



November 21, 2014

Ms. Cindy Bladey
Chief, Rules, Announcements, and Directives Branch
Office of Administration
Mail Stop: 3WFN-06-A44M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Docket ID NRC-2014-0149; Comments by the Delaware Riverkeeper Network on the Draft Environmental Impact Statement for the Early Site Permit for the PSEG Site (NUREG-2168)

Dear Ms. Bladey,

This letter provides the comments of the Delaware Riverkeeper Network (DRN) on the Draft Environmental Impact Statement (DEIS) for the Early Site Permit (ESP) for the Public Service Electric and Gas Company Nuclear, LLC (PSEG) site located on Artificial Island in Lower Alloways Creek Township, Salem County, New Jersey. PSEG submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for an ESP at this site which is adjacent to the Hope Creek and Salem Nuclear Generating Stations. PSEG is seeking approval from NRC to potentially use this site in the future for building and operating a new nuclear power plant (which we will refer to as Salem 4). As part of the review of the PSEG ESP application, NRC has prepared a DEIS which describes the environmental impacts of building and operating a new nuclear power plant at the site.

DRN is providing the following comments to be considered by the NRC when deciding upon this ESP application and in finalizing the DEIS. We request that the Atomic Safety and Licensing Board (ASLB) conduct a contested hearing due to the environmental concerns about the ESP and that NRC not grant this ESP due to the significant adverse environmental impacts associated with the possible future use of the PSEG site to construct and operate a new nuclear power plant. DRN believes that the DEIS is inadequate in assessing the potential environmental impacts and additional information, data, and analyses should be evaluated. Furthermore, DRN believes that a substantially different alternative meets the purpose and need statement rather than building and operating a new nuclear power plant at this site especially since there is potential for significant environmental degradation.

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According to the DEIS for an ESP at the PSEG site dated August 2014, the project would include/require:

- Permanent impact to 108 acres of wetlands for the new nuclear power plant.
- Permanent impact to 45.5 acres of undeveloped wetlands protected under Deeds of Conservation Restriction within the Alloway Creek Watershed Wetland Restoration Site, the Abbott's Meadow Wildlife Management Area, and the Mad Horse Creek Wildlife Management Area for the construction of the proposed causeway.
- Permanent loss of 40 acres of ponds and 9,585 linear feet of creek channel.
- Dredging and the removal of sediment from the Delaware River for building new intake and discharge structures and resulting in physical alteration of aquatic habitat due to infilling, cofferdam placement, dredging, and pile driving.
- Clearing of vegetation that has the potential to affect wildlife including important and potentially threatened or endangered terrestrial and aquatic species.
- Permanent impacts to fish populations from construction and from operation of the nuclear power plant due to impingement and entrainment, high temperature discharges, loss of food and forage habitat, and pollution discharges.
- Water quality impacts to the Delaware River from the construction and operation of a nuclear power plant including stormwater runoff, additional thermal pollution, and plant discharges.
- Consumptive loss of water from the Delaware River due to the operation of the nuclear power plant including more than 26,000 gallons per minute of brackish water, 5,000 gallons per minute of freshwater, and up to 1,000 gallons per minute of groundwater.
- Land committed to the disposal of radioactive and nonradioactive wastes.

Comment 1: A Contested Hearing is needed on this highly controversial and environmentally damaging proposal.

DRN would like to request a contested hearing be scheduled by the ASLB and held regarding this application and proposal. Construction of a fourth nuclear plant on Artificial Island, in an area predicted to be consistently under or surrounded by water in just a few decades to come and in a place where hundreds of acres of wetlands are to be further damaged by PSEG, is an obvious danger and threat to the region, highly controversial, and deserves a public airing and hearing before the NRC renders a decision.

Comment 2: The DEIS works backwards from a predetermined outcome.

