternative impingement controls under 125.94(c), the Department will not at this time revise the compliance schedule to reflect the timeframe for implementation of modified traveling screens. If, after PSEG completes the options evaluation study required by Part IV.G.2.b.i by EDP + 3 years and elects to install traveling screens to comply with 125.94(c), PSEG may apply for a modification of the deadline at Part IV.G.2.b.iii in consideration of the factors described in this comment.

PSEG Comment 7

The draft permit proposes the posting of signs in each of the two intake bays to describe the basic function of the traveling screens and how they reduce impingement mortality. However, PSEG believes that the use of the term “intake bays” was intended to be related to the Unit 1 and Unit 2 circulating water intake structure. PSEG proposes that the language in the current Part IV.G.2.a.ii be replaced with a reference to the circulating water intake structure rather than intake bays.

Response to PSEG Comment 7

The Department agrees that the sign requirement within the circulating water system section of Part IV.G.2.a was intended for the circulating water intake structure and inclusion of the term “intake bays” is not accurate. The Department has modified this language as follows:

"ii. The permittee shall post signs ~~a sign in each of the two intake bays~~ in two commonly accessed locations in the Circulating Water Intake Structure to describe the basic function of the traveling screens and how ~~they~~ the screens reduce impingement mortality."

This change affects Part IV.G.2.a.ii of the final permit.

PSEG Comment 8

Part IV.G.2.b.i proposes to require PSEG to submit a study in compliance with 40 CFR 122.21(r)(6) on or before EDP + 2 years. The Fact Sheet (Section 10.D.3) and Part IV.G.7.d indicates a more appropriate deadline of EDP + 3 years; therefore, PSEG respectfully requests that the Department amend Part IV.G.2.b.i.

In accordance with 40 CFR 122.21(r)(6), PSEG must identify the chosen compliance method for the entire facility; or alternatively, identify the chosen compliance method for each cooling water intake structure at PSEG-Salem. The Department has proposed to require PSEG to choose a compliance method and document that choice in the next permit renewal application, which would typically be submitted 54 months from the EDP. The selection of a compliance method for the service water intake structure within three years after the EDP cannot be predicated on completion of an impingement technology performance optimization study. Even if PSEG were to choose the compliance option provided at 40 CFR 125.94(c)(5), it would not be possible to install the technology at the service water intake structure and complete two years of biological data collection. Conduct of any required impingement technology performance optimization study would need to be delayed until after installation of the selected technology, as EPA clearly intended in the Section 316(b) Rule.

Response to PSEG Comment 8

Part IV.G.2.b.i concerns a requirement to evaluate options to address impingement at the service water system where a deadline of EDP + 2 years is specified. However, the commenter is correct in that both the Fact Sheet reference to this same study and Part IV.G.7.d references EDP + 3 years. An excerpt of the Fact Sheet reference is as follows which also incorporates the changes described in **Response to PSEG Comment 2**:

"For the **service water system**, the permittee operates traveling screens that do not have a modified traveling screen design and there is no fish handling system or return. Because the service water system is a non-contact cooling water system that is estimated at 85 MGD ~~uses 60.48 MGD~~, it is well above the eligibility threshold of 2 MGD. As a result, the permittee shall comply with 40 CFR 122.21(r)(6) for the service water system. The installation of modified traveling screens is one of the allowable options where ~~In addition,~~ the Department has repeatedly gone on record through its comments on EPA's rule making effort as well as through individual permit actions that modified traveling screens are a proven and effective technology to minimize impingement mortality that are readily available. Constant rotation and screen washes serve to reduce impingement mortality by assisting organisms into the fish return system, which should discharge below the tide level. Modified traveling screens are particularly effective in reducing impingement mortality for blue crab, a species which has one of the highest impingement rates. ~~Given the fact that modified traveling screens are a readily available technology and in~~ In consideration of the size of the service water flow, the Department is requiring that compliance with 40 CFR 125.94(c) ~~installation of modified traveling screens~~ be expedited. As a result, compliance with ~~installation of~~ one of the alternatives at 40 CFR 125.94(c) shall be completed by **EDP + 4 years**.

Part IV.G.7.d is stated as follows:

"d. Chosen method(s) of compliance with impingement mortality standard for the service water system (40 CFR 122.21(r)(6) – The permittee shall submit a determination for the service water system within EDP + 3 years along with any study components that are required based on the chosen option…"

Given that the Department's intent was to specify a deadline of EDP + 3 years, Part IV.G.2.b.i is hereby modified in the final permit as follows:

"i. The permittee shall comply with 40 CFR 122.21(r)(6) to evaluate options to address impingement at the service water system. A study shall be submitted by EDP + 3 ~~2~~ years as described in Part IV.G.7.d."

This change affects Part IV.G.2.b.i of the final permit. Please refer to **Response to PSEG Comment 13** for the Department's response to PSEG's objections to completing an impingement technology performance optimization study within EDP + 3 years.

PSEG Comment 9

If PSEG were to choose a compliance option for the service water intake structure that would require the installation of equipment or modifications to the intake structure for this system, it would not be possible to complete those modifications within EDP + 4 years. The design and implementation of modifications to the service water intake structure would be complicated as described at length in **PSEG Comment 6**.

In the event that the Department rejects PSEG's position that it has the right to select BTA for the service water intake structure, Part IV.G.2.b.ii should be amended to require PSEG to develop a schedule that would comply with the specific requirements applicable to the service water intake structure for the Department's review and approval. PSEG would propose to provide such an implementation schedule in conjunction with selection of the compliance alternative required by Part IV.G.2.b.i., as proposed for EDP + 3 years.

Response to PSEG Comment 9

As described in **Response to PSEG Comment 2**, the Department maintains that requiring the permittee to choose an allowable compliance option under 40 CFR 125.94(c) in a proactive manner is appropriate. However, the Department acknowledges that there is the possibility of complications to a potential installation schedule based on USNRC related procedures and protocols as acknowledged in 40 CFR 125.94(f). As such, the Department has slightly modified Part IV.G.2.b.iii as follows:

"iii. The permittee shall comply with 40 CFR 125.94(c) and implement ~~install~~ the chosen technology by EDP + 4 years. In the event that this installation schedule cannot be adhered to due to issues relating to United States Nuclear Regulatory Commission (USNRC) procedure and protocol, the Department can extend the schedule via a subsequent permit action provided documentation from the USNRC is provided."

This change affects Part IV.G.2.b.iii of the final permit. Please see **Response to PSEG Comment 6** concerning an application for a permit modification as necessary to reflect a practicable compliance schedule

after PSEG determines which impingement control measure(s) will be implemented for the service water intake structure.

PSEG Comment 10

The Department should clarify that the list of fragile species applicable to the service water intake structure is likely different than for the circulating water intake structure and cannot be provided within EDP + 6 months. The through-screen velocity at the service water intake structure is at or below 0.5 fps for a substantial portion of each tidal cycle and, because of this low intake velocity, the list of impinged organisms is different. PSEG would be unable to definitively identify these species without additional impingement sampling conducted at the service water intake structure and this logistically could not occur within EDP + 6 months. In addition, an appropriate study would require that data be collected over at least a 12 month period; where an additional three months would be required to analyze the data and prepare a report.

As discussed in **PSEG Comment 8**, PSEG cannot select an impingement mortality alternative for the service water system until EDP + 3 years. If PSEG were to select the alternative specified at 40 CFR 125.94(c)(5), PSEG would conduct an impingement technology performance optimization study after installation of the technology that could also be used to identify fragile species for the service water intake structure. PSEG respectfully requests that Part IV.G.7.b.ii. be modified to allow submittal of the list of fragile species applicable to the service water intake structure at the same time as selection of the impingement mortality alternative discussed in Part IV.G.2.b. (i.e., EDP + 3 years).

Response to PSEG Comment 10

40 CFR Part 125.92(m) defines fragile species as follows:

> "(m) *Fragile species* means those species of fish and shellfish that are least likely to survive any form of impingement. For purposes of this subpart, *fragile species* are defined as those with an impingement survival rate of less than 30 percent, including but not limited to alewife, American shad, Atlantic herring, Atlantic long-finned squid, Atlantic menhaden, bay anchovy, blueback herring, bluefish, butterfish, gizzard shad, grey snapper, hickory shad, menhaden, rainbow smelt, round herring, and silver anchovy."

Given the above regulatory definition, the Department agrees that the collection of site-specific data is appropriate given that fragile species are defined as those with an impingement survival rate of less than 30 percent. While there is readily available data for the circulating water intake structure with respect to fragile species, the Department agrees that the conditions at the service water intake structure are different and that the affected species may differ. Finally, the Department agrees that the collection of site-specific data is conducive to the implementation of a more appropriate technology.

Based on the above, the Department hereby modifies Part IV.G.2.b by adding item "ii" and renumbering item "iii":

> "b. Service Water System.

i. The permittee shall comply with 40 CFR 122.21(r)(6) to evaluate options to address impingement at the service water system. A study shall be submitted by EDP + 3 ~~2~~ years as described in Part IV.G.7.d.

ii. The permittee shall submit a listing of fragile and non-fragile species to the Department by EDP + 3 years. Fragile species are defined at 40 CFR 125.92(m).

iii. The permittee shall comply with 40 CFR 125.94(c) and install the chosen technology by EDP + 4 years..."

This change affects Part IV.G.2.b.i through iii of the final permit.

PSEG Comment 11

PSEG has been conducting testing of a MultiDisc™ Rotary Screen at the circulating water intake structure where one rotary screen is operating in intake bay 13A at the circulating water intake structure. Section 316(b) regulations at 40 CFR 125.92(s) define modified traveling screens that may be used to satisfy the Section 316(b) regulations for minimizing impingement mortality at 40 CFR 125.94(c)(5) and specifically reference rotary screens with a fish return system as an acceptable modified traveling screen so it is therefore an approved compliance option. In accordance with proposed permit condition Part IV.G.7.c and 40 CFR 122.21(r)(6), PSEG will be submitting a determination regarding the chosen method of compliance with the impingement mortality standard within EDP + 3 years for the circulating water intake structure and the service water intake structure. In the interim, and as stated in Part IV.G.2.a.i., PSEG is required to ensure proper operation and maintenance of the currently installed modified traveling screens.

PSEG respectfully requests that the Department acknowledge that the interim BTA determination for impingement mortality for the circulating water intake structure authorizes the continued operation of the one MultiDisc™ Rotary Screen, as long as it remains in place, as well as 11 (or 12) modified Ristroph traveling screens, until an alternative method of compliance with the impingement mortality standard is approved by the Department.

Response to PSEG Comment 11

The Department included a detailed description of the MultiDisc™ Rotary Screen in the Fact Sheet on page 20, and described items in the Contents of the Administrative Record that relate to the installation of the MultiDisc™ Rotary Screen. Therefore, the Department maintains that the Administrative Record is clear in that the Department is aware that the MultiDisc™ Rotary Screen is part of the current intake screens at the circulating water intake structure.

The Department agrees that the interim BTA determination simply says "modified Ristroph traveling screens" and does not specify that one of the screens is a MultiDisc™ Rotary Screen. The Department hereby modifies the Fact Sheet language on page 64 for the purposes of the Administrative Record:

"In consideration of the available information, the Department is hereby designating the use of the existing modified Ristroph traveling screens with a fish handling system as well as the MultiDisc™ Rotary Screen with a fish handling system as **interim BTA for impingement mortality for the circulating water system** until such time as a final impingement and entrainment determination is made based on submission and review of the required study components at 40 CFR 122.21(r)(2)

through (r)(13). Selection of this technology as interim BTA is consistent with the Department's BPJ and is conditional on the proper operation and maintenance of such screens and fish return system."

PSEG Comment 12

The studies required in the 2001 NJPDES permit Part IV.G.2.b and G.9 have already demonstrated that the operation of the circulating water intake structure has been optimized to minimize impingement mortality. Specifically, PSEG conducted comprehensive studies to determine ways to minimize the stresses and mortalities associated with the current modified Ristroph traveling screens and fish return system at the circulating water intake structure. There have been no substantive changes to the circulating water intake structure since PSEG conducted these studies and, as documented in the comprehensive report submitted by PSEG in December 2002, the current intake systems have been optimized to minimize mortality.

PSEG respectfully requests that the Department delete Part IV.G.7.c.i and acknowledge in its Response to Comments that PSEG has satisfied the 40 CFR 122.21(r)(6)(i) requirement for conduct of an impingement technology performance optimization study for the circulating water intake structure.

Response to PSEG Comment 12

Part IV.G.7.c.i of the 2015 draft NJPDES permit is stated as follows:

"i. The impingement technology performance optimization study must include at least two years of biological data collection measuring the reduction in impingement mortality achieved by the modified traveling screens as defined at 40 CFR 125.92(s) and demonstrating that the operation has been optimized to minimize impingement mortality. A description of any biological data collection and data collection approach used in measuring impingement mortality must be included. This shall also include the percent impingement mortality reflecting optimized operation of the modified traveling screen and all supporting calculations."

Part IV.G.2.b.i from the 2001 NJPDES permit states in part:

"…the permittee shall submit a proposed Work Plan for a study to determine ways to minimize the stresses and mortalities found associated with the fish return sluice and sampling pool which shall consider alternate flows, velocities, and depth profiles as part of this Work Plan. This Work Plan shall also consider an evaluation of fish mortality of the fish return system independent from the Ristroph screens to determine mortality rates as fish re-enter the estuary. Emphasis should be placed on reducing potential mortality of susceptible species."

The Department agrees that information submitted to comply with Part IV.G.2.b.i from the 2001 NJPDES permit may be relevant to the current requirement at Part IV.G.7.c.i. The studies submitted (entitled Custom Requirement G.2.b.ii Fish Return System Evaluations, dated December 2002, as prepared by ALDEN Research Laboratory, Inc.) were comprehensive and looked at all potential sources of impingement mortality including screen wash pressures, fish collection systems, fish return systems, impingement sampling methodologies, and screen wash discharge configurations. This included a comprehensive literature review of potential stressors in the fish return/collection systems. This also included an identification of the types and magnitude of stressors found to be injurious to fish where stressors include shear, abrasion, turbulence, and impact. The literature values were then compared to Computational Fluid Dynamics (CFD) models of the PSEG-Salem fish return system.

Subsequent to the CFD analysis, pilot-scale models of both the end-of-pipe discharge and the fish collection pool were constructed at an offsite laboratory. These facilities were used to evaluate the latent mortality of live fish (alewife and weakfish) under conditions similar to those that exist at the Station. The test facility results for the fish collection pool were subsequently verified by conducting on-site testing of the existing fish collection pool at the PSEG-Salem Station using live fish. Alewives were introduced to the collection pool under both high and low flow conditions. Additionally, PSEG conducted analyses of traveling screen spray wash pressures to determine if the wash pressures were contributors to mortality of fish returned to the river. A fully functioning pilot-scale traveling screen was constructed in a laboratory flume and live fish were introduced to this screen under varying spray wash pressures.

The permittee is required to include a separate submission in response to Part IV.G.7.c.i which, under 40 CFR 125.98(e), can include information from the study referenced above with a discussion as to why this information is still relevant. This submission may also include ongoing impingement data as well as data from studies previously submitted for other purposes, such as the biological data collection and assessments of latent impingement mortality. The Department does not agree that it can eliminate Part IV.G.7.c.i as it is a component of the Section 316(b) regulations at 40 CFR Part 122.21(r)(6)(i).

In summary, the Department agrees that Part IV.G.9 was a component of the 2001 NJPDES permit where compliance with this permit condition resulted in submission of studies concerning the Hydrodynamics at the Intake of the Station as well as a Study of Enhancements to Entrainment and Impingement Sampling. Information garnered in this study may also be relevant and may be re-submitted for consideration consistent with 40 CFR 125.98(e) where the permittee can include information from these studies along with a discussion as to why the information is still relevant.

PSEG Comment 13

The Department should provide an acceptable schedule for the conduct of any required impingement technology performance optimization studies. Part IV.G.7.d would require selection of a compliance method for the service water intake structure within EDP + 3 years. The selection of a compliance method cannot be predicated on completion of an impingement technology performance optimization study. Even if PSEG had already chosen the compliance option provided at 40 CFR 125.94(c)(5), it would not be possible to install the technology at the service water intake structure and complete two years of biological data collection within EDP + 3 years. Conduct of any required impingement technology performance optimization study would need to be delayed until after installation of the selected technology. This is consistent with EPA's intent as indicated on page 48321 in the Preamble to the Section 316(b) Rule, which states with respect to compliance standard (5):

> "… if the facility does not already have this technology installed and chooses this option, the Director may postpone this study [until] the screens are installed …."

PSEG appreciates that the Department is willing to consider a proposal for use of circulating water intake structure data as a substitute for service water intake structure intake impingement data. PSEG has used this conservative approach in prior permit applications. However, demonstrating compliance with EPA's Section 316(b) Rule for the service water intake structure may require additional sampling.

PSEG respectfully requests that the Department modify Part IV.G.7.d.i to indicate that conduct of any required impingement technology performance optimization studies would follow the selection and, if

required, installation of an impingement mortality alternative; and would be in accordance with a schedule proposed by the permittee and approved by the Department.

Response to PSEG Comment 13

While the Department agrees that it is mandating selection of an impingement mortality alternative by EDP + 3 years, the Department does not intend for the optimization study to be submitted by EDP + 3 years. Collection of data would occur after the installation of the alternative in accordance with a schedule mutually agreeable to the permittee and the Department. It is anticipated that the details of the impingement technology performance study will be clarified once the permittee chooses an alternative. In other words, the Department agrees that it is not feasible to require collection of data for an optimization study prior to any selected alternative being installed.

To clarify this issue, Part IV.G.7.d and Part IV.G.7.d.i are modified as follows:

"d. Chosen method(s) of compliance with impingement mortality standard for the service water system (40 CFR 122.21(r)(6) – The permittee shall submit a determination for the service water system within EDP + 3 years along with the identification of any study components that are required based on the chosen option and a proposed time schedule. If 40 CFR 125.94 (c)(5) or (6) is chosen, an impingement technology performance optimization study shall also be submitted as follows:.

i. The impingement technology performance optimization study must include at least two years of biological data collection measuring the reduction in impingement mortality achieved by the modified traveling screens as defined at 40 CFR 125.92(s) and demonstrating that the operation has been optimized to minimize impingement mortality. A description of any biological data collection and data collection approach used in measuring impingement mortality must be included. The Department would consider a proposal to utilize data from the circulating water system for the service water system."

PSEG Comment 14

As PSEG-Salem's total cooling water flow is greater than 125 MGD, PSEG fully anticipates submitting reports providing all of the information required under 40 CFR 122.21(r)(9) through (12) and further anticipates complying with the requirements for a peer review at 40 CFR 122.21(r)(13) for the cooling water intake structure and service water intake structure, combined. Since the circulating water intake structure accounts for 96% of the cooling water withdrawn for PSEG-Salem; PSEG has consistently scaled the entrainment data collected at the circulating water intake structure to account for the entrainment due to the additional 4% of flow associated with the service water intake structure. PSEG anticipates using this approach again since Part IV.G.6.c authorizes PSEG to continue to follow its past practice in estimating entrainment losses at the service water intake structure.

PSEG is interpreting the requirement in Part IV.G.7.g, which proposes to require that PSEG submit an Entrainment Characterization Study for both the circulating water intake structure and the service water intake structure in light of Part IV.G.6. If PSEG is not required to conduct entrainment monitoring at the service water intake structure, the Entrainment Characterization Study must, therefore, follow the same analytical approach.

Likewise, PSEG interprets Part IV.G.8 in light of the Section 316(b) Rule and Part IV.G.6 and G.7. EPA's 2014 Section 316(b) Rule clearly establishes that state agencies, such as the Department, determine BTA for entrainment on a facility-wide basis. 40 CFR 125.98(f), entitled "*Site-specific entrainment requirements,*" provides that:

> "The Director must establish site-specific requirements for entrainment after reviewing the information submitted under 40 CFR 122.21(r) and § 125.95. These entrainment requirements must reflect the Director's determination of the maximum reduction in entrainment warranted after consideration of factors relevant for determining the best technology available for minimizing adverse environmental impact at each facility."

Similarly, PSEG fully intends to submit the information required under 40 CFR 122.21(r)(10) through (12) by completing the analyses for the circulating water intake structure since Part IV.G.8 does not distinguish between the circulating water intake structure or the service water intake structure. Where the Department required an evaluation for the service water intake structure separate and apart from any evaluation for the circulating water intake structure, the Department proposed language making that clear. PSEG respectfully requests that the Department confirm PSEG's interpretation that separate evaluations for the circulating water intake structure and service water intake structure under 40 CFR 122.21(r)(9) through (12) is not required. Even if PSEG were to conduct these studies for the service water intake structure, the unique circumstances relating to a small-volume, nuclear-safety related cooling water system could result in a conclusion that none would be feasible or if feasible, would have costs that would far outweigh any benefits.

Specifically, the Department should modify Part IV.G.8 to reflect that the application requirements specified at 40 CFR 122.21(r)(10), (11), (12) and (13) apply at a facility level and that the requirements of the Section 316(b) Rule and Part IV.G.8 can be met by conducting an evaluation of the circulating watering water intake structure. Similarly, PSEG respectfully requests that the Department modify Part IV.G.7.g to delete the requirements for PSEG to conduct a separate Entrainment Characterization Study for the service water intake structure since PSEG has committed to a thorough evaluation of service water intake structure entrainment consistent with Part IV.G.6.c.1.

Response to PSEG Comment 14

The Department agrees that conditions established in Part IV.G.6.c.i and Part IV.G.7.g appear to be contradictory. Part IV.G.6.c.i is entitled "*Entrainment and Impingement Monitoring at Service Water System*" and states the following:

i. "The permittee shall comply with 40 CFR 122.21(r)(6) and 40 CFR 122.21(r)(9) for the service water system. The permittee can conduct impingement and entrainment sampling at the service water intake or can develop a methodology for adapting data from the circulating water system…"

However, Part IV.G.7.g appears to require sampling at both the circulating water intake structure and the service water intake structure and is stated as follows:

"g. Entrainment Characterization Study (40 CFR 122.21(r)(9)) - The permittee shall submit the Entrainment Characterization Study where the period of data collection shall span for at least 2 years. This shall include entrainment at both the circulating water system and the service water system…"

It is the Department's intent to allow PSEG to develop a methodology for determining impingement and entrainment at the service water intake structure by adapting data obtained at the circulating water intake structure. Therefore, in the final permit the Department is amending Part IV.G.7.g to state the following:

> "g. Entrainment Characterization Study (40 CFR 122.21(r)(9)) - The permittee shall submit the Entrainment Characterization Study where the period of data collection shall span for at least 2 years. This shall include entrainment at both the circulating water system and the service water system which may be based on sampling at both systems, or based on data obtained from the circulating water system that is adapted to estimate entrainment at the service water system…"

The Department has chosen a practical solution in allowing PSEG to estimate impingement and entrainment at the service water intake structure based on data obtained at the circulating water intake structure. Specifically, this methodology would result in establishment of a quantity of impingement and entrainment based on the volume of water withdrawn at the circulating water intake structure where this data would then be scaled to the volume of water withdrawn at the service water intake structure. The Department maintains that its intent on this issue is now clear with the modifications to Part IV.G.7.g.

Nonetheless, 40 CFR 125.94(d) states that the permitting authority "must establish BTA standards for entrainment for each intake on a site-specific basis." In other words, the BTA determination for impingement can be made at the entire facility level or for each individual intake structure for certain compliance options, 40 CFR 122.21(r)(6), 40 CFR 125.94(c)(7). However, the entrainment BTA standards must be made for each individual intake in accordance with 40 CFR 125.94(d). As to the information PSEG must submit to satisfy entrainment related 40 CFR 122.21(r) application requirements, the Department will allow PSEG to extrapolate data from the circulating water intake structure and apply it to the service water intake structure where appropriate. Circulating water intake structure information will not always be cross-applicable to the service water intake structure for every 40 CFR 122.21(r)(9) to (13) requirement.

The Department acknowledges that PSEG raises concern that conditions relating to impingement at the service water intake structure may not be directly proportional to conditions at the circulating water intake structure. If PSEG wishes to apply a site-specific through-screen velocity for the service water intake structure, to apply a different mortality rate, or to use any other values that differ from the circulating water intake structure, these factors must be measured and/or calculated on a site-specific basis which could include field measurements at the service water intake structure. For example, as described in **Response to PSEG Comment 2** and **Response to PSEG Comment 3**, the permittee would need to measure and document actual through-screen velocity if it chooses certain compliance options under 40 CFR 125.94(c) .

Part IV.G.8 is entitled "*Section 316(b) Application Components for Facilities with Actual Intake Flow >125 MGD*" and includes the Comprehensive Technical Feasibility and Cost Evaluation Study (40 CFR 122.21(r)(10)); the Benefits Valuation Study (40 CFR 122.21(r)(11)); the Non-water Quality Environmental and Other Impacts Study (40 CFR 122.21(r)(12)) and the Peer Review (40 CFR 122.21(r)(13)). While the Department has adapted the requirements at 40 CFR 122.21(r)(9) to allow circulating system data to be adapted for the service water system, this does not impact the application requirements at 40 CFR 122.21(r)(10), (r)(11), (r)(12) and (r)(13). PSEG must address both the circulating water intake structure and the service water intake structure in the required analysis at (r)(10), (r)(11), (r)(12) and (r)(13) and provide each required application component for each intake, rather than aggregating the values produced by this analysis. This is appropriate since there will be differences in information specific to the service water intake structure and circulating water intake structures given the vast differences in flow volumes and intake velocities. In addition, the factors that dictate the operation of these structures vary; for example, the

USNRC safety related requirements that apply to the service water intake structure as discussed in **PSEG Comment 5**.

This change affects Part IV.G.7.g of the final permit.

PSEG Comment 15

PSEG has been a champion of wetlands restoration for decades and implemented the EEP pursuant to the 1994 NJPDES permit. As PSEG has consistently stated since 1993, the EEP will continue to provide real and measurable benefits to the Delaware Estuary in perpetuity, long after PSEG-Salem ceases operations. As recognized by world-renowned aquatic and estuarine biologists, fisheries scientists, and numerous environmental organizations; the benefits of the EEP to the Delaware Estuary have been demonstrable, not only in offsetting any impacts of PSEG-Salem's use of cooling water, but in actually increasing habitat and aquatic production in the estuary. In fact, PSEG has demonstrated in its comments on draft NJDPES permits and permit applications that the health of the estuary is improving.

At the time that PSEG submitted its 2006 NJPDES permit renewal application, EPA's rules governing cooling water intake structures allowed the use of restoration in whole or in conjunction with other EPA approved options for determining BTA at a cooling water intake structure. The 2004 Phase II Rule was subsequently challenged and overturned by the Second Circuit in *Riverkeeper, Inc. v. EPA*, 475 F.3d 83 (2007) for a variety of reasons, including but not limited to ruling that restoration could not be used in determining BTA pursuant to Section 316(b). PSEG was a party in *Riverkeeper II*, arguing that restoration was appropriate under Section 316(b), and sought certiorari of the Second Circuit's opinion regarding numerous errors by the Second Circuit, including its opinion striking down restoration as a compliance mechanism pursuant to Section 316(b). The Supreme Court only granted certiorari on the issue of whether costs and benefits could be considered in determining BTA. Subsequently, EPA declined to adopt restoration as a compliance mechanism and, as a result of the litigation and the rulemaking, restoration is not a compliance option for NJPDES permits under the 2014 Section 316(b) Rule.

At this point, the regulatory reasons for including EEP related terms and conditions in PSEG-Salem's NJPDES permit no longer exist since the Section 316(b) regulations simply do not support the use of restoration in a NJPDES permit. Further, there is no provision in the New Jersey Water Pollution Control Act, NJSA 58:10A-1 et seq., or the NJPDES regulations at NJAC 7:14A-1 et seq., that allow consideration of the EEP beyond what has been implemented under Federal law, including Section 316(b). By including those conditions in a continued permit, the Department improperly subjects PSEG to monitoring, recordkeeping and compliance requirements, all of which are inappropriate and beyond the scope of Federal and State law now that restoration is no longer a compliance option under Section 316(b).

Notwithstanding this legal reality, PSEG is willing to support the EEP program going forward, in partnership with the Department, to help continue the benefits of this incredibly successful program. For example, PSEG is willing to entertain another legally binding partnership mechanism, such as a Memorandum of Agreement (MOA), to continue maintenance of the EEP. PSEG notes that each wetland site is subject to Deeds of Conservation Restriction, which were required by the Department in the 1994 NJPDES permit. Other legally binding deed covenants in certain of the host municipalities also establish obligations regarding EEP. PSEG is willing to discuss a mechanism that could be agreed upon separate from this NJPDES permit renewal, which would allow the partnership to continue, and requests that PSEG have the opportunity to meet to do so. However, PSEG believes that it is inappropriate to continue these conditions in the context of a NJPDES permit and requests those permit conditions be stricken.

Without waiving the foregoing, PSEG hereby suggests specific wording changes to Part IV.G.3. The last line of text in Part IV.G.3.a. should be corrected to read "…naturally occurring marsh grasses; and/or (3) upland buffer." Furthermore, the Department should delete all reference to the Management Plans in G.3.b. and G.3.c., which focused on the original restoration design and implementation. PSEG requests that the text referencing continued implementation of the Management Plans be replaced with a permit condition that includes the following:

> "PSEG shall be required to continue management and maintenance of the Delaware Estuary restoration, enhancement, and preservation sites protected by PSEG pursuant to Part IV, Section 3 of the prior NJPDES permit as specified in applicable Deeds of Conservation Restriction and Deed Covenants."

Response to PSEG Comment 15

As noted in the Fact Sheet, this subject NJPDES permit renewal requires the permittee to continue implementation of the EEP including restoring, enhancing and/or preserving wetlands within the region of the Delaware Estuary. This includes the restoration of no less than 10,000 acres of diked wetlands to normal daily tidal inundation; restoration of wetlands dominated by common reed (*Phragmites*) to primarily *Spartina* species and other desirable vegetation; and/or upland buffer. Wetland systems provide foraging and refuge habitat, serve as nursery areas for early life stages and juveniles, and provide direct food resources for consumer organisms in the Delaware Estuary food web. An increase in the area of saltmarsh leads to increased growth in marsh grasses which then increases the food supply for aquatic species. Additionally, an increase of saltmarshes also results in an increase in the amount of living space (habitat) available for the various species. For all these reasons, wetlands restoration and enhancement contributes directly to the increased abundance of these species and contributes to the diverse and robust assemblage of marine life in the bay. If these lands were to return to their pre-restoration conditions, valuable fish habitat could be lost or degraded and the biological community may be affected or threatened. Several resource agencies support the EEP as described in **Comments 39** and **40**, where some resource agencies call for additional projects as described in **Comment 47**.

The Department acknowledges that the Second Circuit Court overturned the Phase II Rule for a variety of reasons including the use of the restoration component as a compliance mechanism for a BTA determination. However, as described in **Response 23**, these wetland restoration requirements were established outside the requisite BTA determination as required under Section 316(b). Rather, the Department incorporated this plan as a Special Condition to the NJPDES permit because of its environmental benefits and because it would continue to help minimize the potential for adverse impact from the cooling water intake structure. The Department maintains that because restoration was never required as part of the BTA determination, the Second Circuit Court decision does not affect the terms of this permit.

The Department has determined that retention of the wetlands restoration requirements is appropriate in order to ensure that these projects are fully implemented and the benefits realized. The wetland restoration provisions were originally offered by PSEG and the Department agreed to include them as special conditions in the 1994 and 2001 permits. As these special conditions were negotiated with PSEG and incorporated as conditions of PSEG-Salem's NJPDES permit, the Department does not agree that these conditions should be removed and separately handled through a standalone "Memorandum of Agreement." This is the third NJPDES permit cycle for which these restoration requirements have been included. The

Department has already deleted some of the permit requirements relating to wetlands monitoring from the 2001 NJPDES permit given that the acquisition of land has been completed. While the Department acknowledges that Deeds of Covenant exist for the sites, the objective of these legal documents is quite different from the Management Plans. Specifically, the Deeds of Covenant describe how the property owner is responsible for the payment of taxes, maintenance of facilities, and avoidance of off-site impacts as well as maintenance requirements and standards. In contrast, Management Plans specify the success criteria along with interim evaluation criteria in the form of trends or trajectories. Progress toward success criteria is measured by comparing observed conditions to an expected trend or trajectory for the site. PSEG manages restoration of its sites, consulting with its Adaptive Management Team when progress towards meeting success criteria deviates from the expected trajectory. In the event that the restoration of the sites is complete, the Department would consider evaluating if the Deeds of Covenant would fully satisfy the Department's objectives with respect to long term expectations for the sites.

With respect to the specific language suggestions for Part IV.G.3.a, the Department does not object to inclusion of the number "(3)" prior to the phrase "upland buffer". However, while all Management Plans have already been submitted to the Department, the Department does not agree that deletion of the Management Plan requirements is appropriate. Because restoration of these sites is not complete and because wetland restoration originated in the NJPDES permit, the inclusion of Management Plans as permit conditions is appropriate. For those sites where restoration is complete, the Management Plans do not trigger any further restoration action so inclusion of such as a permit condition does not generate additional effort.

This change affects Part IV.G.3.a of the final permit where a "(3)" precedes the term upland buffer. Modified language is as follows:

> "a. The permittee shall continue to implement the Estuary Enhancement Program in restoring, enhancing and/or preserving wetlands within the region of the Delaware Estuary. The permittee shall continue to restore an aggregate of no less than 10,000 acres of: (1) diked wetlands; and/or (2) wetlands dominated by common reed (Phragmites australis) to Spartina species with other naturally occurring march grasses; and/or <u>(3)</u> upland buffer."

PSEG Comment 16

PSEG concurs with the Department's conclusion in the draft permit that monitoring of juvenile and adult passage of river herring at the installed fish ladders is counter-productive. However, Part IV.G.4.a inappropriately requires the permittee to retain responsibility for operation and maintenance of the fish ladders. As PSEG stated in its 2006 NJPDES permit renewal application, the inclusion of requirements relating to fish ladders in PSEG-Salem's NJPDES permit was no longer necessary or appropriate under the then effective Phase II Rule. Moreover, the maintenance of fish ladders is no longer appropriate in the current Section 316(b) Rule and these provisions should be stricken.

Without waiving the foregoing, the sentence on the second line of text in G.4.a should be corrected to read:

> "The permittee shall operate and maintain these ladders unless the ladders have been removed or replaced by other parties responsible for dam maintenance or repair in accordance with the…."

Response to PSEG Comment 16

The Department maintains that the fish ladders installed by PSEG continue to provide benefits to anadromous fish in the Delaware Estuary by providing passage to spawning grounds and, coupled with required stocking efforts, have helped reestablish historic runs. This is the third NJPDES permit cycle for which these fish ladder requirements have been included. The positive impacts that these ladders have on spawning helps to offset losses due to impingement and entrainment at the Station. Therefore, the Department is retaining the requirement to operate and maintain the fish ladders in Part IV.G.4.a.

However, the Department agrees that it is not physically possible to operate and maintain fish ladders that have been removed, nor may it be feasible for PSEG to operate and maintain ladders that have been replaced by other parties. As a result, the requested modification has been made to Part IV.G.4.a as follows:

> "The permittee has installed twelve fish ladders as described in the Biological Monitoring Program Annual Reports. The permittee shall operate and maintain these ladders unless the ladders have been removed or replaced by other parties responsible for dam maintenance or repair in accordance with the developed operations and maintenance manuals or by ensuring that agreements exist that require other parties to be responsible for operations and maintenance."

This change affects Part IV.G.4.a of the final permit.

PSEG Comment 17

As indicated in the 2006 NJPDES permit renewal application, PSEG does not believe that inclusion of comprehensive biological monitoring requirements in the NJPDES Permit is necessary or appropriate. This is confirmed by EPA's Section 316(b) Rule, which now defines the biological monitoring requirements necessary to support renewal of NPDES Permits at 40 CFR 125.96. However, Part IV.G.5.a would require the conduct of wide-ranging and expensive biological monitoring programs that benefit all with an interest in the aquatic resources of the Delaware Estuary. The costs of these programs should not be imposed on a single private entity. These baywide monitoring programs would more appropriately be conducted by state or federal agencies. Except for impingement and entrainment monitoring as specified in the Section 316(b) Rule, the data provided by these proposed programs has limited or no application in this or future renewals of the PSEG-Salem NJPDES permit.

PSEG respectfully requests that the Department delete all proposed biological monitoring requirements and include language cross-referencing 40 CFR 125.96 for the scope of future monitoring requirements.

Response to PSEG Comment 17

40 CFR 125.96 gives the Department wide latitude within its discretion to require biological monitoring beyond that minimally required by 40 CFR 125.94 for existing facilities. The biological monitoring requirements in PSEG's permit are a longstanding requirement which ensures the availability of long-term trend data that is utilized by PSEG as well as resource agencies to evaluate the effects of PSEG-Salem on aquatic populations in the Delaware Bay and to determine the effectiveness of the EEP. This includes the effects of both the intake and the thermal discharge. Because the EEP is being continued as a condition of this permit for the reasons given in **Response to PSEG Comment 15**, it is also appropriate to extend the requirement for baywide biological monitoring. This is the third NJPDES permit cycle for which these requirements have been included and the continuation of these requirements ensures the availability of a consistent, long-term dataset to support permit determinations. PSEG often cites the results of these monitoring programs to support its claims regarding the effects of the cooling water intake structure on the

Delaware Estuary as described in **PSEG Comment 1**. In sum, the Department does not agree that these requirements should be terminated.

PSEG Comment 18

The incorporation by reference of a fifteen year old letter from the permittee to the Department's Division of Fish and Wildlife into the draft NJPDES permit is neither necessary nor appropriate. The commitments and provisions described within this letter were required for PSEG's compliance with Part IV.G.8 of PSEG-Salem's current 2001 NJPDES permit and are no longer necessary to ensure compliance with EPA's Section 316(b) Rule. PSEG should no longer be required to fund this basic scientific research and monitoring scope; that should more appropriately be conducted by the Department's Division of Fish and Wildlife.

PSEG, therefore, respectfully requests the removal of Part IV.G.5.b from this renewal permit. Without waiving the foregoing, the Department should correct and clarify the language contained within Part IV.G.5.b.ii since the sentence as currently written is incomplete and therefore, unclear.

Response to PSEG Comment 18

This comment refers to Part IV.G.5.b which refers to the terms and conditions of a letter addressed to Robert McDowell, Director of NJFW from Jeffrey J. Pantazes of PSEG Services Corporation. The purpose of this letter is to incorporate improvements to the Biological Monitoring Program Work Plan; specifically the inclusion of provisions for the conduct of a beach seine survey encompassing the region of the Delaware River between the Chesapeake and Delaware Canal and the Fall Line in Trenton. Additionally, this letter serves to formalize a commitment by PSEG to fund the NJFW Delaware River Striped Bass Recruitment Survey ($30,750 on an annual basis) in order to resolve potential conflicts between PSEG's proposed beach seine survey and the NJFW Striped Bass Recruitment survey. Finally, this letter sets forth the sampling parameters and conditions to ensure that the objectives of both programs are attained without duplication of sampling effort.