The National Environmental Policy Act (NEPA) requires that “major Federal actions significantly affecting the quality of the human environment” must be analyzed and quantified by all Federal agencies in the form of an Environmental Impact Statement.¹ The purpose and the scope of this statute is far-reaching and requires that the agency preparing the Environmental Impact Statement take a “hard look” at all aspects of a proposal to insure that the public interest will be served by the agency’s ultimate decision.²

¹ 42 U.S.C.A. §§ 4321-4370h

² See, for example an analysis of factors associated with a “hard look” at Center for Biological Diversity v. Dep’t of Interior, 623 F.3d 633, 642-50 (9th Cir. 2010)

This review, as detailed below, can generally be summarized by the belief that the NRC has worked backwards on the DEIS by starting with a conclusion that a nuclear power plant should be built and then justifying it through the use and analysis of the information presented in the DEIS. This justification DEIS, i.e. the proposed construction of Salem 4, is the opposite of what the NRC should have conducted, and virtually guarantees the outcome in a way that violates the intent and purpose of NEPA. If the NRC conducted an objective analysis, including consideration of the information in this comment regarding the project's significant and irreversible environmental impacts, it would be clear that the "no build" alternative should be selected. In addition, the NRC and the applicant have not demonstrated a need for this project.

Comment 3: The Early Site Permit process violates NEPA through the improper establishment of a NRC sponsored segmentation process.

The DEIS makes no mention of the basis and background for the creation of the ESP process that is in fact driving this entire application. The creation of the ESP process began with its adoption in the Federal Register of April 18, 1989. At that time, its intended purpose was to provide a more streamlined process for the creation of standardized reactor designs.³ It is interesting to note that the original language of the standards for review of applications clearly stated that "the draft and final environmental impact statements prepared by the Commission focus on the environmental effects of construction and operation of a reactor or reactors ..."⁴ While that may have been the case, it is not the current status of the 10 C.F.R. §52.18 regulations and it raises serious questions as to how this ESP process has "evolved" and if the current ESP process is at all in conformance with all NEPA requirements.

NEPA Regulations⁵ state how an agency should consider if an action is connected to other actions; like in this case, if picking a site location is connected to ultimately building a nuclear power plant:

"The scope of an individual statement may depend on its relationships to other statements (§§ 1502.20 and 1508.28) ... (a) Actions (other than unconnected single actions) which may be: (1) Connected actions, which means that they are closely related and therefore should be discussed in the **same** impact statement.

Actions are connected if they:

(i) ***Automatically trigger other actions which may require environmental impact statements.***

(ii) ***Cannot or will not proceed unless other actions are taken previously or simultaneously.***

(iii) ***Are interdependent parts of a larger action and depend on the larger action for their justification.***

(2) ***Cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement...*** (Emphasis added.)

³ See 54 F.R. 15372-01

⁴ See, 54 F.R. 15388, 10 C.F.R. §52.18 (1989)

⁵ 40 C.F.R. § 1508.25

DRN maintains that issuance of an ESP and building a nuclear power plant are connected actions and that all four of the above requirements apply to the ultimate use of this property. Therefore, the NRC has acted in an arbitrary and capricious fashion; first by modifying the original regulations implementing the ESP permit to no longer look at the design of a power plant and second by not preparing one comprehensive EIS in order to properly analyze the true impacts associated with the site and a proposal to build a nuclear power plant. Preparing an EIS for only the ESP and not the power plant violates NEPA by segmenting the review of one project into two.

A change was made to the original ESP regulations in 2006⁶ so that now they are promoting “segmentation” of the environmental review, by only looking at the site for the issuance of a permit and then looking at the reactor design later. This approach of segmentation of the overall project violates NEPA.⁷ Since the ultimate use of this property will be for a nuclear reactor, the current process segments out this review and allows for investments, time and resources to be committed to this location by the federal government and the applicant. ESP not only allows for preconstruction investments but also preconstruction work on the site. All of these investments of time and money will likely later be used as an attempt to justify the ultimate approval of the nuclear reactor when an application is made, and this approach violates the spirit and the requirements of NEPA.