This is a longstanding requirement which ensures the availability of a stable funding source for the collection of long-term trend data that is utilized by PSEG as well as resource agencies to evaluate the effects of PSEG-Salem on the aquatic populations of the Delaware Bay and to determine the effectiveness of the EEP. As described in the letter, NJFW deposits the funds in an account that is dedicated for the conduct of this beach seine survey work. For the reasons described in **Response to PSEG Comment 17**, this biological monitoring condition falls within the Department's discretion under 40 CFR 125.96 and the Department does not agree that this commitment should be terminated. However, the Department will clarify this permit condition and correct some errors. The Department intended to eliminate the requirement to sample in November as described on page 74 of the Fact Sheet:

> "While the Department is continuing the requirement for PSEG to fund the Department's NJFW program regarding the Delaware River Striped Bass Recruitment Survey (Part IV G.5), the Department is amenable to one change. Specifically, rather than the NJFW conducting additional sampling at the 32 fixed stations during June, July and November, sampling shall be discontinued in November."

However, this change was not incorporated into Part IV.G.5. Additionally, while the date of the letter is correctly referenced in the Contents of the Administrative Record as April 4, 2002, Part IV.G.5 incorrectly

specifies the date of the same letter as June 12, 2002. These errors are now rectified where Part IV.G.5.b is reiterated for the purpose of clarity as follows:

"b. The permittee shall continue to comply with the terms and conditions of the April 4~~ June 12~~, 2002 letter to ensure that the sampling objectives of the PSEG Beach Seine program and the Delaware River Striped Bass Recruitment Beach Seine Sampling are satisfied without duplication of sampling effort."

i. The Department's Division of Fish and Wildlife (NJFW) shall sample twice per month (August to October) at 32 fixed stations as well as additional sampling at these stations during June and July. Sampling shall be performed once per month in June and twice per month during July. A total of nine ~~ten~~ beach seine survey events will be conducted during the June to October ~~November~~ period.

ii. In order to satisfy the objectives of both programs without duplication of sampling effort, NJFW will conduct striped bass recruitment beach seine sampling to include ~~Both PSEG and NJFW will jointly develop an estimate of the average area swept by the seines including observations and measurements associated with each group's sampling efforts including~~ measurement of individual length (nearest millimeter) for up to 30 specimens per haul of the following species: American shad, blueback herring, alewife, Atlantic menhaden, bay anchovy, Atlantic silversides, striped bass, white perch, bluefish, Atlantic croaker, spot, weakfish, and blue crab.

iii. PSEG will provide its seine data to the NJFW by March 1 and conversely NJFW will provide its seine data to PSEG by March 1.

This change affects Part IV.G.5 of the final permit.

PSEG Comment 19

The draft permit Fact Sheet at page 79 correctly references previous correspondence between PSEG and the Department regarding sludge management issues at PSEG-Salem and notes that "…the Department is satisfied that the Annual Radioactive Effluent Release Report (ARERR) contains the necessary sludge management information required under the Sludge Quality Assurance Regulations (SQAR, NJAC 7:14C) and Part II of the permit." The Fact Sheet at page 79 goes on to provide that it was the Department's intent to require PSEG to submit proof of proper sludge management of each sludge type to the Department's Division of Water Quality. PSEG respectfully requests that the Department include a new subsection in Part II.B.8 of the Final Permit that would incorporate the language in Section 12.E. of the Fact Sheet at page 79.

Response to PSEG Comment 19

The Department agrees that clarification of this issue is appropriate given the site-specific circumstances that are applicable to PSEG-Salem. The Department was able to incorporate this change as Part II.C.1.a. consistent with the draft permit Fact Sheet language:

"1. Residuals Requirements

a. Based upon previous correspondence with PSEG, the Department is satisfied that the Annual Radioactive Effluent Release Report (ARERR) contains the necessary sludge management information required under the Sludge Quality Assurance Regulations (SQAR, N.J.A.C. 7:14C) and Part II of the permit. Annually, PSEG shall submit proof of proper sludge management of each sludge type to the following address:

NJDEP-DWQ
Bureau of Pretreatment and Residuals
Mail Code 401-02B, P.O. Box 420
Trenton, NJ 08625-0420"

The remaining Fact Sheet language is not necessary or appropriate as a permit condition and has not been included.

This change affects Part II.C.1.a. of the final permit.

PSEG Comment 20

Acute Toxicity Requirements at DSNs 481A-486A should be deleted from Part III. PSEG has been performing whole effluent toxicity (WET) monitoring twice per year on the non-contact cooling water effluent discharged via DSNs 481A through 486A for several permit cycles. PSEG has not changed its processes for condenser cooling or the processes that generate other waste streams ultimately discharged via these DSNs. Nor have there been changes to chemicals added to the non-contact cooling water or to the other waste streams that are commingled with the cooling water prior to the discharge via DSNs 481A to 486A, other than the polyacrylic acid (PAA). Results have shown no observable acute or chronic effects that would warrant further sampling. If PSEG were to request changes to processes that discharge to these outfalls, the Department could impose WET testing as a condition to the approval.

Response to PSEG Comment 20

Section 101(a) of the Clean Water Act establishes a national policy of restoring and maintaining the chemical, physical and biological integrity of the Nation's waters. In addition, section 101(a)(3) of the Clean Water Act and the NJSWQS at NJAC 7:9B-1.5(a)3 state that the discharge of toxic pollutants in toxic amounts is prohibited. Further, 40 CFR 122.44(d) and NJAC 7:14A-13.6(a) require that where the Department determines using site-specific WET data that a discharge causes, shows a reasonable potential to cause, or contributes to an excursion above the SWQS, the permitting authority must establish effluent limits for WET. In order to satisfy the requirements of the Clean Water Act, the NJSWQS and the NJPDES Regulations, the need for a WQBEL for WET was evaluated for these discharges.

The type of WET test required for a particular facility is determined by evaluating the mixing characteristics of the effluent (i.e. dilution factor) in the receiving water. WET testing is a requirement of most individual NJPDES/discharge to surface water permits. A requirement to perform acute WET testing has been applied to PSEG-Salem in consideration of the significant mixing at the point of discharge. Acute toxicity testing measures only the lethal effects (mortality) of the effluent on the test organisms.

Acute WET testing is required twice per year on a minimum of one of the four representative circulating water outfalls to which DSN 48C discharges. DSN 48C is an internal, low volume waste stream that consists of secondary plant waste water which may contain chemicals, especially acidic and caustic wastewater before

discharge. Discharge monitoring report form data for Acute WET from January 2010 through December 2014 shows 11 data points where all results were >100 which indicates no observable acute effects. Nonetheless, the Department maintains that routine acute WET monitoring is appropriate in order to assess the toxicity effects of the circulating water system including the potential synergistic effects of DSN 48C and the other wastewater components. More specifically, routine data collection is necessary so that the Department can determine if this discharge causes, shows a reasonable potential to cause, or contributes to an excursion above the SWQS. While there are four circulating water outfalls to which DSN 48C discharges, the Department is only requiring data collection on one of the four outfalls which is allowable pursuant to NJAC 7:14A-4.4(b)1. The Department is not reducing the frequency or removing the requirement to conduct routine acute WET monitoring since it maintains that a routine sampling requirement is appropriate on at least one of the representative outfalls and Acute WET monitoring is consistent with standard surface water discharge permit conditions throughout the state.

PSEG Comment 21

Regarding Part IV.A.1.h, the absolute prohibition on the discharge of polychlorinated biphenyls (PCBs) at 40 CFR Part 423, assumes that the presence of the pollutant would be detected using conventional analytical methods, such as EPA Method 600/4-81-045. Methods such as those currently required had not been developed at the time EPA promulgated the prohibition on PCB discharges in 40 CFR Part 423. EPA Method 1668A, a method that EPA began to recommend in the early 2000s, is not considered a conventional analytical method and use of EPA Method 1668A, as required by the Department, may identify extremely low levels of PCBs.

PSEG also respectfully requests that the language proposed in Part IV.A.1.h be deleted and replaced with the language at Part IV.A.1.g from the 2001 NJPDES permit to ensure that the appropriate compliance requirements are cited.

Response to PSEG Comment 21

The Department agrees that the narrative language as contained at Part IV.A.1.h is intended to assure compliance with 40 CFR 423 and was premised on a routine analytical method that was available at the time of promulgation of those regulations. The requirement included at Part IV.A.1.h is a separate requirement than the PCB monitoring requirements as included on Part IV.D.2 entitled "Delaware River Basin PCB Requirements" which requires a far more sensitive analytical method. As a result, the Department does not object to the suggested change and has modified Part IV.A.1.h as follows:

> "h. The permittee shall comply with 40 CFR 423 regarding the discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid. <u>There shall be no discharge of PCB compounds as analyzed by conventional methods</u>."

This change affects Part IV.A.1.h of the final permit.

PSEG Comment 22

Regarding Part IV.E.1.e.iii, as noted on Page 8 of the Fact Sheet, the Department notes its approval of PSEG's request to use PAA as an additive to the steam plant or the non-radioactive liquid waste disposal system at PSEG-Salem. The Department, however, did not modify Part IV.E.1.e.iii to specifically identify

this compound. As the language in the final permit would control, PSEG respectfully requests that the Department add PAA to the list of authorized chemicals in Part IV.E.1.e.iii.

Response to PSEG Comment 22

As documented in the Fact Sheet, the Department had reviewed the Material Safety Data Sheet for PAA and has incorporated the following change to Part IV.E.1.e.iii of the final permit:

"iii. DSN 48C: The permittee is authorized to use the following additives in the steam plant and the non-radioactive liquid waste disposal system: ammonium hydroxide, hydrazine, ethanolamine, and polyacrylic acid (PAA), which are used for corrosion control in the plant steam systems; sodium hypochlorite, hydrogen peroxide, sodium hydroxide, and a coagulant aid, which are used in the non-radioactive liquid waste disposal treatment system; and sodium hydroxide and sulfuric acid, which are used to regulate demineralizers."

This change affects Part IV.E.1.e.iii of the final permit.

Acronyms

A1Es	Age-One Equivalent Losses
AEC	Atomic Energy Commission
ARERR	Annual Radioactive Effluent Release Report
ASMFC	Atlantic States Marine Fisheries Commission
BAT	Best Available Technology
BIC	Balanced Indgenous Community
BIOP	Biological Opinion
BPJ	Best Professional Judgment
BTA	Best Technology Available
CFD	Computational Fluid Dynamics
CFR	Code of Federal Register
CM	Centimeter
CMR	Conditional Mortality Rate
CWA	Clean Water Act
CWIS	Cooling Water Intake Structure
DNREC	Delaware Department of Natural Resources and Environmental Control
DPS	Distinct Population Segment
DRBC	Delaware River Basin Commission
DSN	Discharge Serial Number
EDP	Effective Date of the Permit
EPA	Environmental Protection Agency
EEP	Estuary Enhancement Program
EEIM	Extended Empirical Impingement Model
ESA	Endangered Species Act
ESSA	ESSA Technologies
F	Fishing Mortality
FPS	Feet per second
GPM	gallons per minute
ITS	Incidental Take Statement

M	Mortalities
MGD	Million Gallons Per Day
MOA	Memorandum of Agreement
MM	Millimeter
MWe	Megawatts Electric
NEPA	National Environmental Policy Act
NGS	Nuclear Generating Station
NJ	New Jersey
NJAC	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NJFW	New Jersey Division of Fish and Wildlife
NJPDES	New Jersey Pollutant Discharge Elimination System
NJSA	New Jersey Statutes Annotated
NJSWQS	New Jersey Surface Water Quality Standards
NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OPRA	Open Public Records Act
PAA	Polyacrylic Acid
PCBs	Polychlorinated Biphenyls
PFBC	Pennsylvania Fish and Boat Commission
PJM	Pennsylvania, New Jersey, Maryland
PPT	Parts Per Thousand
PSEG	Public Service Energy Group
R.M.	River Mile
RIS	Representative Important Species
RPMs	Reasonable and Prudent Measures
SE	Saline Estuary
SQAR	Sludge Quality Assurance Regulations
SSB	Spawning Stock Biomass
SWIS	Service Water Intake Structure
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USNRC	U.S. Nuclear Regulatory Commission
WET	Whole Effluent Toxicity
ZIM	Zone of Initial Mixing

Attachment 1:

The comments provided by these interested parties are identical or similar in content and are represented as Comment 22

A. Katchikian
A. Morgado
Adam Schneider
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Alison Robinson
Allegra Schecter
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Amy Annarruma
Andre Cavalier
Andrea Fleming
Andrea Giardina
Andrea Smith
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Andrea Zinn
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Angela Townley
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Ann Dente
Ann F. Rhoads
Anna Buontempo
Anne Backlund
Anne Goldberg
Anne Heaney
Anneliese Lipinski
AnnMarie DiNatale
Anthony Montapert
Antoinette Meale
Aodan Peacock
Ariel Schwalb
Arlene Aughey
Arlene Patoray
Arthur Borsi
Arthur Crowley
Arthur Rack
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Ava Friedrich
Barbara Conover
Barbara Darvin
Barbara Petzko
Barbara Recht
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Barbara Skinner
Barbara Stomber
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Beth Berniker
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Bettie Reina
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Betty Ann Duggan
Betty Kish
Beverly Jaroszewski
Beverly Solomon
Bill
Bill O'Connor
Billie Herzer
Bob Alexander
Bob Allen
Bob Ambrosini
Bob McPherson
Bob Pfister
Bonnie Acosta
Brad Walrod
Brandy Bones
Brenda Cummings
Brenda Federowicz
Brian Abruzzi
Brian Bourne
Brian Burns
Brian Carey
Brian Finn
Brian Reynolds
Brian Tucker
Brion Vallone
Bruce McGlynn
Bruce Reeves
Bryan Cytryn
Bryan Sulzman
C.B. Michaels
Candace Bassat
Candace Jania
Carl Cooper
Carl Oerke
Carl Palmer
Carl Reiners
Carla Giuffrida Yulan
Carlene Visperas
Carmen Fanelli III
Carol Bishop
Carol C. Etheridge
Carol Davis
Carol Glandorf
Carol Grieco
Carol Jagiello
Carol L. Kennedy
Carol Montague
Carol Parker
Carol Richmond
Carol Woodruff
Carolyn Marion
Caryll Goldberg
Cassandra Valent
Catherine Beatle
Catherine Hunt
Catherine Kudlick
Catherine Marcial
Cathy Dondiego
Cathy Newman
Chad Shebey
Charles Cresson
Charles Davis
Charles Muise
Charles Pack
Charles Price
Charlie McCullagh
Charline B
Cheryl D'Angelica
Cheryl Fagerty
Chris Bozowski
Chris Carbone
Chris Chesire
Chris Drumright
Chris Granata
Chris Harris
Chris Hazynski
Chris Jensen
Chris Marino
Chris Scholl
Chris Wood
Chris. Kirsten
Christina Joo
Christine Barreiro
Christine Bjanes
Christopher Coles
Christopher Davis
Christopher Dunham
Chrysanthi Skiada
Chuck Graver
Cindy Priel
Claire Baney-Tucker
Clara Schroeder
Claudia Osborn
Colleen Gala
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Connie Wokoun
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Crystal Delia
Curt Baker
Curt Hofman
Cynthia Kent
Cynthia Kishinchand
Cynthia Mellon
D. Lewis
D. MacInnes
Dale Camwell
Damian Velez
Dan Hall
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Dan Mozgai
Daniel Beck
Daniel Gordon
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Daniel Tumpson
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Dave Toomey
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David Cassling
David Ira Kagan
David Kalb

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David Kissinger
David LaVerne
David Nichols
David S. Miller
David Schneck
David Stemac
David Winning
Dawn M. Sutton
Dawn Sink
Dawn Zelinski
Debbie Williamson
Deborah E-Platt
Deborah Freedman
Deborah Gregory-Fink
Deborah Light
Deborah Parker
Deborah Rickman
Debra Valazza
Del. Riv. Striper Tournmt
Dena Levine
Denise Clark
Denise Laffer
Denise Marchisotto
Denise McDermott
Denise McGowan-Guida
Denise Pargeter
Denise Sprague
Dennis Ober
DeSoto Hearz
Diana Sheffield
Diane Barry
Diane Burke
Diane Clark
Diane Deidloff
Diane Gallagher
Diane Marie
Diane Smith
Dianne Douglas
Don Fonshill
Donna Browne
Donna Caldwell
Donna Connor
Donna Jenkins
Donna Kerslake
Donna Walters
Donnie Shankie
Doreen Frega
Doreen Terletzky
Dorina Hippauf
Dorina Van Guilder
Doris Carey
Doris Rosenthal
Dorothy Flippen
Dorothy Holtzman
Dorothy Jackson
Dorothy Le
Dosier Hammond
Doug Kutney
Douglas Engle
Douglas Raska
Douglas Schleifer
Douglas Schneller
Dr. Lloyd Ross
E. Dantuono
E. Sto
Ed Clauss
Ed Jocz
Eddie Hayduk
Edmund Venella
Edward Schecter
Edward Spevak
Eileen Abramovici
Eileen Bevacqui
Eileen G. Kirsh
Eileen Leonard
Eileen McNamara
Eileen Ward
Elaine Cuttler
Eleanor Fox
Elena Marie
Elizabeth Czajka
Elizabeth Guthrie
Elizabeth Mellen
Elizabeth Roedell
Elizabeth Seltzer
Elizabeth Zwicker
Ellen Jamieson
Ellen Lebowitz
Ellen McConnell
Elsie Turqman
Elsie Zecchino
Eric Bare
Eric Mussler
Eric Spray
Erica Brinker
Erin Crump
Ernst Mecke
Etta Albright
Eugene Gorrin
Eugene Pumphrey
Eugenia Muller
Evelyn Hamilton
Evelyn Marencik
Fitzhugh Read
Fran Maroney
Frances Duggan
Francis Grodd
Francis Groff
Frank & Wife Hyman
Frank A. Brincka
Frank Finochio
Frank Fotusky
Frank Gregory
Frank Hyman
Frank Hyman Wayne
Frank Puzzo
Frank Santangelo
Frank Siderio
Franklin Nash
Fred Fall
Fred Formicola Sr.
Fred Sinton
Gabriel Morner
Gabriel S. Farrell
Gail D. Haus
Gail P. Ewin
Garrett Lesnevich
Gary Brill
Gene Steiker
Gennaro F. DeLucia
Geoff Browne
Geoffrey Lanthrop
George Abaunza
George Hurst
George Kull
George Mitschang
George Schaefer
George Schulz
Georgean Arsons
Georgina Shanley
Gerald Duffy
Gerald Walle
Gerson Lesser, M.D.
Gertrude Glazer-Armstrong
Gibson Reynolds
Gigi Ventola
Gina Curry
Gina Megay
Gina Norton
Glenn Turner
Glenn Welsh
Greg Munson
Greg Navarro
Greg Sells
Gretchen Varelli
Guida Georgia
Gulnar Mewawala
Gunta Alexander
Guy Gray
Hadith Harper
Harini Shankar
Harold Cox
Harold Jenssen
Harold Wilkinson
Harriet Grose
Harriet Jenquist
Harry Robinson
Heather Bernhardt
Heather Nemeth
Heidi Echternacht
Heidi Furman
Helen Harrington
Helen Syen
Henry C. Toft
Henry Summers
Hilary Malyon
Hilary Persky
Hogan Dwyer
Holly McDonald
Howard Iwahashi
Howard Kidorf
Howard Schwartz
Ian Whelan
Irene Cassidy
Irene Donovan
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J. Gold
Jack Schwinn
Jacquelyn Barth

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Jacquelyn Imbrogno
Jacquie Amiriantz
James & Joan Tomczyk
James Bentley
James Brunton
James Ducilli
James Florance
James Gerard
James Gill
James Gorman
James Hemm
James Kelly
James Rosenthal
James Shea
Jamie Greer
Jan Tyniec
Jane Bonkoski
Jane Kirshenbaum
Janet Cavallo
Janet Hill
Janet Lyons-Fairbanks
Janice Banks
Janice Haggerty
Janis Bozowski
Jay Sweeney
Jean Fasano
Jean Henry
Jean Kay
Jean Nick
Jean Schumer
Jeaneen Andretta
Jeanne Cutler
Jeanne Held-Warmkessel
Jeff McMahan
Jeff Simmers
Jeffery Shuben
Jeffrey Rattner
Jelica Roland
Jennifer Ban
Jennifer Fleisher
Jennifer Quigley
Jeremy Anton
Jeremy Neimand
Jeremy Raben
Jerry Davies
Jerry Duffy
Jerry Lawson
Jessica Aronfreed
Jessica Lederman
Jill Waldon
Jill Wiener
Jim Curran
Jim Kaff
Jim Littlefield
Jim Rosenthal
Jim Ryan
Jim Tyrrell
Jo Gilbert
Joan Borthwick
Joan Farber
Joan Maccari
Joan Ziegler
Jo-Ann E. Krietzberg
Jo-Ann Eckstut
Joanne Dixon
Joanne Ryan
Jody Walters
Joe Sergeant
John Berry
John Brigandi
John Crowley
John Dulik
John Egan
John Fitzgerald
John Helak
John Kashner
John Kerwin
John Kohms
John Kptarski
John Kraut
John Lauria
John Massaro
John Pasqua
John Passante
John Schreiber
John Sheppard
John Teevan
John Theobald
Jon Prochovnick
Jonathan Nolde
Jonathan Rowland
Jorge De Cecco
Joseph and Susan Ganci
Joseph Balwierczak
Joseph Braus
Joseph Forgione
Joseph Fysz
Joseph L. Rykiel
Joseph Maryanski Jr.
Joseph Pesciotta
Joseph Quirk
Joseph Wincek
Josephine Puglisi
Judith Bennis
Judith Canepa
Judith Gruswitz
Judith Mayhew
Judith Robinson
Judy Michaels
Judy Pizarro
Julia Brown
Julia Caspar
Julia DiAmore
Juliann Pinto
Julija Merljak
K. Dodds
K. Paul
Kami Lowe
Kamilah Gilbert
Karen Baransky
Karen Berman
Karen Chin-Mancini
Karen Feiler
Karen McGrath
Karen Rankin Baransky
Karen Stickney
Karleen Aghevli
Kate Kerpez
Kate Richman
Kate Sherwood
Katelyn Nunberg
Kathi Thonet
Kathleen Bandaruk
Kathy Aprile
Kathy Dabanian
Kathy Hart
Kathy Keating
Katie Gorman
Katie Whitaker
Kazue Tanaka
Kelly Caffrey
Kelly Federowicz
Kelly Pluck
Ken Chmura
Ken Christensen
Ken Cooper
Ken Dolsky
Ken Harms
Kenneth Malkin
Keren Longville
Kerry Fonville
Kevin Bolbach
Kevin Obermiller
Kevin Parham
Kevin Sickles
Kim Murphy
Kimberly Seger
Kimberly Shaub
Kirk Haveman
Kristen Federowicz
Kristin
Kristofor Bloomquist
L. Glasner
L. Helaudais
Lance Michel
Larry Bender
Larry Brendler
Larry Olivier
Larry Rack
Larry Salvatoriello
Laura Favorito
Laura Hawkins
Lea Stabinski
Leia C.
Leia Dyani C.
Lenore Reeves
Lenore Roca
Leo Brown
Leon
Leon Muhudinov
Leonard Spitzer
Lillian Gueli
Lina Silimkhan
Linda Bender
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Linda Del Plzzo
Linda Fante
Linda Jablonski Hassa
Linda Jadach
Linda Mack
Linda Malkin
Linda Marticek

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Linda McKillip
Linda Reik
Linda Roach
Linda Stelman
Linda Zaccaria
Lionel Ruberg
Lisa Downs
Lisa Iannucci
Lisa Kazmier
Lisa S. Matthews
Lisa Sabatino
Liz D.
Lois Blake
Lois Grace-Gecsey
Lorenz Steininger
Lorraine Blaszczak
Lotte Sonnenschein
Lou Matlack
Louanna Branca
Louis C. Harris Jr.
Louis LaBrunda
Lucas Alden
Luke Damgen
Lynda Armona
Lynn Ebeling
Lynn Henderson
Lynn Merle
Lynnette Krueger
Malcolm Leslie
Mandy Johnson
Manuel
Manuel Delhi
Marc Forman
Marc Obernesser
Marcia Blackwell
Margaret Cassling
Margaret McHugh
Margaret McKenna
Margaret Needham
Margaret Scheu
Margaret Simpson
Margaret Urban
Margaret Yelenik
Margit Meissner-Jackson
Margo Pellegrino
Margy Capecelatro
Mari Celeste Massaro
Maria Ackerman
Maria Janucik
Marianne Lynch
Maricel Hahn
Marie Curtis
Marilee Kauffman
Marilyn Heimowitz
Marilyn Ofner
Marilynn Baldwin
Marion Barnes
Marion M. Kyde
Marion O'Donnell
Marion Steininger
Marjorie LaBarbera
Mark and Judy Harvey
Mark Bailey
Mark Binder
Mark Canright
Mark Couch
Mark Dickson
Mark Forrester
Mark Milcarsky
Mark Napolitano
Mark Nordyke
Mark Reback
Mark Romano
Mark Schwiebert
Mark Spinner
Mark Van Rossen
Mark Waltzer
Marlene Robinson
Martha Neuhaus
Martha Wright
Martina Clark
Martina Patterson
Marty Wolman
Marvin
Marvin Brickner
Marvin Feil
Marvin Newton
Mary Halper
Mary Heinz
Mary Heubner
Mary Kellett
Mary O'Donnell
Mary Shafer
MaryAnn Bacon
MaryAnn Burch
Maryann Foss
Maryann Kirchenbauer
Maryanne Pilgram
Maryellen Norpel
Mary Ann Barrett
Mary Ann Bentz
Mary Ann Leitch
Mary Ann Scuttaro
Mary Ann Stroker
Mary Anne Stinner
Mary Jo Kundrats
Mary Lynn Ricketts
Matt Bennett
Matt Hengesbaugh
Matthew A. Shubitz
Matthew Flannery
Matthew O'Rourke
Maude Tatar
Maureen Loughman
Maureen Sheehan
Maureen Syrnick
Maurice Rosenstraus
Megan Peterson
Melanie McDermott
Melissa Challender
Melissa Friedman
Melissa Mohr
Melissa Saunders
Michael Butler
Michael Deckard
Michael Derins
Michael Federowicz
Michael Fedorov
Michael Gargurevich
Michael Manley
Michael O'Neill
Michael Roswell
Michael W. Evans
Michael Zane
Michele Egloff
Michele Van Allen
Michelle DeKlyen
Michelle Gargurevich
Michelle Hayward
Michelle Murphy
Mike Dour
Mike Gentile
Mike Turano
Moira Cahill
Molly Hauck
Monica Jelonnek
Monica Lamb-Torres
Moshe Ben-Reuven
Nancy Chismar
Nancy Cunningham
Nancy Denton
Nancy E. Rone
Nancy Litchfield
Nancy Tanzi
Nancy Trent
Nancy Willing
Nichole Diamond
Nick Balla
Nick Berezansky
Nicole Dallara
Nicole Falkowitz
Nicole Rahman
Nicole Tomos
Nicole Weber
Noris Nunez
O. Ruiz
Pamela Fitzpatrick
Pamela Scoville
Pat Dingleberry
Pat Raywood
Patricia Idrobo
Patricia Kerstner
Patricia Libbey
Patricia M. Sullivan
Patricia Myers
Patricia O'Brien
Patricia Soteropoulos
Patti Jarozynski
Paul Buckley
Paul Danik
Paul Federowicz
Paul Gandolfo
Paul L.
Paul Parker
Paul Riley
Paul Roden
Paul Ruderman
Paul Sanderson
Pepper Challender
Perilli
Peter Goldman
Peter Hamerslag

Attachment 1:

The comments provided by these interested parties are identical or similar in content and are represented as Comment 22

Peter Sullivan
Phil Correale
Philip De Carlo
Philip Drumm
Philip J. Hyun
Phyllis Healy-Sova
Pouné Saberi
R. Blaser
R. Caruso
R. Conway
R. Deluccia
Ralph Bobroski
Randy Harrison
Ray Johns
Rebecca Gotterer
Rebecca Winkler
Reed DuBow
Regina Cornwell
Reguel Steinbock
Renata Bodner
Renee Locks
Rich Jablonski
Richard Berggren
Richard Garcia
Richard Hern
Richard Ingraham
Richard Oliva
Rick Rambo
Rita Carney
Rita Perrelli
Rita Varley
Robert
Robert & Kathryn Boyle
Robert Aldridge
Robert Brinkerhoff
Robert Brown
Robert Gardella
Robert Gordob
Robert Gordon
Robert Graver
Robert Hearn
Robert Jenkins
Robert Kinsella
Robert Krause
Robert Lester
Robert Levenson
Robert Lisowski
Robert M. Deems
Robert McCray
Robert McDermott
Robert Pennington
Robert Post
Robert R. Marshall
Robert Schmetzer
Robert Spivack
Robert Treanor
Robert Zajac
Roberta Wagner
Robin Harvey
Rod LoScalzo
Ron & Maria De Stefano
Ron Carlson
Ron Jensen
Ron Raz
Ron Sheetz
Ronad Gulla
Ronald Rosewall
Ronald Sverdlove
Ronald Tokarchik
Ronnie DAmario
Rosalie Valente
Rose Ansbro
Rose Rosenbaum
Rosemarie Agosta
Rosemarie Rosenberg
Rosemary Collopy
Roxanna Veras
Roy Bartoo
Rui Moreira
Ruth Boice
Ruth Boroshok
Ruth Kram
Ruth Steinberg
S. Pasricha
S. Simpson
Salim Ali
Sally Angelo
Sally Gellert
Sally Giles
Sally Malanga
Sandra Folzer/John Dulik
Sandra Garcia
Sandra L. Zimmerman
Sandra Malnak
Sandra Moskovitz
Sandra Riddick
Sandra Stratton-Gonzalez
Sandra Wilkes
Sandra Zimmerman
Sandrine Cortet
Sandy Carson
Sandy Pelland
Sandy Sandy
Sara Lazarus
Sarah Easter
Sarah Walker
Sauna Trenkle
Sayenne Heijkamp
Scott MacDougall
Scott Macinnis
Sean McFeeley
Shane M. Worth
Shannon Gessler
Sharon Baechtle
Sharon Callahan
Sharon Cappuccio
Sharon Luba
Sharon Meza
Sharon Nicodemus
Sheera Stern
Sheila Dillon
Sheila Mazar
Sherry Ramsey
Shirley Bensetler
Sibyl Brotman
Sophia Grammatas
Sophia Tascon
Stacey Wood
Stefanie Johnson
Stephanie Eckert
Stephanie Finkelstein
Stephanie Finman
Stephanie Schultz
Stephen Blank Sr.
Stephen Eaton
Stephen Granieri
Steve Ayers
Steve Leusner
Steve Marshall
Steve Mattan
Steve Redden
Steve Schulek
Steve Tardif
Steven Kokol
Steven Kostis
Steven Krumm
Sue Harrington
Sue Ruggiero
Susan Babbitt
Susan Balik
Susan Dorchin
Susan Elman
Susan Erny
Susan Fanning
Susan Garelik
Susan Godoy
Susan Krawczyk
Susan M. Blubaugh
Susan Parker
Susan Sherman
Susan Ullman
Susan Uustal
Susan Vanmeter
Susan Waldman
Susan Wolf
Susan Yatsky
Suzanne Aptman
Suzanne Martin
Suzanne Shourds Gulbranson
Tatiana Torres
Temma Fishman
Teresa Curran
Teresa Rivas
Teresa Stimpfel
Terry Tingley
Thea Kearney
Theresa Croce
Theron Tinsley
Thomas Barringer
Thomas Casey
Thomas Chirip
Thomas Gardiner Jr.
Thomas Lyons
Thomas Smith
Thomas Vail
Thomas Wiggins
Tina Cox
Tish Molloy
Todd Reichart
Tom Aguilar
Tom Hazynski
Tom Morse

Tony Novak
Tracey Tronolone
Tracy Schwamb
Veona Martin
Veronica Farmer
Vickey Baker
Victor Gonchar
Victor Sytzko
Vikram Sikand
Viktoria Cohen
Vincent Prudente
Virginia Breza
Virginia Falconer
Virginia Rietz
Vivian Matalon
Voula Feuilly
Walter Bock
Wanda Plucinski
Warren Sherwood
Wayne Jablonski
Wayne Person
Wendy Green
Wendy W. Goetz
William Christ
William D.
William Haegele
William Hall
William Hull
William J. Bolen
William Pierce
William Pierdomenico
William Rodio
William Sharfman
Wilma Davison
Wim van Rossum
Win Olsen
Winifred Lutz
Yashoda Jordan
Zabrina Leith
Zorina Weber

Attachment 2:

The comments provided by these interested parties are identical or similar in content and are represented as Comment 23

A. Harris
Adrian Shiva
Al Soltis
Al Sterra
Alan Didino
Alan Gross
Alexandra Zavilowicz
Alice Golin
Alla Sobel
Andre Bernard
Andrea Fleming
Andrea Gilbert
Andrejs Jansons
Andrew Colletto
Andrew Mumford
Angela Delp
AniMae Chi
Ann Sandritter
Anna Egorova
Anna Kline
Anna Sidorova
Anne Marie Macari
Anne Shirinian-Orlando
Anneke Brewer
AnnMarie DiNatale
Anthony Brien
Anthony Ivankovic
Anthony Maista
April Jacob
Arlene Zimmer
Art Rosenberg
Ashley Farreny
Astrid Caruso
B. Greene
Barb Powell
Barbara Conover
Barbara Curtis
Barbara Levenstien
Barbara Wylie
Barbarosa Armm
Bash Riz
Beatrice Mcginnis
Betsy Cousins-Coleman
Bettina Hempel
Betty Abrams
Betty J. Van Wicklen
Beverly Railsback
Beverly Smalley
Beverly Solomon
Bill Howe
Birgitta Karlen
Bob Rusk
Brenda Cummings
Bridget Irons
C.B. Michaels
Caitlin Burke
Candace Jania
Carl Palmer
Carla Forsyth
Carlos Fernandez
Carol Broll
Carol Evans
Carol Fritz
Carolyn Foote Edelmann
Carolyn Marion
Carolyn Pereyra
Cassandra Browning
Catherine Eiref
Catherine Kudlick
Catherine Smith
Cathy Snyder
Charlene Cain
Charles Ciraulo
Charles Muise
Charles Quinn
Cheryl Dzubak
Cheryl Fagerty
Cheryl Garside
Cheryl Lees
Chris Kirsten
Chris Scholl
Christi Tempesta
Christine Malaroche
Christine Novak
Cindy Kerekes
Clara McIver
Clifford Weiss
Clyde Vigil
Colonel Meyer
Connie Bracco
Connie L. Keller
Corrina Parker
Cristen McConville
Cynthia Kent
Dan Hall
Dan O'Leary
Dan Parillo
Dana Leva Livingston
Daniel Marzani
Daniel Reynolds
Daniel Tumpson
Daniela Mess.
Danny Thomas
Darwin Schild
Dave Shellenberger
David Benner
David Darwin
David Ira Kagan
David Snope
David Winning
David Zhao
Debbie King
Debby Colgan
Deborah Kratzer
Deborah Scoblionkov
Denise Lytle
Denise Maurer
Denise McDermott
Denise Sacks
Dennis Mcintyre
Diana Von Hoffmann
Diane Abel
Diane Alexeev
Diane Bonanno
Diane Clark
Diane Gallagher
Diane Grohn
Diane MacInnes
Diane Shaughnessy
Dirck Benson
Dogan Ozkan
Don Fonshill
Don Gentile
Donald Waltman
Donna Fasanella
Donna Jenkins
Donna Nina
Doreen Terletzky
Dorina Hippauf
Dorothy Dozier
Dorothy Jackson
Dorothy Le
Dosier Hammond
Doug Smith
Douglas Raska
Douglas Schleifer
Dr. Lloyd Ross
Drew Cucuzza
E. Sto
Eddie Hayduk
Edward P. Morgan
Edward Thornton
Eileen Ward
Elaine Cuttler
Elaine Ercolano
Elaine Simon
Eleanor Anderson
Elena Marie
Elisabeth Richter
Elissa Hoeger
Elizabeth Baker
Elizabeth Carbone
Elizabeth Mellen
Ellen Mullery
Ellen Roos-Marr
Elsie Zecchino
Enid Rosenblatt
Eric Baratta
Erica Brinker
Erica Johanson
Erik Hartten
Erik Swanson
Estelle Padawer
Eva Outhwaitle
Evelyn Gomez
Ewa Norton
Faith Franck
Faith Zerbe
Flora Pino García
Fran Daily
Frances Duggan
Francis Groff
Frank & Wife Hyman
Frank Fotusky
Frank Gregory
Frank Hyman
Frantz Jedonne
Fred Ehmann
Fred Vineyard
Gabriel Morner
Gaby Mayer
Gaebriella George

Attachment 2:

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Gail Dato
Gary Brill
Gene Cahill
Gene D. Steiker
Gennaro F. DeLucia
George Colnaghi
Georgina Shanley
Gina Norton
Glen Deluca
Glenn & Debbie Carson
Glenn Rinker
Glenn Welsh
Gloria Lieberstein
Greg Gorman
Greg Schneider
Gregory Munson
Gretchen Varelli
Gus A. Ruggiero
Hal Trufan
Harini Shankar
Harry Hudson
Helen Cox
Helen Syen
Helen Towler
Henry Berkowitz
Henry M.
Hiram Jenkins
Holly McDonald
Howard B. Hassman
Howard Kidorf
Howard Schwartz
Howell Cohen
I. Schippert
Ian Campbell
Ian Fawthrop
Ida Carideo
J. Brummell
J. Rigney
J.C. Ford
Jack Cimprich
Jack Miller
Jacquelyn Imbrogno
Jacquie Amiriantz
James Bentley
James Heanin
James Heaphy
James Kaff
James Schmidgall
James Thompson
James V. Naughton
Jan Bishop
Jan Emerson
Jane Martin
Jane McMahill
Jane Penn
Janet Raymond
Janet Robinson
Janet Schubert
Janice Ehrenhaft
Janine Bauer
Jason Curtis
Jeffrey Rattner
Jelica Roland
Jen Derins
Jen Flynn
Jennifer Harford
Jennifer Vickers
Jeri Kobrick
Jesse Reyes
Jessica Lederman
Jessica Renard
Jim Murphy
Jo Gilbert
Joan Ward
Jo-Ann Arena
Jo-Ann Bowman
Jo-Ann Ramos
Joanne Gibbons
Joanne Linden
Joanne Pannone
Joe Louderbaw
Joe Merces
Joel Morse
John Gilris
John Henderson
John Hopkins
John J. Buttil
John K Hawes
John Kohms
John Massaro
John Mieczkowski
John Papandrea
John Rancich
John Resciniti
John Sheppard
John Waltz
John Willms
Jon Levin
Jonathan Klizas
Jonson Miller
Joseph Brigandi
Joseph DeSanctis
Joseph Forgione
Joseph Ponisciak
Joseph Porter
Joseph Visaggio
Joseph Wargo
Josh Saks
Joshua Cupriks
Joshua Saks
Judith Bennis
Judith Mayhew
Judy Buchsbaum
Judy Fairless
Judy Kulp
Judy Michaels
Julia DiAmore
Julianna Williams
Julie Garber
Julija Merljak
June Cattell
K. Paul
Karen McGuiness
Karen Swaine
Katherine Taboda
Kathleen Canavan
Kathleen Cockerill
Kathleen Cullity
Kathleen Galligan
Kathleen Kubinak
Kathleen Seltzer
Katie Gorman
Keith Thomas
Kelley Scanlon
Kelly Choi
Kelly Pluck
Ken Burkhardt
Ken Harms
Ken Price
Ken Sharp
Kerry Heck
Kevin Bannon
Kevin Dail
Kevin McCormick
Kevin Parks
Kevin Sickles
Kim Murphy
Kirk Haveman
Kristen Federowicz
Kristofor Bloomquist
Kurt Leithner
Kyle Vitale
Larry Graziano
Larry McGill
Larry Rack
Laura Aurilio
Laura Levey
Laura Lynch
Lauren Anderson
Lauren B.
Lauri Moon
Leia C.
Leonard Spitzer
Leslie R Stephens
Lina Silimkhan
Linda Fante
Linda Hassa
Linda Henson
Linda Mazzone
Linda Rubiano
Lisa Gilling
Lisa J. Riggiola
Lisa Neste
Liz Krumov
Lois Riggs
Lori Pantaleo
Lorraine Petrie
Lou Plocher
Louis Marks
Louis Novello
Louise Sherman
Louise Usechak
Lucille O'Keefe
Luke Damgen
Lynn Ebeling
Lynnette Krueger
M. Giardino
Madeleine Lee
Manuela Wolter
Marc Forman
Margaret Dimitriadis
Margaret Emerson