Since the DEIS uses segmentation as its underlying approach, DRN requests the NRC to withdraw the DEIS, as it promotes arbitrary and capricious agency actions in violation of NEPA.

Comment 4: Limited Work Authorization for this project is a violation of due process.

Limited Work Authorization on this property may be a violation of due process since it further commits both the NRC and PSEG on a track for nuclear permitting approval without providing the public with notice and an opportunity to be heard.

Comment 5: Since the ESP has nothing to do with nuclear power, the NRC should not be the lead agency preparing this Environmental Impact Statement.

Since ESP does not involve anything nuclear, then the NRC should not be the lead federal agency preparing this DEIS. Nothing in the ESP relates to nuclear energy or reactor design issues; it all relates to questions of site suitability, land use impacts, water-related impacts, wetlands impacts, endangered species impacts, historic and cultural resource impacts, ecological impacts and environmental justice impacts. The NRC admits that it has no information on a proposed reactor and it is entirely “hypothetical” (p 8, Reader’s Guide). If the ESP process is allowed to continue without requiring a real nuclear power plant proposal, then the NRC should not be the lead agency performing the EIS since it is not really staffed or qualified to do so, nor is it the best federal agency to conduct an objective analysis of these issues.

⁶ 71 F.R. 12782, 12790, 12891-12892

⁷ See, for example *Hammond v. Norton*, 370 F.Supp.2d 226 (2005) for a more detailed examination of the factors that are examined in a segmentation analysis

NEPA regulations provide assistance as to choosing the best agency to provide the lead and five factors should be considered:

Section 1501.5(c) states: If an action falls within the provisions of paragraph (a) of this section the potential lead agencies shall determine by letter or memorandum which agency shall be the lead agency and which shall be cooperating agencies. The agencies shall resolve the lead agency question so as not to cause delay. If there is disagreement among the agencies, the following factors (which are listed in order of descending importance) shall determine lead agency designation:

- Magnitude of agency's involvement.
- Project approval/disapproval authority.
- Expertise concerning the action's environmental effects.
- Duration of agency's involvement.
- Sequence of agency's involvement.

While the NRC will ultimately license a reactor, the ESP Process is entirely environmental, thus the lead agency should be an agency trained in investigating and analyzing site environmental conditions, like the U.S. Environmental Protection Agency (EPA) or the U.S. Fish and Wildlife Service (FWS).

The NRC may state that it has contacted these agencies for input, but there is no comparison to actually making that agency the lead agency or a cooperating agency. The NRC should therefore revise the scope of this DEIS to make the EPA and FWS lead or cooperating agencies and not just passive contributors. In addition, the use of the U.S. Army Corps of Engineers (USACE) as a cooperating agency is not a sufficient means to adequately analyze environmental impacts for this DEIS, since its statutory mission is not centered on protecting the environment.

Comment 6: It is premature to prepare an EIS for an applicant that does not even own the land upon which this nuclear power plant will be constructed.

PSEG does not presently own all of the land upon which the proposed nuclear power plant and its accompanying structures will be built. It may own it in the future or it may not, but right now through the issuance of this DEIS, the NRC is taking official agency action based upon speculation. Agencies of the federal government are not authorized to devote agency resources, unless otherwise approved, for speculative activities. This DEIS is just such a speculative wasteful agency endeavor, since until such time as PSEG can demonstrate bona fide ownership (or permission to use all) of this property, it is premature for the NRC to prepare this DEIS or any agency documents related to this premature proposal.

This lack of ownership fact has been confirmed through Public Notice (CENAP-OP-R-2009-0157) for a 404 permit by USACE. In that application, PSEG was not able to state that the “applicant possesses or will possess the requisite property interest to undertake the activity.” PSEG cannot demonstrate this prerequisite requirement for permit application completeness, since it does not own or currently have legal authority to undertake the proposed activities listed in the draft permit. Based upon a different Public Notice (CENAP-PL-E-14-01, dated July 15,

2014), the USACE has confirmed that PSEG is not at this time the owner of the property proposed for this 404 permit. USACE is the present owner of this property. While that Public Notice proposes some form of land swap by the USACE to PSEG, there is no level of certainty that this will occur, especially since even if the USACE agrees to a trade, there could be additional legal obstacles or actions to challenge it or invalidate it.