Attachment 2:

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Margaret McKenna
Margaret Mills
Margaret Monks
Margaret Needham
Margit Meissner-Jackson
Margot Becker
Mari Celeste Massaro
Maria Janucik
Marian Cruz
Marian Glenn
Marian Reiff
Marianne Cinaglia
Marianne Sender
Maricel Hahn
Marie D'Anna
Marilee Kauffman
Marilyn Cohen
Marilyn Heimowitz
Marilyn Rye
Marilyn Tjaden
Marion Komar
Mark
Mark Bailey
Mark Dickson
Mark Federowicz
Mark Milcarsky
Mark Myers
Mark Nagelhout
Mark Naranjo
Mark Stanton
Marlene Robinson
Marsha Weisfeld
Marta Guttenberg
Martha C. Akers
Martha Edwards
Martin Judd
Martin O'Connor
Marvin Brickner
Mary Anne Borge
Mary Bissell
Mary Burns
Mary Hauser
Mary Kellett
Mary Lehman
Mary Levan
Mary Lynn Ricketts
Mary O'Donnell
Mary Redfield
Mary Rivas
Mary Shafer
Mary Spector
Marya Parral
MaryAnn Bacon
Maryann Kirchenbauer
MaryJane Genestra
Matt Bennett
Matthew Bratter
Matthew Bulger
Matthew Flannery
Matthew Ford
Matthew Franck
Maureen Carson
Maurice Rosenstraus
Melinda Mendez
Melissa Challender
Mervi Rantala
Michael Abramek
Michael Butler
Michael Cetta
Michael Federowicz
Michael Hamburger
Michael Haskell
Michael Keady
Michael Lombardi
Michael Lucas
Michael Meyers-Jouan
Michael Miller
Michael Murphy
Michael O'Brien
Michael Troulis
Michael Vincek
Michelle Hoff
Michelle Murphy
Miia Suuronen
Mike Albar
Mike Dour
Mike Turano
Mikhail Grabois
Millisa Combatti
Milos Kivich
Mimi Chu
Minerva De La Torriente
Miryam Fonken
Moira Cahill
Mollie Vreeland
Molly Hauck
Monica Cardoza
Monica Freund
Monica Lamb-Torres
Morgan Cormia
Moshe Ben-Reuven
Nancy Chismar
Nancy Denton
Nancy Tanzi
Natasha Salgado
Neil Holzman
Nic Todd
Nicole Weber
Noris Nunez
Olvremi Esuruoso
Par Burton
Pat Dingleberry
Pat Raywood
Pat Ruggles
Pat Williamson
Patricia Brown
Patricia C. Rolston
Patricia Cipolla
Patricia Harris
Patricia Jenatsch
Patricia Kelly
Patricia Nathan
Patricia Soteropoulos
Patrick Mulligan
Patrick Randow
Paul Danik
Paul Dougherty
Paul Federowicz
Paul Gandolfo
Paul KImmins
Paul L.
Paul Roden
Paul Sanderson
Paul Teicher
Paula Bushkoff
Paula Xiberras
Pauline B. Paranto
Peggy Stahlin
Penny Gregorio
Peter Kinney
Philip Horowitz
Philip Mino
Phyllis Garr
R. Blaser
Ralph Garlin Clingan
Ramya Chellappa
Ray Johns
Rebecca Gold
Rebecca Gotterer
Rene DeSimone
Renee Zimmerman
Richard Burke
Richard Fuller
Richard Ingraham
Richard Jaretsky
Richard McNutt
Richard Van Aken
Robert & Donna Janusko
Robert Brown
Robert Carson
Robert F. Nunn M.D.
Robert Fitch
Robert Gardella
Robert J. Karasiewicz
Robert Jenkins
Robert Jonas
Robert Kinsella
Robert Lisowski
Robert McNulty
Robert Moore
Robert Pezick
Robert Post
Robert Zajac
Robert Zdance
Ron Jensen
Rosalie H. Kaye
Rose Reina-Rosenbaum
Rose Rosenbaum
Rosemarie Ceaser
Rui Moreira
Russell Everett
Russell Goodman
Ruth Boroshok
Ruth Messick
S. Murray
Sally Malanga
Sam Koplinka-Loehr
Sandra DeSmedt
Sandra L. Zimmerman
Sandy Carson
Sandy Spremulli
Sarah Easter

Sasha Mendez
Sau-Ha Nikki Chen
Scott Rotman
Scott Sobel
Scott Whitener
Sean Dugan
Sean G.
Shannon Pendleton
Sheila Gillies
Sherell C. Faunce
Sherrill Harrod
Shirley Bensetler
Shoshana Osofsky
Shyama Orum
Sondra Wolferman
Stan Emelanden
Stephanie Eckert
Stephanie Seymour
Stephen Blank Sr.
Stephen Evans
Stephen Granieri
Stephen Halpern
Stephen Schoggen
Steve Tardif
Steve Troyanovich
Steven Fenster
Steven Mondel
Stuart Sender
Sue Ruggiero
Suneet Srivastava
Susan Barrett
Susan Dasch
Susan Eckstein
Susan Hurwitz
Susan Katz
Susan Lazarchick
Susan Mullins
Susan Nanney
Susan Oelkers
Susan Proietta
Susan Shaak
Susan Sherman
Susan Uustal
Susan Williamson
Sylvia Ruth Gray
Sylvie Auger
T. Cho
T. G.
Tami Palacky
Tari Pantaleo
Ted Fishman
Teresa Rivas
Terry Friedman
Terry Glover
Theodore Brantly
Theresa Croce
Thomas Barringer
Thomas Koven
Thomas P. Palmer
Thomas Smith
Thorton Long
Todd Stevenson
Tom Brown
Tom Harris
Tony Pendas
Ugo Atulomah
Valerie Capezzuto
Vamsi Rani
Vicki Keehner
Victor Gonchar
Victor Sytzko
Virginia Rietz
Vivian Matalon
Wanda Crain
Warren Elmer
Wayne Person
William Covert
William Edwards
William Mcauley Wyckoff
William Vachula
Zorina Weber

NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM

The New Jersey Department of Environmental Protection hereby grants you a NJPDES permit for the facility/activity named in this document. This permit is the regulatory mechanism used by the Department to help ensure your discharge will not harm the environment. By complying with the terms and conditions specified, you are assuming an important role in protecting New Jersey's valuable water resources. Your acceptance of this permit is an agreement to conform with all of its provisions when constructing, installing, modifying, or operating any facility for the collection, treatment, or discharge of pollutants to waters of the state. If you have any questions about this document, please feel free to contact the Department representative listed in the permit cover letter. Your cooperation in helping us protect and safeguard our state's environment is appreciated.

Permit Number: NJ0005622

Final: Surface Water Renewal Permit Action

Permittee:
PSEG Nuclear, LLC
P.O. Box 236
Hancocks Bridge, NJ 08038

Co-Permittee:

Property Owner:
PSEG Nuclear, LLC
P.O. Box 236
Hancocks Bridge, NJ 08038

Location Of Activity:
PSEG Nuclear LLC Salem Generating Station
Alloway Creek Neck Rd
Lower Alloways Creek Township, Salem County

Authorization Covered Under This Approval	Issuance Date	Effective Date	Expiration Date
B -Industrial Wastewater	06/10/2016	08/01/2016	07/31/2021

By Authority of:
Commissioner's Office

DEP AUTHORIZATION
Pilar Patterson, Chief
Bureau of Surface Water Permitting
Water Pollution Management Element
Division of Water Quality

(Terms, conditions and provisions attached hereto)

PART I
GENERAL REQUIREMENTS:
NJPDES

A. General Requirements of all NJPDES Permits

1. Requirements Incorporated by Reference

a. The permittee shall comply with all conditions set forth in this permit and with all the applicable requirements incorporated into this permit by reference. The permittee is required to comply with the regulations, including those cited in paragraphs b. through e. following, which are in effect as of the effective date of the final permit.

b. General Conditions

Penalties for Violations	N.J.A.C. 7:14-8.1 et seq.
Incorporation by Reference	N.J.A.C. 7:14A-2.3
Toxic Pollutants	N.J.A.C. 7:14A-6.2(a)4i
Duty to Comply	N.J.A.C. 7:14A-6.2(a)1 & 4
Duty to Mitigate	N.J.A.C. 7:14A-6.2(a)5 & 11
Inspection and Entry	N.J.A.C. 7:14A-2.11(e)
Enforcement Action	N.J.A.C. 7:14A-2.9
Duty to Reapply	N.J.A.C. 7:14A-4.2(e)3
Signatory Requirements for Applications and Reports	N.J.A.C. 7:14A-4.9
Effect of Permit/Other Laws	N.J.A.C. 7:14A-6.2(a)6 & 7 & 2.9(c)
Severability	N.J.A.C. 7:14A-2.2
Administrative Continuation of Permits	N.J.A.C. 7:14A-2.8
Permit Actions	N.J.A.C. 7:14A-2.7(c)
Reopener Clause	N.J.A.C. 7:14A-6.2(a)10
Permit Duration and Renewal	N.J.A.C. 7:14A-2.7(a) & (b)
Consolidation of Permit Process	N.J.A.C. 7:14A-15.5
Confidentiality	N.J.A.C. 7:14A-18.2 & 2.11(g)
Fee Schedule	N.J.A.C. 7:14A-3.1
Treatment Works Approval	N.J.A.C. 7:14A-22 & 23

c. Operation And Maintenance

Need to Halt or Reduce not a Defense	N.J.A.C. 7:14A-2.9(b)
Proper Operation and Maintenance	N.J.A.C. 7:14A-6.12

d. Monitoring And Records

Monitoring	N.J.A.C. 7:14A-6.5
Recordkeeping	N.J.A.C. 7:14A-6.6
Signatory Requirements for Monitoring Reports	N.J.A.C. 7:14A-6.9

e. Reporting Requirements

Planned Changes	N.J.A.C. 7:14A-6.7
Reporting of Monitoring Results	N.J.A.C. 7:14A-6.8
Noncompliance Reporting	N.J.A.C. 7:14A-6.10 & 6.8(h)
Hotline/Two Hour & Twenty-four Hour Reporting	N.J.A.C. 7:14A-6.10(c) & (d)
Written Reporting	N.J.A.C. 7:14A-6.10(e) &(f) & 6.8(h)
Duty to Provide Information	N.J.A.C. 7:14A-2.11, 6.2(a)14 & 18.1
Schedules of Compliance	N.J.A.C. 7:14A-6.4
Transfer	N.J.A.C. 7:14A-6.2(a)8 & 16.2

PART II

GENERAL REQUIREMENTS: DISCHARGE CATEGORIES

A. Additional Requirements Incorporated By Reference

1. Requirements for Discharges to Surface Waters

a. In addition to conditions in Part I of this permit, the conditions in this section are applicable to activities at the permitted location and are incorporated by reference. The permittee is required to comply with the regulations which are in effect as of the effective date of the final permit.

i. Surface Water Quality Standards N.J.A.C. 7:9B-1

ii. Water Quality Management Planning Regulations N.J.A.C. 7:15

B. General Conditions

1. Scope

a. The issuance of this permit shall not be considered as a waiver of any applicable federal, state, and local rules, regulations and ordinances.

2. Permit Renewal Requirement

a. Permit conditions remain in effect and enforceable until and unless the permit is modified, renewed or revoked by the Department.

b. Submit a complete permit renewal application: 180 days before the Expiration Date.

3. Notification of Non-Compliance

a. The permittee shall notify the Department of all non-compliance when required in accordance with N.J.A.C. 7:14A-6.10 by contacting the DEP HOTLINE at 1-877-WARNDEP (1-877-927-6337).

b. The permittee shall submit a written report as required by N.J.A.C. 7:14A-6.10 within five days.

4. Notification of Changes

a. The permittee shall give written notification to the Department of any planned physical or operational alterations or additions to the permitted facility when the alteration is expected to result in a significant change in the permittee's discharge and/or residuals use or disposal practices including the cessation of discharge in accordance with N.J.A.C. 7:14A-6.7.

b. Prior to any change in ownership, the current permittee shall comply with the requirements of N.J.A.C. 7:14A-16.2, pertaining to the notification of change in ownership.

5. Access to Information

a. The permittee shall allow an authorized representative of the Department, upon the presentation of credentials, to enter upon a person's premises, for purposes of inspection, and to access / copy any records that must be kept under the conditions of this permit.

6. Operator Certification

a. Pursuant to N.J.A.C. 7:10A-1.1 et seq. every wastewater system not exempt pursuant to N.J.A.C. 7:10A-1.1(b) requires a licensed operator. The operator of a system shall meet the Department's requirements pursuant to N.J.A.C. 7:10A-1.1 and any amendments. The name of the proposed operator, where required shall be submitted to the Department at the address below, in order that his/her qualifications may be determined prior to initiating operation of the treatment works.

i. Notifications shall be submitted to:
NJDEP
Examination and Licensing Unit
P.O. Box 417
Trenton, New Jersey 08625
(609)777-1012.

b. The permittee shall notify the Department of any changes in licensed operator within two weeks of the change.

7. Operation Restrictions

a. The operation of a waste treatment or disposal facility shall at no time create: (a) a discharge, except as authorized by the Department in the manner and location specified in Part III of this permit; (b) any discharge to the waters of the state or any standing or ponded condtion for water or waste, except as specifically authorized by a valid NJPDES permit.

8. Residuals Management

a. The permittee shall comply with land-based sludge management criteria and shall conform with the requirements for the management of residuals and grit and screenings under N.J.A.C. 7:14A-6.15(a), which includes:

i. Standards for the Use or Disposal of Residual, N.J.A.C. 7:14A-20;

ii. Section 405 of the Federal Act governing the disposal of sludge from treatment works treating domestic sewage;

iii. The Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and the Solid Waste Management Rules, N.J.A.C. 7:26;

iv. The Sludge Quality Assurance Regulations, N.J.A.C. 7:14C;

v. The Statewide Sludge Management Plan promulgated pursuant to the Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq., and the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq.; and

vi. The provisions concerning disposal of sewage sludge and septage in sanitary landfills set forth at N.J.S.A. 13:1E-42 and the Statewide Sludge Management Plan.

vii. Residual that is disposed in a municipal solid waste landfill unit shall meet the requirements in 40 CFR Part 258 and/or N.J.A.C. 7:26 concerning the quality of residual disposed in a municipal solid waste landfill unit. (That is, passes the Toxicity Characteristic Leaching Procedure and does not contain "free liquids" as defined at N.J.A.C. 7:14A-1.2.)

b. If any applicable standard for residual use or disposal is promulgated under section 405(d)of the Federal Act and Sections 4 and 6 of the State Act and that standard is more stringent than any limitation on the pollutant or practice in the permit, the Department may modify or revoke and reissue the permit to conform to the standard for residual use or disposal.

c. The permittee shall make provisions for storage, or some other approved alternative management strategy, for anticipated downtimes at a primary residual management alternative. The permittee shall not be permitted to store residual beyond the capacity of the structural treatment and storage components of the treatment works. N.J.A.C. 7:14A-20.8(a) and N.J.A.C. 7:26 provide for the temporary storage of residuals for periods not exceeding six months, provided such storage does not cause pollutants to enter surface or ground waters of the State. The storage of residual for more than six months is not authorized under this permit. However, this prohibition does not apply to residual that remains on the land for longer than six months when the person who prepares the residual demonstrates that the land on which the residual remains is not a surface disposal site or landfill. The demonstration shall explain why residual must remain on the land for longer than six months prior to final use or disposal, discuss the approximate time period during which the residual shall be used or disposed and provide documentation of ultimate residual management arrangements. Said demonstration shall be in writing, be kept on file by the person who prepares residual, and submitted to the Department upon request.

d. The permittee shall comply with the appropriate adopted District Solid Waste or Sludge Management Plan (which by definition in N.J.A.C. 7:14A-1.2 includes Generator Sludge Management Plans), unless otherwise specifically exempted by the Department.

e. The preparer must notify and provide information necessary to comply with the N.J.A.C. 7:14A-20 land application requirements to the person who applies bulk residual to the land. This shall include, but not be limited to, the applicable recordkeeping requirements and certification statements of 40 CFR 503.17 as referenced at N.J.A.C 7:14A-20.7(j).

f. The preparer who provides residual to another person who further prepares the residual for application to the land must provide this person with notification and information necessary to comply with the N.J.A.C. 7:14A-20 land application requirements.

g. Any person who prepares bulk residual in New Jersey that is applied to land in a State other than New Jersey shall comply with the requirement at N.J.A.C. 7:14A-20.7(b)1.ix to submit to the Department written proof of compliance with or satisfaction of all applicable statutes, regulations, and guidelines of the state in which land application will occur.

C. Custom Requirement

1. Residuals Reporting

a. Based upon previous correspondence with PSEG, the Department is satisfied that the Annual Radioactive Effluent Release Report (ARERR) contains the necessary sludge management information required under the Sludge Quality Assurance Regulations (SQAR, N.J.A.C. 7:14C) and Part II of the permit. Annually, PSEG shall submit proof of proper sludge management of each sludge type to the following address:

NJDEP-DWQ
Bureau of Pretreatment and Residuals
Mail Code 401-02B, P.O. Box 420
Trenton, NJ 08625-0420
.

PART III
LIMITS AND MONITORING REQUIREMENTS

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
048C SW Outfall 48C	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples obtained for this internal monitoring point shall be collected after all treatment has been performed but prior to mixing with any circulating water system effluent. The permittee has the ability to route the discharge from 48C to DSN's 481, 482, 484 and/or 485.

Contributing Waste Types

Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - A - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			
Solids, Total Suspended	Effluent Gross Value	*****	*****	*****	*****	30 Monthly Average	100 Daily Maximum	MG/L	2/Month	Composite
January thru December	QL	***	***		***	***	***			
Nitrogen, Ammonia Total (as N)	Effluent Gross Value	*****	*****	*****	*****	35 Monthly Average	70 Daily Maximum	MG/L	2/Month	Composite
January thru December	QL	***	***		***	***	***			
Petroleum Hydrocarbons	Effluent Gross Value	*****	*****	*****	*****	10 Monthly Average	15 Daily Maximum	MG/L	2/Month	Grab
January thru December	QL	***	***		***	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - A - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Carbon, Tot Organic (TOC)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	50 Daily Maximum	MG/L	2/Month	Composite
January thru December	QL	***	***		***	***	***			

Surface Water WCR - Semi Annual Reporting Requirements:

Submit a Semi-Annual WCR: within twenty-five days after the end of every 6 month monitoring period beginning from the effective date of the permit (EDP).

Table III - A - 2: Surface Water WCR - Semi Annual Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Compliance Quantity	Units	Sample Type	Monitoring Period
Sulfate, Total (as SO4)	Effluent Gross Value	REPORT	UG/L	Grab	January thru December
Boron, Total (as B)	Effluent Gross Value	REPORT	UG/L	Grab	January thru December
Dichlorobromomethane	Effluent Gross Value	REPORT	UG/L	Grab	January thru December
Bromoform	Effluent Gross Value	REPORT	UG/L	Grab	January thru December

Surface Water WCR - Semi Annual Reporting Requirements:

Submit a Semi-Annual WCR: within twenty-five days after the end of every 6 month monitoring period beginning from the effective date of the permit (EDP).

Table III - A - 2: Surface Water WCR - Semi Annual Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Compliance Quantity	Units	Sample Type	Monitoring Period
Chloroform	Effluent Gross Value	REPORT	UG/L	Grab	January thru December
Acrylonitrile	Effluent Gross Value	REPORT	UG/L	Grab	January thru December
Chlorodibromomethane	Effluent Gross Value	REPORT	UG/L	Grab	January thru December

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
481A SW Outfall 481A	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples shall be obtained at the discharge "standpipe" which is a point after combination of the two circulators and introduction of all other wastewater components. Unless service water system is being discharged, the effluent limits of 0.2 mg/L (daily max.) and "monitor only" (monthly average) apply for CPO.

Contributing Waste Types

Non-contact Cooling Water, Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

The permittee is required to perform acute toxicity testing on a minimum of one representative CWS outfall while DSN 48C is being routed to that outfall.

Table III - B - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6.0 Daily Minimum	*****	9.0 Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
pH	Intake From Stream	*****	*****	*****	REPORT Daily Minimum	*****	REPORT Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
LC50 Statre 96hr Acu Cyprinodon	Effluent Gross Value	*****	*****	*****	REPORT Daily Minimum	*****	*****	%EFFL	2/Year	Composite
January thru December	AL	***	***		50	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

The permittee is required to perform acute toxicity testing on a minimum of one representative CWS outfall while DSN 48C is being routed to that outfall.

Table III - B - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Chlorine Produced Oxidants Option 1	Effluent Gross Value	*****	*****	*****	*****	0.3 Monthly Average	0.5 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Chlorine Produced Oxidants Option 2	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	0.2 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Daily Maximum	DEG.C	1/Day	Continuous
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
482A SW Outfall 482A	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples shall be obtained at the discharge "standpipe" which is a point after combination of the two circulators and introduction of all other wastewater components. Unless service water system is being discharged, the effluent limits of 0.2 mg/L (daily max.) and "monitor only" (monthly average) apply for CPO.

Contributing Waste Types

Non-contact Cooling Water, Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

The permittee is required to perform acute toxicity testing on a minimum of one representative CWS outfall while DSN 48C is being routed to that outfall.

Table III - C - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6.0 Daily Minimum	*****	9.0 Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
pH	Intake From Stream	*****	*****	*****	REPORT Daily Minimum	*****	REPORT Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
LC50 Statre 96hr Acu Cyprinodon	Effluent Gross Value	*****	*****	*****	REPORT Daily Minimum	*****	*****	%EFFL	2/Year	Composite
January thru December	AL	***	***		50	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

The permittee is required to perform acute toxicity testing on a minimum of one representative CWS outfall while DSN 48C is being routed to that outfall.

Table III - C - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Chlorine Produced Oxidants Option 1	Effluent Gross Value	*****	*****	*****	*****	0.3 Monthly Average	0.5 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Chlorine Produced Oxidants Option 2	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	0.2 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Daily Maximum	DEG.C	1/Day	Continuous
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
483A SW Outfall 483A	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples shall be obtained at the discharge "standpipe" which is a point after combination of the two circulators and introduction of all other wastewater components. Unless service water system is being discharged, the effluent limits of 0.2 mg/L (daily max.) and "monitor only" (monthly average) apply for CPO.

Contributing Waste Types

Non-contact Cooling Water, Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - D - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6.0 Daily Minimum	*****	9.0 Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
pH	Intake From Stream	*****	*****	*****	REPORT Daily Minimum	*****	REPORT Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
Chlorine Produced Oxidants Option 1	Effluent Gross Value	*****	*****	*****	*****	0.3 Monthly Average	0.5 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - D - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Chlorine Produced Oxidants Option 2	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	0.2 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Daily Maximum	DEG.C	1/Day	Continuous
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
484A SW Outfall 484A	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples shall be obtained at the discharge "standpipe" which is a point after combination of the two circulators and introduction of all other wastewater components. Unless service water system is being discharged, the effluent limits of 0.2 mg/L (daily max.) and "monitor only" (monthly average) apply for CPO..

Contributing Waste Types

Non-contact Cooling Water, Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

The permittee is required to perform acute toxicity testing on a minimum of one representative CWS outfall while DSN 48C is being routed to that outfall.

Table III - E - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6.0 Daily Minimum	*****	9.0 Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
pH	Intake From Stream	*****	*****	*****	REPORT Daily Minimum	*****	REPORT Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
LC50 Statre 96hr Acu Cyprinodon	Effluent Gross Value	*****	*****	*****	REPORT Daily Minimum	*****	*****	%EFFL	2/Year	Composite
January thru December	AL	***	***		50	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

The permittee is required to perform acute toxicity testing on a minimum of one representative CWS outfall while DSN 48C is being routed to that outfall.

Table III - E - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Chlorine Produced Oxidants Option 1	Effluent Gross Value	*****	*****	*****	*****	0.3 Monthly Average	0.5 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Chlorine Produced Oxidants Option 2	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	0.2 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Daily Maximum	DEG.C	1/Day	Continuous
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
485A SW Outfall 485A	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples shall be obtained at the discharge "standpipe" which is a point after combination of the two circulators and introduction of all other wastewater components. Unless service water system is being discharged, the effluent limits of 0.2 mg/L (daily max.) and "monitor only" (monthly average) apply for CPO.

Contributing Waste Types

Non-contact Cooling Water, Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

The permittee is required to perform acute toxicity testing on a minimum of one representative CWS outfall while DSN 48C is being routed to that outfall.

Table III - F - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6.0 Daily Minimum	*****	9.0 Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
pH	Intake From Stream	*****	*****	*****	REPORT Daily Minimum	*****	REPORT Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
LC50 Statre 96hr Acu Cyprinodon	Effluent Gross Value	*****	*****	*****	REPORT Daily Minimum	*****	*****	%EFFL	2/Year	Composite
January thru December	AL	***	***		50	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

The permittee is required to perform acute toxicity testing on a minimum of one representative CWS outfall while DSN 48C is being routed to that outfall.

Table III - F - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Chlorine Produced Oxidants Option 1	Effluent Gross Value	*****	*****	*****	*****	0.3 Monthly Average	0.5 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Chlorine Produced Oxidants Option 2	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	0.2 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Daily Maximum	DEG.C	1/Day	Continuous
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
486A SW Outfall 486A	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples shall be obtained at the discharge "standpipe" which is a point after combination of the two circulators and introduction of all other wastewater components. Unless service water system is being discharged, the effluent limits of 0.2 mg/L (daily max.) and "monitor only" (monthly average) apply for CPO.

Contributing Waste Types

Non-contact Cooling Water, Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

Intake flow reporting for "Raw/Sew/Influent" for DSN 486 refers to the service water intake.

Table III - G - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Raw Sew/influent	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6.0 Daily Minimum	*****	9.0 Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			
pH	Intake From Stream	*****	*****	*****	REPORT Daily Minimum	*****	REPORT Daily Maximum	SU	1/Week	Grab
January thru December	QL	***	***		***	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Comments:

Intake flow reporting for "Raw/Sew/Influent" for DSN 486 refers to the service water intake.

Table III - G - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Chlorine Produced Oxidants Option 1	Effluent Gross Value	*****	*****	*****	*****	0.3 Monthly Average	0.5 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Chlorine Produced Oxidants Option 2	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	0.2 Daily Maximum	MG/L	3/Week	Grab
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	REPORT Daily Maximum	DEG.C	1/Day	Continuous
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
487B SW Outfall 487B	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples shall be obtained from the discharge monitoroing point of the #3 Skim Tank. DSN 487B discharges to Zone 5 of the Delaware River

Contributing Waste Types

Process Water, Storm Water Runoff

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - H - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Batch	Calculated
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6.0 Daily Minimum	*****	9.0 Daily Maximum	SU	1/Batch	Grab
January thru December	QL	***	***		***	***	***			
Solids, Total Suspended	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	100 Daily Maximum	MG/L	1/Batch	Grab
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	43.3 Daily Maximum	DEG.C	1/Batch	Grab
January thru December	QL	***	***		***	***	***			
Petroleum Hydrocarbons	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	15 Daily Maximum	MG/L	1/Batch	Grab
January thru December	QL	***	***		***	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - H - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Carbon, Tot Organic (TOC)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	50 Daily Maximum	MG/L	1/Batch	Grab
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
489A SW Outfall 489A	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples for DSN 489 shall be obtained at the terminus of the oil/water separator. DSN 489 discharges to Zone 5 of the Delaware River.

Contributing Waste Types

Storm Water Runoff

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - I - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Effluent Gross Value	REPORT Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Month	Calculated
January thru December	QL	***	***		***	***	***			
pH	Effluent Gross Value	*****	*****	*****	6.0 Daily Minimum	*****	9.0 Daily Maximum	SU	1/Month	Grab
January thru December	QL	***	***		***	***	***			
Solids, Total Suspended	Effluent Gross Value	*****	*****	*****	100 Daily Maximum	30 Monthly Average	*****	MG/L	1/Month	Grab
January thru December	QL	***	***		***	***	***			
Petroleum Hydrocarbons	Effluent Gross Value	*****	*****	*****	*****	10 Monthly Average	15 Daily Maximum	MG/L	1/Month	Grab
January thru December	QL	***	***		***	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - I - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Carbon, Tot Organic (TOC)	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	50 Daily Maximum	MG/L	1/Month	Grab
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
FACA SW Outfall FACA	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples collected at DSN's 481A, 482A and 483A shall be reported as a whole to represent the thermal discharge from Unit 1. DSN's 481A, 482A and 483A discharge to Zone 5 of the Delaware River.

Contributing Waste Types

Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - J - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Temperature, oC	Raw Sew/influent	*****	*****	*****	*****	REPORT Monthly Average	REPORT Daily Maximum	DEG.C	Continuous	Continuous
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	*****	DEG.C	Continuous	Continuous
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	*****	46.1 Daily Maximum	DEG.C	Continuous	Continuous
June thru September	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	*****	43.3 Daily Maximum	DEG.C	Continuous	Continuous
October thru May	QL	***	***		***	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - J - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Temperature, oC	Effluent Net Value	*****	*****	*****	*****	REPORT Monthly Average	15.3 Daily Maximum	DEG.C	1/Day	Calculated
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
FACB SW Outfall FACB	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples collected at DSN's 484A, 485A and 486A shall be reported as a whole to represent the thermal discharge from Unit 2. DSN's 484A, 485A and 486A discharge to Zone 5 of the Delaware River.

Contributing Waste Types

Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - K - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Temperature, oC	Raw Sew/influent	*****	*****	*****	*****	REPORT Monthly Average	REPORT Daily Maximum	DEG.C	Continuous	Continuous
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	REPORT Monthly Average	*****	DEG.C	Continuous	Continuous
January thru December	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	*****	46.1 Daily Maximum	DEG.C	Continuous	Continuous
June thru September	QL	***	***		***	***	***			
Temperature, oC	Effluent Gross Value	*****	*****	*****	*****	*****	43.3 Daily Maximum	DEG.C	Continuous	Continuous
October thru May	QL	***	***		***	***	***			

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - K - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Temperature, oC	Effluent Net Value	*****	*****	*****	*****	REPORT Monthly Average	15.3 Daily Maximum	DEG.C	1/Day	Calculated
January thru December	QL	***	***		***	***	***			

MONITORED LOCATION:	RECEIVING STREAM:	STREAM CLASSIFICATION:	DISCHARGE CATEGORY(IES):
FACC SW Outfall FACC	Delaware River	Mainstem Delaware-Zone 5	B - Industrial Wastewater

Location Description

Samples collected at DSN's 481-486 shall be reported as a whole to represent the thermal discharge and circulating water system intake flow from the facility as a whole. DSN's 481-486 discharge to Zone 5 of the Delaware River.

Contributing Waste Types

Process Water

Surface Water DMR Reporting Requirements:

Submit a Monthly DMR: within twenty-five days after the end of every month beginning from the effective date of the permit (EDP).

Table III - L - 1: Surface Water DMR Limits and Monitoring Requirements

PHASE: Final **PHASE Start Date:** 08/01/2016 **PHASE End Date:**

Parameter	Sample Point	Limit	Limit	Units	Limit	Limit	Limit	Units	Frequency	Sample Type
Flow, In Conduit or Thru Treatment Plant	Raw Sew/influent	3024 Monthly Average	REPORT Daily Maximum	MGD	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			
Thermal Discharge Million BTUs per Hr	Effluent Net Value	REPORT Monthly Average	30600 Daily Maximum	MBTU/HR	*****	*****	*****	*****	1/Day	Calculated
January thru December	QL	***	***		***	***	***			

PART IV

SPECIFIC REQUIREMENTS: NARRATIVE

Notes and Definitions

A. Footnotes

B. Definitions

Industrial Wastewater

A. MONITORING REQUIREMENTS

1. Standard Monitoring Requirements

a. Each analysis required by this permit shall be performed by a New Jersey Certified Laboratory that is certified to perform that analysis.

b. The permittee shall perform all water/wastewater analyses in accordance with the analytical test procedures specified in 40 CFR 136 unless other test procedures have been approved by the Department in writing or as otherwise specified in the permit.

c. When more than one test procedure is approved for the analysis of a pollutant or pollutant parameter, the test procedure must be sufficiently sensitive as defined at 40 CFR 136, 122.21(e)(3), and 122.44(i)(1)(iv).

d. All sampling shall be conducted in accordance with the Department's Field Sampling Procedures Manual, or an alternate method approved by the Department in writing.

e. All monitoring shall be conducted as specified in Part III.

f. All sample frequencies expressed in Part III are minimum requirements. Any additional samples taken consistent with the monitoring and reporting requirements contained herein shall be reported on the Monitoring Report Forms.

g. Annual and semi-annual wastewater testing shall be conducted in a different quarter of each year so that tests are conducted in each of the four permit quarters of the permit cycle. Testing may be conducted during any month of the permit quarters.

h. The permittee shall comply with 40 CFR 423 regarding the discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid. There shall be no discharge of PCB compounds as analyzed by conventional methods.

B. RECORDKEEPING

1. Standard Recordkeeping Requirements

a. The permittee shall retain records of all monitoring information, including 1) all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation (if applicable), 2) copies of all reports required by this NJPDES permit, 3) all data used to complete the application for a NJPDES permit, and 4) monitoring information required by the permit related to the permittee's residual use and/or disposal practices, for a period of at least 5 years, or longer as required by N.J.A.C. 7:14A-20, from the date of the sample, measurement, report, application or record.

b. Records of monitoring information shall include 1) the date, locations, and time of sampling or measurements, 2) the individual(s) who performed the sampling or measurements, 3) the date(s) the analyses were performed, 4) the individual(s) who performed the analyses, 5) the analytical techniques or methods used, and 6) the results of such analyses.

C. REPORTING

1. Standard Reporting Requirements

Industrial Wastewater

a. The permittee shall submit all required monitoring results to the Department on the forms provided to them. The Monitoring Report Forms (MRFs) may be provided to the permittee in either a paper format or in an electronic file format. Unless otherwise noted, all requirements below pertain to both paper and electronic formats.

b. Any MRFs in paper format shall be submitted to the following addresses:

   i. NJDEP
   Mail Code 401-02B
   Division of Water Quality
   Office of Permit Management
   P.O. Box 420
   Trenton, New Jersey 08625-0420.

   ii. Delaware River Basin Commission (DRBC)
   P. O. Box 7360
   West Trenton, New Jersey 08628

   iii. (if requested by the Water Compliance and Enforcement Bureau)
   NJDEP: Southern Bureau of Water Compliance and Enforcement
   One Port Center
   2 Riverside Drive, Suite 201
   Camden, New Jersey 08103

c. Any electronic data submission shall be in accordance with the guidelines and provisions outlined in the Department's Electronic Data Interchange (EDI) agreement with the permittee. Paper copies must be available for on-site inspection by DEP personnel or provided to the DEP upon written request.

d. All monitoring report forms shall be certified by the highest ranking official having day-to-day managerial and operational responsibilities for the discharging facility.

e. The highest ranking official may delegate responsibility to certify the monitoring report forms in his or her absence. Authorizations for other individuals to sign shall be made in accordance with N.J.A.C. 7:14A-4.9(b).

f. Monitoring results shall be submitted in accordance with the current Discharge Monitoring Report Manual and any updates thereof.

g. If monitoring for a parameter is not required in a monitoring period, the permittee must report "CODE=N" for that parameter.

h. For intermittent discharges, the permittee shall obtain a sample during at least one of the discharge events occurring during a monitoring period.

i. If there are no discharge events during an entire monitoring period, the permittee must notify the Department when submitting the monitoring results. This is accomplished by placing a check mark in the "No Discharge this monitoring period" box on the paper or electronic version of the monitoring report submittal form.

D. SUBMITTALS

1. Standard Submittal Requirements

a. The permittee shall amend the Operation & Maintenance Manual whenever there is a change in the treatment works design, construction, operations or maintenance which substantially changes the treatment works operations and maintenance procedures.