Since this trade has not happened, any preparation of a DEIS is premature and purely speculative as to the outcome of the full ownership of the property in question. Federal agencies are not allowed under any law to issue permits based upon speculative information, since the ultimate decision and any judicial review of such will likely show that it was arbitrary and capricious. Since the NRC is contemplating the issuance of a permit, it has done exactly that and any permit issued based upon an incomplete application, such as this one, will likely be invalidated if challenged in Court. While Courts will not often substitute their judgment for agency decisions based upon conformity with agency substantive expertise, they will readily strike down decisions of agencies that do not follow their own procedural requirements. The preparation of the DEIS and the intent of the NRC to issue the ESP at this time is just such an example of procedural error, readily subject to challenge.

NRC should therefore withdraw the DEIS since PSEG presently does not have adequate legal authority to seek this ESP approval since it does not own the land or have other legal power over all of the land upon which this nuclear power plant is proposed.

Comment 7: Since the DEIS fails to include comments from contributing agencies, NRC should leave the record open for comments for an additional 60 Days.

Since many other federal agencies will likely provide comments, notably EPA and FWS, the public is precluded from reviewing and commenting on their submissions due to the NRC having closed the comment period. These federal agencies may raise other significant issues and the public should have the opportunity to provide comments on their submissions before the issuance of the Final EIS. Since all of these comments can be posted with on-line access, DRN requests that the NRC post all of these comments and then leave the record open for an additional 60 days so that the public may have the opportunity to supplement their comments to include this additional information.

Comment 8: The use of eleven pages of acronyms and abbreviations (“AA⁸”) in the DEIS confuses the public and frustrates the NEPA process.

The DEIS contains eleven (11) pages of AAs. The use of many of most of these AAs is unnecessary, and it creates confusing and potentially misleading information to be presented without sufficient public understanding of the DEIS. NEPA Regulations Section 1500.2, Policy, states: “Federal agencies shall to the fullest extent possible: ... (b) Implement procedures to make the NEPA process more useful to decision makers and the public.”

⁸ It only seems appropriate to create a new acronym for “acronyms and abbreviations” to demonstrate that too much of a good thing, acronyms and abbreviations, does not facilitate reasoned analysis or understanding of issues.

NRC should not use eleven pages of AA's in the DEIS, especially when their common use in New Jersey may be different from those provided. This excessive use of AA prevents the public from understanding the importance of what is being said. For example, "DCR" is defined in the DEIS as "Deed of Conservation Restriction." In New Jersey, a "DCR" is defined as a "Discharge Cleanup and Removal" plan, and nearby Delaware Residents (among those impacted by this decision) know this abbreviation to mean the Delaware City Refinery, another power plant. The Army Corps of Engineers uses "USACE" as their identified acronym, yet the DEIS uses "DA" as their identifying acronym.

While the use of common and known acronyms can facilitate reading a document more quickly, the eleven pages used in the DEIS is excessive, especially when many of these terms are not known or may have multiple meanings.

Comment 9: The proposed project results in unacceptable permanent and temporary impacts to wetlands.

Although the United States is making important progress in the conservation of wetland resources, FWS continues to report that wetland losses are greater than wetland gains.⁹ Wetlands continue to face pressures from development, from the effects of sea level rise, and from the cumulative effect of other environmental pollutants and stressors.