2. Delaware River Basin PCB Requirements

a. On December 15, 2003, the U.S. EPA, Regions 2 and 3, adopted a Total Maximum Daily Load (TMDL) for PCBs for Zones 2, 3, 4, and 5 of the tidal Delaware River. On December 15, 2006, the U.S. EPA, Regions 2 and 3, adopted a Total Maximum Daily Load (TMDL) for PCBs for Zone 6 (Delaware Bay). The TMDLs require the facilities identified as discharging PCBs to these zones of the Delaware River or to the tidal portions of tributaries to these zones to conduct monitoring for 209 PCB congeners, and prepare and implement a PCB Pollutant Minimization Plan (PMP).

b. Subsequent monitoring required by DRBC in 2005 confirmed the presence of PCBs, and indicates that this facility does not contribute to 99% of the cumulative loadings from all point sources. Therefore, the permittee shall collect one 24-hour composite or a grab (as determined by DRBC Sampling protocol) sample annually during a wet weather flow and one 24-hour composite sample annually during a dry weather flow at DSN 489. In addition, one dry weather samples shall be collected annually at DSN 48C.

c. All sample analyses shall be performed using EPA Method 1668A, Revision A: Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by HRGC/HRMS. EPA-821-R-00-002, December 1999 as supplemented or amended, and results for all 209 PCB congeners shall be reported. Project-specific, sample collection protocols, analytical procedures, and reporting requirements at http://www.state.nj.us/drbc/quality/toxics/pcbs/monitoring.html shall be followed. Monitoring information, sample data, and reports associated with PCB monitoring shall be submitted to the Department and DRBC in the form of two compact discs in the format referenced at http://www.nj.gov/drbc/library/documents/PCB-EDD011309.pdf.

d. In accordance with the U.S. EPA Regions 2 and 3 Total Maximum Daily Loads (TMDLs) for PCBs for Zones 2-5 of the Tidal Delaware River, the permittee submitted a Pollutant Minimization Plan (PMP) which was approved on April 25, 2006. The permittee shall continue to comply with the requirements of Section 4.30.9 of DRBC's Water Quality Regulations. Therefore, the permittee shall:.

   i. Continue to implement the PMP to achieve PCB loading reduction goals, and;

   ii. Submit an Annual Report on the yearly anniversary of the commencement of the PMP to DRBC and the Department consistent with the guidance specified at http://www.state.nj.us/drbc/programs/quality/pmp.html.

e. The PCB data shall be submitted to the DRBC only, The PMP (if needed) and PMP Annual Reports shall be submitted to the following:.

   i. Delaware River Basin Commission
   Modeling, Monitoring & Assessment Branch
   P.O. Box 7360
   West Trenton, NJ 08628

E. FACILITY MANAGEMENT

1. Discharge Requirements

a. The permittee shall discharge at the locations specified in PART III of this permit.

b. The permittee shall not discharge foam or cause foaming of the receiving water that: 1) Forms objectionable deposits on the receiving water, 2) Forms floating masses producing a nuisance, or 3) Interferes with a designated use of the waterbody.

c. The permittee's discharge shall not produce objectionable color or odor in the receiving stream.

d. The discharge shall not exhibit a visible sheen.

e. The Permittee is authorized to use the following corrosion inhibitors, biocides, or other cooling water additives:.

i. DSNs 481-486: Sodium hypochlorite may be used in the service water system, if needed, in excess of two hours per day to allow for continuous chlorination to control macroinvertebrate fouling.

ii. DSNs 481-486: Sodium hypochlorite may also be added to the circulating water system to control biofouling, upon prior notification to the Department. As part of this notification, the permittee shall provide the Department with a methodology for sodium hypochlorite addition. Upon approval by the Department, in writing, chlorine produced oxidants may not be discharged from DSNs 481-486 for more than two hours per day where chlorine produced oxidants shall be monitored three times per day at DSNs 481-486 during this two hour period. A daily maximum effluent limitation of 0.2 mg/L would apply during the chlorination of the main condensers where the permittee would be required to maintain a log noting the time and duration of chlorination of the main condensers.

iii. DSN 48C: The permittee is authorized to use the following additives in the steam plant and the non-radioactive liquid waste disposal system: ammonium hydroxide, hydrazine, ethanolamine, and polyacrylic acid (PAA), which are used for corrosion control in the plant steam systems; sodium hypochlorite, hydrogen peroxide, sodium hydroxide, and a coagulant aid, which are used in the non-radioactive liquid waste disposal treatment system; and sodium hydroxide and sulfuric acid, which are used to regulate demineralizers.

iv. DSN 487B: Ammonia and hydrazine are used for corrosion control in the auxiliary boiler blowdown.

v. All outfalls: If the permittee decided to begin using additional agents or replace the above agents in the future for any outfalls, the permittee must notify the Department at least 180 days prior to use so that the permit may be reopened, if necessary, to incorporate any additional limitations deemed necessary. ADDRESS PAA?.

2. Applicability of Discharge Limitations and Effective Dates

a. Surface Water Discharge Monitoring Report (DMR) Form Requirements

i. The final effluent limitations and monitoring conditions contained in Part III for all outfalls apply for the full term of this permit action.

b. Wastewater Characterization Report (WCR) Form Requirements

i. The final effluent monitoring conditions contained in Part III for all outfalls apply for the full term of this permit action.

3. Operation, Maintenance and Emergency conditions

a. The permittee shall operate and maintain treatment works and facilities which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit as specified in the Operation & Maintenance Manual.

b. The permittee shall develop emergency procedures to ensure effective operation of the treatment works under emergency conditions in accordance with NJAC 7:14A-6.12(d).

4. Toxicity Testing Requirements - Acute Whole Effluent Toxicity

a. The permittee shall conduct toxicity tests on its wastewater discharge in accordance with the provisions in this section. Such testing will determine if appropriately selected effluent concentrations adversely affect the test species.

b. Acute toxicity tests shall be conducted using the test species and method identified in Part III of this permit.

c. Any test that does not meet the specifications of N.J.A.C. 7:18, laboratory certification regulations, must be repeated within 30 days of the completion of the initial test. The repeat test shall not replace subsequent testing required in Part III.

d. The permittee shall resubmit an Acute Methodology Questionnaire within 60 days of any change in laboratory.

e. Submit an acute whole effluent toxicity test report: within twenty-five days after the end of every 6 month monitoring period beginning from the effective date of the permit (EDP). The permittee shall submit toxicity test results on appropriate forms.

f. Test reports shall be submitted to:

i. New Jersey Department of Environmental Protection
Mail Code 401-02B
Division of Water Quality
Bureau of Surface Water Permitting
401 East State Street
P.O. Box 420
Trenton, New Jersey 08625-0420.

5. Toxicity Reduction Implementation Requirements (TRIR)

a. The permittee shall initiate a tiered toxicity investigation if two out of six consecutive WET tests demonstrate that the effluent does not comply or will not comply with the toxicity limit or action level specified in Part III of this permit.

i. If the exceedence of the toxicity limit or action level is directly caused by a documented facility upset, or other unusual event which has been identified and appropriately remedied by the permittee, the toxicity test data collected during the event may be eliminated when determining the need for initiating a TRIR upon written Department approval.

b. The permittee shall begin toxicity characterization within 30 days of the end of the monitoring period when the second toxicity test exceeds the toxicity limits or action levels in Part III. The monitoring frequency for toxicity testing shall be increased to monthly. Up to 12 additional tests may be required.

i. The permittee may return to the toxicity testing frequency specified in Part III if four consecutive toxicity tests conducted during the Toxicity Characterization do not exceed the toxicity limit or action level.

ii. If two out of any six consecutive, acceptable tests again exceed the toxicity limit or action level in Part III, the permittee shall repeat the Toxicity Reduction Implementation Requirements.

c. The permittee shall initiate a preliminary toxicity identification (PTI) upon the third exceedence of the toxicity limit or action level specified in Part III during toxicity characterization.

i. The permittee may return to the monitoring frequency specified in PART III while conducting the PTI. If more frequent WET testing is performed during the PTI, the permittee shall submit all biomonitoring reports to the DEP and report the results for the most sensitive species on the DMR.

ii. As appropriate, the PTI shall include:
(1) treatment plant performance evaluation,
(2) pretreatment program information,
(3) evaluation of ammonia and chlorine produced oxidants levels and their effect on the toxicity of the discharge,
(4) evaluation of chemical use and processes at the facility, and
(5) an evaluation of incidental facility procedures such as floor washing, and chemical spill disposal which may contribute to effluent toxicity.

iii. If the permittee demonstrates that the cause of toxicity is the chlorine added for disinfection or the ammonia concentration in the effluent and the chlorine and/or ammonia concentrations are below the established water quality based effluent limitation for chlorine and/or ammonia, the permittee shall identify the procedures to be used in future toxicity tests to account for chlorine and/or ammonia toxicity in their preliminary toxicity identification report.

iv. The permittee shall submit a Preliminary Toxicity Identification Notification within 15 months of triggering TRIR. This notification shall include a determination that the permittee intends to demonstrate compliance OR plans to initiate a Comprehensive Toxicity Investigation (CTI).

d. The permittee must demonstrate compliance with the WET limitation or action level in four consecutive WET tests to satisfy the requirements of the Toxicity Reduction Investigation Requirements. After successful completion, the permittee may return to the WET monitoring frequency specified in PART III.

e. The permittee shall initiate a CTI if the PTI does not identify the cause of toxicity and a demonstration of consistent compliance with the toxicity limit or action level in Part III can not be made.

i. The permittee shall develop a project study plan identifying the party or parties responsible for conducting the comprehensive evaluation, establish a schedule for completing the study, and a description of the technical approach to be utilized.

ii. If the permittee determines that the PTI has failed to demonstrate consistent compliance with the toxicity limit or action level in Part III , a Comprehensive Toxicity Investigation Workplan must be prepared and submitted within 90 days.

iii. The permittee shall summarize the data collected and the actions taken in CTI Quarterly Reports. The reports shall be submitted within 30 calendar days after the end of each quarter.

iv. The permittee shall submit a Final CTI Report 90 calendar days after the last quarterly report. The final CTI report shall include the corrective actions identified to reduce toxicity and a schedule for implementing these corrective actions.

f. Upon receipt of written approval from the Department of the corrective action schedule, the permittee shall implement those corrective actions consistent with that schedule.

i. The permittee shall satisfy the requirements of the Toxicity Reduction Implementation Requirements and return to the original toxicity monitoring frequency after corrective actions are implemented and the permittee demonstrates consistent compliance with the toxicity limit or action level in Part III in four consecutive toxicity tests.

ii. If the implemented corrective measures do not result in consistent compliance with the toxicity limit or action level in Part III, the permittee shall submit a plan for resuming the CTI.

iii. Documents regarding Toxicity Investigations shall be sent to the following:
New Jersey Department of Environmental Protection
Mail Code 401-02B
Division of Water Quality
Bureau of Surface Water Permitting
401 East State Street
P.O. Box 420
Trenton, New Jersey 08625-0420.

F. CONDITIONS FOR MODIFICATION

1. Causes for Modification

a. The Department may modify or revoke and reissue any permit to incorporate 1) any applicable effluent standard or any effluent limitation, including any effluent standards or effluent limitations to control the discharge of toxic pollutants or pollutant parameters such as acute or chronic whole effluent toxicity and chemical specific toxic parameters, 2) toxicity reduction requirements, or 3) the implementation of a TMDL or watershed management plan adopted in accordance with N.J.A.C. 7:15-7.

b. The permittee may request a minor modification to eliminate the monitoring requirements associated with a discharge authorized by this permit when the discharge ceases due to changes at the facility.

G. Custom Requirement

1. Intake Flow Limit and Dye Tracer Evaluation

a. The permittee shall limit the circulating water system intake flow to a monthly average rate not to exceed 3024 million gallons per day. This limit is included in Part III under FAC C. Reporting and compliance with this limitation shall be determined in accordance with the calculations described under item G.10.c.i. below for FAC C, as well as in item G.1.b. below.

b. Circulating water system intake flow shall be calculated in accordance with Part IV.G.10. The flow rate for each individual circulating water pump shall be determined every year using a dye tracer evaluation ("the Tracer Evaluation"). Tracer Evaluation testing shall be performed as follows:.

i. Prior to performing each annual test, the appropriate Enforcement Region must be notified regarding the use of any dye. Oral notification satisfies this requirement.

ii. Upon completion of the Tracer Evaluation for each individual pump, the permittee shall report the following to the Department; 1) Date of dye tracer evaluation; 2) Final concentration of dye in discharge; 3) Total dye discharged; and 4) Flow rate of circulating water pump(s) tested.

iii. The report required to be submitted pursuant to G.1.b.ii. above shall be submitted in accordance with the DMR schedule for the month which follows the month that the Tracer Evaluation is performed. The individual circulating water pump flow rates determined for each pump shall be used in calculating the circulating water system intake, as required for FAC C in Part III, for the month which follows the month that the Tracer Evaluation was performed.

iv. Either Rhodamine WT or Uranine dye are approved for this testing. The Department may approve other dyes for use after reviewing product information including MSDS.

v. The Department reserves the right to review and approve an alternate flow verification methodology via a minor modification to this permit.

2. Intake Screens and Fish Return System

a. Circulating Water System.

i. The permittee shall ensure proper operation and maintenance of its Ristroph Traveling Screens at all times to minimize impingement effects on aquatic life.

ii. The permittee shall post signs in two commonly accessed locations in the Circulating Water Intake Structure to describe the basic function of the traveling screens and how the screens reduce impingement mortality.

iii. The permittee shall submit a listing of fragile and non-fragile species to the Department by EDP + 3 months. Fragile species are defined at 40 CFR 125.92(m) and are relevant to 40 CFR 122.21(r)4.

b. Service Water System.

i. The permittee shall comply with 40 CFR 122.21(r)(6) to evaluate options to address impingement at the service water system. A study shall be submitted by EDP + 3 years as described in Part IV.G.7.d.

ii. The permittee shall submit a list of fragile and non-fragile species to the Department by EDP + 3 years. Fragile species are defined at 40 CFR 125.92(m).

iii. The permittee shall comply with 40 CFR 125.94(c) and implement the chosen technology by EDP + 4 years. In the event that this installation schedule cannot be adhered to due to issues relating to United States Nuclear Regulatory Commission (USNRC) procedure and protocol, the Department can extend the schedule via a subsequent permit action provided documentation from the USNRC is provided.

3. Wetland Restoration and Enhancement Efforts

a. The permittee shall continue to implement the Estuary Enhancement Program in restoring, enhancing and/or preserving wetlands within the region of the Delaware Estuary. The permittee shall continue to restore an aggregate of no less than 10,000 acres of: (1) diked wetlands; and/or (2) wetlands dominated by common reed (Phragmites australis) to Spartina species with other naturally occurring march grasses; and/or (3) upland buffer.

b. The permittee shall continue to implement the Management Plans for the Dennis, Commercial, Maurice River Township, the Bayside Tract, Cohansey, Alloways, the Rocks (in Delaware), Cedar Swamp (in Delaware), Dennis Wildlife Management Area, New Sweden Wildlife Management Area, Heislerville Wildlife Management Area and Millville Wildlife Management Area. The Management Plans and any necessary revisions are automatically incorporated as conditions of this NJPDES permit. The permittee must continue to implement the Management Plan(s) with respect to maintenance during any period of time the NJPDES permit is extended, including any lands that have met the success criteria.

c. The permittee shall continue to manage an Estuary Enhancement Program Advisory Committee (EEPAC) to serve as a body to provide technical advice to the permittee concerning any continuing implementation of the existing Management Plans. Any future Management Plan(s) must be submitted to the EEPAC for technical advice prior to submission to the Department for approval. Conditions regarding the EEPAC are as follows:.

   i. The permittee shall submit notification to the Department regarding selected members of the EEPAC. The EEPAC shall consist of representatives from two federal agencies that have jurisdiction over wetland restoration activities or fisheries; four scientists with appropriate wetlands expertise; and two representative of either Cape May, Cumberland, or Salem Counties (as appointed by the governments of Cape May, Cumberland, or Salem Counties). The Department shall designate one representative to serve on the EEPAC The permittee shall designate a representative to serve on the EEPAC and to serve as the EEPAC's chair. These are the minimum requirements where the permittee can expand on this list if desired.

   ii. A complete list of EEPAC members shall be submitted to the Department within 3 months from the effective date of the permit (EDP). The Department reserves the right to deny any member where any such denial will be within 30 days of submission of such list.

   iii. The EEPAC shall meet at least once per year and can terminate once all success criteria have been met.

4. Fish Ladders

a. The permittee has installed twelve fish ladders as described in the Biological Monitoring Program Annual Reports. The permittee shall operate and maintain these ladders unless the ladders have been removed or replaced by other parties responsible for dam maintenance or repair in accordance with the developed operations and maintenance manuals or by ensuring that agreements exist that require other parties to be responsible for operations and maintenance.

b. The permittee shall perform inspections during the upstream adult migration period to ensure that the ladders are operating as designed. The permittee shall provide formal notification to the ladder owner of any maintenance issues identified during routine inspections.

c. Documentation concerning inspection and any maintenance issues shall be made available to the Department upon request.

5. Biological Monitoring Program

a. The permittee shall continue to implement the improved biological monitoring program and incorporate any updates as set forth in this permit. The biological monitoring program shall include, at a minimum: impingement and entrainment monitoring; bay-wide abundance monitoring (PSEG Baywide Beach Seine Survey, PSEG Baywide Bottom Trawl Survey, and PSEG River Ichthyoplankton Survey); vegetative cover mapping (aerial photography) and geomorphology mapping (aerial photography) of sites that have not attained success criteria; and other special monitoring studies as may be required by the Department.

b. The permittee shall continue to comply with the terms and conditions of the April 4, 2002 letter to ensure that the sampling objectives of the PSEG Beach Seine program and the Delaware River Striped Bass Recruitment Beach Seine Sampling are satisfied without duplication of sampling effort. Conditions of the sampling protocol have been slightly modified as follows:.

   i. The Department's Division of Fish and Wildlife (NJFW) shall sample twice per month (August to October) at 32 fixed stations as well as additional sampling at these stations during June and July. Sampling shall be performed once per month in June and twice per month during July. A total of nine beach seine survey events will be conducted during the June to October period.

   ii. In order to satisfy the objectives of both programs without duplication of sampling efforts, NJFW will conduct striped bass recruitment beach seine sampling to include measurement of individual length (nearest millimeter) for up to 30 specimens per haul of the following species: American shad, blueback herring, alewife, Atlantic menhaden, bay anchovy, Atlantic silversides, striped bass, white perch, bluefish, Atlantic croaker, spot, weakfish, and blue crab.

   iii. PSEG will provide its seine data to the NJFW by March 1 and conversely NJFW will provide its seine data to PSEG by March 1.

c. The updated Biological Monitoring Program Work Plan shall be submitted within EDP + 3 months. Not later than 60 days after the Department's approval of the Work Plan, the permittee shall implement the Work Plan. The improved Biological Monitoring Program Work Plan is automatically incorporated as a condition of this permit upon final approval by the Department.

d. Results of the Biological Monitoring Program shall be submitted to the Department as follows:.

   i. Annually by June 30 of the following year in an annual report to be submitted to the Bureau of Surface Water Permitting.

   ii. Audited raw data from all biological monitoring activities shall be provided to the Department’s Marine Fisheries Administration in an appropriate electronic format, including all appropriate supporting tables and documents. This submittal shall include raw data from the current year and shall be submitted annually by June 30 of the following year. Data from all previous years of monitoring shall be provided by June 30, 2016. Results shall be sent to:

   NJ Division of Fish and Wildlife
   Mail Code 501-03, PO Box 420
   Trenton, NJ 08625-0420

   DE Division of Fish and Wildlife
   89 Kings Highway
   Dover, DE 19901.

6. Entrainment and Impingement Monitoring

a. Entrainment Monitoring for Circulating Water System.

i. Entrainment sampling shall be conducted three days per week at a frequency of seven samples per day during January through March and August through December (non-peak entrainment periods), conditions permitting. Sampling shall also be conducted four days per week at a frequency of fourteen samples per day during the period April through July (peak entrainment periods), conditions permitting.

ii. Specimens collected will be identified to the lowest practical taxon and life stage, and counted. The sampling protocol shall be suitable to capture identifiable oyster and horseshoe crab larvae in the 0.75 mm to 3 mm range. Total length shall be measured to the nearest millimeter for a representative subsample of each target species and life stage per sample. For each sample, additional data collected will include circulator status (on/off), air temperature, water temperature, and salinity.

b. Impingement Monitoring for Circulating Water System.

i. Impingement sampling collections shall be made three days per week. Ten samples shall be collected per 24-hour period, conditions permitting.

ii. All fish collected shall be sorted by species and counted and the condition (live, dead, or damaged) of each specimen will be recorded. Length of each specimen will be measured for a subset of each target species, along with the total aggregate weight for all specimens of each species and condition code. For each sample, additional data collected will include circulator status (on/off), air temperature, water temperature, and salinity.

c. Entrainment and Impingement Monitoring at Service Water System.

i. The permittee shall comply with 40 CFR 122.21(r)(6) and 40 CFR 122.21(r)(9) for the service water system. The permittee can conduct impingement and entrainment sampling at the service water intake or can develop a methodology for adapting data from the circulating water system to the service water system. The permittee shall summarize its methodology for sampling the service water in a revised biological monitoring program as per Part IV.G.5.c.

7. Section 316(b) Application Components for All Facilities

a. Source water physical data (40 CFR 122.21(r)(2)); Cooling water intake structure data (40 CFR 122.21(r)(3)); and Cooling water system data (40 CFR 122.21(r)(5)) - These requirements have been fully satisfied based on information provided in the 2006 NJPDES renewal application at Sections 4-II and 5-II. However, any updated operational information pertaining to these requirements that is relevant to the period of study represented with the application components at 40 CFR 122.21(r) can be submitted along with those submissions at that time.

b. Source water baseline biological characterization data - The requirements at 40 CFR 122.21(r)(4)(i) through (viii) have been satisfied based on previous application submissions. However, the 2014 rule contains new requirements at 40 CFR 122.21(r)(4)(x) – (xii). The permittee shall submit either an update of current information or new information relevant to these three items below within EDP + 6 months. These requirements are as follows:.

i. Identification of protective measures and stabilization activities that have been implemented and a description of how these measure and activities affected the baseline water condition in the vicinity of the intake.

ii. A list of fragile species applicable to the Station that are not already identified as fragile at 40 CFR 125.92(m).

iii. Any information submitted in order to obtain an incidental take exemption or authorization for its cooling water intake structure(s) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. Exemption or authorization may be used to satisfy the permit application information requirement of paragraph 40 CFR 122.95(f) if included in the application.

c. Chosen method(s) of compliance with impingement mortality standard for the circulating water system (40 CFR 122.21(r)(6)) - The permittee shall submit a determination for the circulating water system within EDP + 3 years along with any study components that are required based on the chosen option. If 40 CFR 125.94 (c)(5) or (6) is chosen, an impingement technology performance optimization study shall also be submitted as follows:.

i. The impingement technology performance optimization study must include at least two years of biological data collection measuring the reduction in impingement mortality achieved by the modified traveling screens as defined at 40 CFR 125.92(s) and demonstrating that the operation has been optimized to minimize impingement mortality. A description of any biological data collection and data collection approach used in measuring impingement mortality must be included. This shall also include the percent impingement mortality reflecting optimized operation of the modified traveling screen and all supporting calculations.

d. Chosen method(s) of compliance with impingement mortality standard for the service water system (40 CFR 122.21(r)(6) – The permittee shall submit a determination for the service water system within EDP + 3 years along with the identification of any study components that are required based on the chosen option and a proposed time schedule. If 40 CFR 125.94 (c)(5) or (6) is chosen, an impingement technology performance optimization study shall also be submitted as follows:.

i. The impingement technology performance optimization study must include at least two years of biological data collection measuring the reduction in impingement mortality achieved by the modified traveling screens as defined at 40 CFR 125.92(s) and demonstrating that the operation has been optimized to minimize impingement mortality. A description of any biological data collection and data collection approach used in measuring impingement mortality must be included. The Department would consider a proposal to utilize data from the circulating water system for the service water system.

e. Entrainment Performance Studies (40 CFR 122.21(r)(7)) - The permittee shall submit any previously conducted entrainment performance studies that address technology efficacy, through-facility entrainment survival, and other entrainment studies within EDP + 3 years. Any such submittals must include a description of each study, together with underlying data, and a summary of any conclusions or results. Any studies conducted at other locations must include an explanation as to why the data from their locations are relevant and representative of conditions at the Station. In the case of studies more than 10 years old, the applicant must explain why the data are still relevant and representative of conditions at the facility and explain how the data should be interpreted using the definition of entrainment at 40 CFR 125.92(h).

f. Operational Status (40 CFR 122.21(r)(8)) - The permittee shall submit a description of the operational status of each generating, production, or process unit that uses cooling water. The permittee shall submit the necessary information within EDP + 3 years so that the information corresponds with the impingement and entrainment study components. Additionally, the operational status information must address both the circulating water system and the service water system, including but not limited to:.

i. For power production or steam generation, descriptions of individual unit operating status including the age of each unit; capacity utilization rate (or equivalent) for the previous 5 years (including any extended or unusual outages that significantly affect current data for flow); impingement, entrainment, or other factors (including identification of any operating unit with a capacity utilization rate of less than 8 percent averaged over a 24-month block contiguous period); and any major upgrades completed within the last 15 years (including but not limited to boiler replacement, condenser replacement, turbine replacement or changes to fuel type).

ii. Descriptions of completed, approached, or scheduled upgrades and Nuclear Regulatory Commission relicensing status of each unit at nuclear facilities.

iii. Descriptions of plans or schedules for any new units planned within the next 5 years.

g. Entrainment Characterization Study (40 CFR 122.21(r)(9)) - The permittee shall submit the Entrainment Characterization Study where the period of data collection shall span for at least 2 years. This shall include entrainment at both the circulating water system and the service water system which may be based on sampling at both systems, or based on data obtained from the circulating water system that is adapted to estimate entrainment at the service water system. This two year data collection period shall correspond with the benefits valuation study period at 40 CFR 122.21(r)(11). Species included in the Entrainment Characterization Study shall not be limited to RIS but shall include characterization of all life stages of fish, shellfish, and any species protected under Federal, State, or Tribal law (including threatened or endangered species). The Entrainment Characterization Study must include the following components:.

i. Identification and documentation of the data collection period and frequency. The study should identify and document organisms collected to the lowest taxon possible of all life stages of fish and shellfish that are in the vicinity of the cooling water intake structure(s) and are susceptible to entrainment, including any organisms identified by the Director, and any species protected under Federal, State, or Tribal law, including threatened or endangered species with a habitat range that includes waters in the vicinity of the cooling after intake structure. Biological data collection must be representative of the entrainment at the intake subject to this provision. The study shall identify and document how the location of the cooling water intake structure in the waterbody and the water column are accounted for by the data collection locations;.

ii. Characterization of all life stages of fish, shellfish, and any species protected under Federal, State, or Tribal law (including threatened or endangered species), including a description of their abundance and their temporal and spatial characteristics in the vicinity of the cooling water intake structure(s). This characterization shall be based on sufficient data to characterize annual, seasonal, and diel variations in entrainment, including but not limited to variations related to climate and weather differences, spawning, feeding and water column migration. This characterization may include historical data that are representative of the current operation of the facility and of biological conditions at the site. Identification of all life stages of fish and shellfish must include identification of any surrogate species used, and identification of data representing both motile and non-motile life-stages of organisms;.

iii. Documentation of the current entrainment of all life stages of fish, shellfish, and any species protected under Federal, State, or Tribal law (including threatened or endangered species). The documentation may include historical data that are representative of the current operation of the facility and of biological conditions at the site. Entrainment data to support the facility's calculations must be collected during periods of representative operational flows for the cooling water intake structure, and the flows associated with the data collection must be documented. The method used to determine latent mortality along with data for specific organisms mortality or survival that is applied to other life-stages of species must be identified. The owner or operator of the facility must identify and document all assumptions and calculations used to determine the total entrainment for that facility together with all methods and quality assurance/quality control procedures for data collection and data analysis. The proposed data collection and data analysis methods must be appropriate for a quantitative survey.

iv. The Entrainment Characterization Study shall be submitted by EDP + 3 years.

8. Section 316(b) Application Components for Facilities with Actual Intake Flow > 125 MGD

a. Comprehensive Technical Feasibility and Cost Evaluation Study (40 CFR 122.21 (r)(10)) - The permitee shall submit an engineering study of the technical feasibility and incremental costs of candidate entrainment control technologies. This includes an evaluation of the technical feasibility of closed-cycle recirculating systems as defined at 40 CFR 125.92(c), fine mesh screens with a mesh size of 2 millimeters or smaller, and water reuse or alternate sources of cooling water. In addition, this study shall include:.

i. A description of all technologies and operational measures considered (including alternate designs of closed-cycle recirculating systems such as natural draft cooling towers, mechanical draft cooling towers, hybrid designs, and compact or multi-cell arrangements);.

ii. A discussion of land availability, including an evaluation of adjacent land and acres potentially available due to generating unit retirements, other buildings and equipment retirements, and potential for repurposing of areas developed for transmission yards, and parking lots;.

iii. A discussion of available sources of process water, grey water, waste water, reclaimed water, or other waters of appropriate quantity and quality for use as some or all of the cooling water needs of the facility;.

iv. Documentation of factors other than costs that may make a candidate technology impractical or infeasible for further evaluation; and.

v. The study must include engineering cost estimates of all technologies considered in Part IV.G.8.a(i)-(iv) above. Facility costs must also be adjusted to estimate social costs. All costs must be presented as the net present value (NPV) and the corresponding annual value. Costs must be clearly labeled as compliance costs or social costs. The permitee must separately discuss facility level compliance costs and social costs, and provide documentation as described at 40 CFR 122.21(r)(10)(iii).

vi. The Comprehensive Technical Feasibility and Cost Evaluation study shall be completed by EDP +3 years and is then subjected to peer review as per Part IV.G.8.d below.

b. Benefits Valuation Study (40 CFR 122.21(r)(11)) - The permitee must submit an evaluation of the benefits of the candidate entrainment reduction technologies and operational measures evaluated in paragraph (r)(l0) including using the Entrainment Characterization Study completed as per 40 CFR 122.21(r)(9). Each category of benefits must be described narratively, and when possible, benefits should be quantified in physical or biological units and monetized using appropriate economic valuation methods. The benefits valuation study must include, but is not limited to, the following elements:.

   i. Incremental changes in the numbers of individual fish and shellfish lost due to impingement mortality and entrainment as defined in 40 CFR 125.92, for all life stages of each exposed species;.

   ii. Description of basis for any estimates of changes in the stock sizes or harvest levels of commercial and recreational fish or shellfish species or forage fish species;.

   iii. Description of basis for any monetized values assigned to changes in the stock size or harvest levels of commercial and recreational fish or shellfish species, forage fish, and to any other ecosystem or non use benefits;.

   iv. A discussion of mitigation efforts completed prior to October 14, 2014 including how long they have been in effect and how effective they have been;.

   v. Discussion, with quantification and monetization, where possible, of any other benefits expected to accrue to the environment and local communities, including but not limited to improvements for mammals, birds, and other organisms and aquatic habitats; and.

   vi. Discussion, with quantification and monetization, where possible, of any benefits expected to result from any reductions in thermal discharges from entrainment technologies.

c. Non-water Quality Environmental and Other Impacts Study (40 CFR 122.21(r)(12)) - The permittee must submit a detailed facility-specific discussion of the changes in non-water quality environmental and other impacts attributed to each technology and operational measure considered in the Comprensive Technical Feasibility and Cost Evaluation Study above. The study should detail both impacts increased and impacts decreased. The study shall be completed by EDP + 3 years and is then subject to peer review as per Part IV.G.8.d below. The study must include the following:.

   i. Estimates of changes to energy consumption, including but not limited to auxiliary power consumption and turbine backpressure energy penalty;.

   ii. Estimates of air pollutant emissions and of the human health and environmental impacts associated with such emissions;.

   iii. Estimates of changes in noise;.

   iv. A discussion of impacts to safety, including documentation of the potential for plumes, icing, and availability of emergency cooling water;.

   v. A discussion of facility reliability, including but not limited to facility availability, production of steam, impacts to production based on process unit heating or cooling, and reliability due to cooling water availability;.

   vi. Significant changes in consumption of water, including a facility-specific comparison of the evaporative losses of both once-through cooling and closed-cycle recirculating systems, and documentation of impacts attributable to changes in water consumption.

vii. A discussion of all reasonable attempts to mitigate these factors.

d. Peer Review (40 CFR 122.21(r)(13)) - The permitee shall conduct an external peer review of each report as follows:.

i. The permittee must select peer reviewers and notify the Department by EDP + 2 years. The Department may disapprove of a peer reviewer or require additional peer reviewers within 90 days of receipt of this information.

ii. The Director may confer with EPA, Federal, State and Tribal fish and wildlife management agencies with responsibility for fish and wildlife potentially affected by the cooling water intake structure, independent system operators, and state public utility regulatory agencies, to determine which peer review comments must be addressed.

iii. The permittee must provide an explanation for any significant reviewer comments not accepted. Peer reviewers must have appropriate qualifications and their names and credentials must be included in the peer review report.

iv. The permittee shall complete the Non-Water Quality Environmental and Other Impacts Study by EDP + 3 years. The study shall then be sent to the selected peer reviewer to be completed and submitted to the Department by EDP + 4 years.

9. Section 316(a) Variance Conditions

a. Notwithstanding any other provision of this permit, the Department reserves the right to seek termination of the Section 316(a) variance granted or termination of this permit based on the permittee's noncompliance with any term or condition of this permit. Further, the Department specifically reserves the right to seek penalties pursuant to N.J.S.A. 58:10A-10 et seq. based on the permittee's noncompliance with any term or condition of this permit.

b. If upon renewal, the permittee wants the Section 316(a) variance to be continued, the request for the variance along with a basis for its continuance must be submitted at the time of application for the renewal permit. The Department's Section 316(a) determination shall include, but not be limited to: 1) a review of whether the nature of the thermal discharge or the aquatic population associated with the Station has changed; 2) whether the protection and propagation of the balanced indigenous population is assured; 3) whether the best scientific methods to assess the effect of the permittee's cooling system have changed; 4) whether the technical knowledge of stresses caused by the cooling system has changed.

10. Custom NJPDES Monitoring Requirements

a. DSNs 481-486.

i. Effluent flow- Effluent flow is calculated daily as the sum of the circulating water flow and the service water flow. The circulating water flow for each outfall is calculated as the number of operating hours of the circulating water pumps and the flow rates for each pump. The service water contribution is calculated from the service water pump operating hours times the design flow rate of the service water pumps. The flow rates measured over the course of a calendar day shall be averaged on a a daily basis consistent with the definition of daily discharge pursuant to N.J.A.C. 7:14A-1.2. These daily discharge points shall be utilized for the purposes of completing discharge monitoring reports as well as for calculation purposes.

ii. Effluent Temperature- Effluent temperature shall be measured at DSNs 481-486 on a continuous basis. Effluent flow for DSNs 481-486 is reported on DMRs as indicated in Part III. The effluent temperature values measured over the course of a calendar day shall be averaged on a daily basis consistent with the definition of daily discharge pursuant to N.J.A.C. 7:14A-1.2. These daily discharge points shall be utilized for the purposes of completing discharge monitoring reports as well as for calculation purposes.

iii. Chlorine Produced Oxidants- Option 1: The daily maximum limitation of 0.5 mg/L and the monthly average limitation of 0.3 mg/L shall apply when only service water system non-contact cooling water is discharged through DSNs 481-486. Option 2: The daily maximum limitation of 0.2 mg/L shall apply when predominantly circulating water system water is being discharged through DSNs 481-486. Under normal operating conditions (i.e. no outage), the permittee discharges under an Option 2 scenario.

iv. Intake pH- One sample of intake water shall be analyzed for pH and shall be reported as intake pH for DSNs 481-486.

b. FAC A and FAC B.

i. Intake Temperature- Intake temperature shall be measured at the intake to the main circulating water system for Units 1 and 2 on a continuous basis. The intake temperatures from Units 1 and 2 shall be averaged to obtain the intake temperature for FAC A (Unit 1) as well as the intake temperature for FAC B (Unit 2). In the event that one of the temperature monitoring devices is out of service (such as for calibration and maintenance) the other temperature monitoring device will be applied to both units for reporting intake temperature.

ii. Effluent temperature for FAC A and FAC B shall be calculated and reported as follows:

Effluent Temperature for FAC A = [(Eff. Temp. at DSN 481 x Eff. Flow at DSN 481) + (Eff. Temp. at DSN 482 x Eff. Flow at DSN 482) + (Eff. Temp. at DSN 483 x Eff. Flow at DSN 483)] / (Eff. Flow at DSN 481 + Eff. Flow at DSN 482 + Eff. Flow at DSN 483)

Effluent Temperature for FAC B = [(Eff. Temp. at DSN 484 x Eff. Flow at DSN 484) + (Eff. Temp. at DSN 485 x Eff. Flow at DSN 485) + (Eff. Temp. at DSN 486 x Eff. Flow at DSN 486)] / (Eff. Flow at DSN 484 + Eff. Flow at DSN 485 + Eff. Flow at DSN 486).

iii. Differential Temperature- Differential temperature shall be calculated by subtracting the daily intake temperature from the daily effluent temperature where the values for intake temperature and effluent temperature values are explained above. The permittee calculates differential temperature on an hourly basis where the daily differential temperature is an arithmetic average of the values obtained during the course of the day. This is consistent with the definition of "daily discharge" in accordance with N.J.A.C. 7:14A-1.2.

c. FAC C.

i. Intake Flow- Intake flow for the circulating water system is calculated as the sum of the twelve individual circulating water system intakes and reported as a monthly average in million gallons per day. The flow of each individual circulating water pump shall be calculated as the product of the number of operating hours for that pump for the reporting period and the flow rate for that pump. The flow rate for each respective pump shall be assessed on an annual basis in accordance with the Tracer Evaluation Requirement in item G.1. For the purposes of DMR reporting, the intake flow values measured over the course of a calendar day shall be averaged on a daily basis consistent with the definition of daily discharge pursuant to N.J.A.C. 7:14A-1.2.

ii. Thermal Discharge- Thermal discharge in MBTU/Hr is the total heat released from Unit 1 (FAC A) and Unit 2 (FAC B) where it shall be calculated as follows:

Thermal Discharge FAC C (MBTU/Hr) = [M1Cp(Teff-Tint)]Unit 1 + [M2Cp(Teff-Tint)]Unit 2/1,000,000

Where:
M1 = Mass flow rate of water from Unit 1 in lbs/hour (includes circulating water flow as well as service water flow)
M2 = Mass flow rate of water from Unit 2 in lbs/hour (includes circulating water flow as well as service water flow)
Mass flow rate is equal to flow in gal/hour x 8.34 lb/gallon
Teff = effluent temperature from Unit (e.g. Unit 1)
Tint = intake temperature from Unit
Cp is the specific heat capacity of water which is 1 BTU/lb degrees Fahrenheit.

d. DSN 48C and DSN 489: During periods of maintenance, calibration or failure of the flow meter, flow can be calculated using the operating hours of the discharge pumps times the flow rate of the discharge pumps.

11. Other Regulatory Requirements

a. The permittee shall discharge so as not to violate the Delaware River Basin Commission Water Quality Regulations as amended for Zone 5 waters. This includes the stream quality objectives for radioactivity, namely: alpha emitters- maximum 3 pc/L (picocuries per liter) and beta emitters- maximum 1,000 pc/L. The permittee shall ensure compliance with the heat dissipation area set forth in any current DRBC docket. Compliance may be determined by the DRBC based on its own sampling events.

b. The permittee shall comply with all regulations set forth in N.J.S.A. 26:2D-1 et seq. regarding Radiation Protection. All radioactive wastes shall be collected, removed, and disposed of in accordance with N.J.S.A. 7:28-11.1 et seq.

c. The permittee is licensed by the U.S. Nuclear Regulatory Commission (USNRC) and responsible to that agency for compliance with radiological effluent limitations, monitoring requirements, and other licensing conditions.

d. The permittee is required to comply with Section 4.2 of Appendix B to the NRC Facility Operating Licenses Nos. DPR-70 and DPR-75 which includes National Marine Fisheries Service's (NMFS) Section 7 Consultation Biological Opinion related to the operation of Salem Units 1 and 2 Generating Stations, including attachments, and all subsequent amendments as may be approved by NMFS. All correspondence between the permittee and the NMFS specifically related to Salem's effects on threatened and endangered species shall be sent to the Department at the following address:

   Director, Division of Fish and Wildlife
   501 East State Street, P.O. Box 400
   Trenton, NJ 08625-0400.

e. As per 40 CFR 125.98(j), this permit does not authorize the take, as defined at 16 U.S.C. 1532(19), of threatened or endangered species of fish or wildlife. Such take is prohibited under the Endangered Species Act unless it is exempted pursuant to 16 U.S.C. 1536(o) or permitted pursuant to 16 U.S.C. 1539(a). Absent such exemption or permit, any facility operating under the authority of this regulation must not take threatened or endangered wildlife.