The wetlands and marshes impacted by the proposed project are part of the Delaware Bay Wetlands, an internationally recognized Wetland of Importance by the Ramsar Convention, an intergovernmental treaty signed in 1971 for the purpose of conserving wetlands. These wetlands are also recognized as an important network of protected sites for shorebirds and waterfowl. Several state endangered Bald Eagles breed along these areas, and the extensive tidal wetlands support state-endangered Northern Harriers. In addition to being the most productive habitat, wetlands protect inland areas from tidal and storm damage, provide protection from flooding, filter runoff water to help sustain or improve water quality, support recreation, and provide aesthetic value. Therefore, wetlands are often considered a "crucial habitat type in the Delaware Estuary for supporting broad ecological health."¹⁰

Despite the importance of wetlands, the Delaware Estuary has been experiencing a net loss of tidal wetland acreage at a rate estimated at an acre per day.¹¹ For example, more than 140,000 acres of tidal marsh were lost from the Delaware Estuary between 1996 and 2005 due to continued filling associated with development.¹² Because of these extensive wetland losses, the Delaware Estuary only has approximately 5% of the pre-settlement acreage of freshwater tidal

⁹ Dahl, T.E. 2011. Status and trends of wetlands in the conterminous United States 2004 to 2009. U.S. Department of the Interior; Fish and Wildlife Service, Washington, D.C. 108 pp.

¹⁰ Kreeger, D.A. and A. T. Padeletti. 2013. Monitoring and Assessment of Representative Tidal Wetlands of the Delaware Estuary. Partnership for the Delaware Estuary (PDE) final report to the USEPA. PDE Report No. 13-03.144p.; Partnership for the Delaware Estuary. 2012. Technical Report for the Delaware Estuary and Basin. PDE Report No. 12-01. 255 pages. www.delawareestuary.org/science_programs_state_of_the_estuary.asp.

¹¹ Kreeger and Padeletti. 2013, *supra note* 10; PDE 2012, *supra note* 10.

¹² Kreeger and Padeletti. 2013, *supra note* 10; PDE 2012, *supra note* 10; D. Kreeger and A.T. Padeletti. October 2011. The condition of tidal freshwater wetlands in Pennsylvania, 2011. PDE Report No. 11-07. 1 –33 pp.

marshes remaining. Furthermore, the majority of the existing Delaware Estuary marshes are degraded and stressed.¹³

Generally, the only way to adequately protect aquatic resources is to avoid impacting them in the first place. Wetlands receive legal protection because they have been shown to be a significant ecological resource that provides a variety of functions that are of value to humans, wildlife and the economy. For example, wetland declines are believed by experts to be responsible in part for the “significant decline in blue fish populations” in New Jersey. Blue fish and striped bass are recreationally important and depend on wetlands that provide habitat for their small prey fish.¹⁴ Constructing upon such a large acreage of wetlands in the Delaware Estuary will contribute to this decline.

Although the NRC asserts that the wetlands impacts “are regulated under the authority and jurisdiction of the USACE and NJDEP” (p 4-41), the NRC should also independently evaluate the impact of wetland losses associated with this project as part of their decision-making. The Delaware River watershed is in need of wetlands restoration, and this project will surely not accomplish an improvement in wetland ecosystem function. It is critical that decision-making is done such that proposed projects help improve the ecological state of the estuary instead of justifying further damage by asserting the ecosystem is already degraded.

“NRC-authorized activities would be significant contributors to the noticeable impact...” from the loss of important wetland resources (p 4-43). However, the review team asserts that the “habitat loss would not destabilize wetland resources in the vicinity” (p 4-43). This assessment is contradictory since the NRC states the impact will be “noticeable” but not “destabilizing.” Furthermore, this assessment does not take into account the trend of extensive wetland losses in the watershed along with the impact of sea level rise on wetland losses in the near future. For this reason, the proposed project results in unacceptable permanent impacts to critical wetlands, and the NRC should not issue the ESP or authorize activities which would have such detrimental impacts to wetland resources.

Comment 10: There is limited discussion and analysis of avoidance/ minimization measures.

Avoidance/ minimization measures should be considered early and as an integral and critical component of the alternatives development and decision-making processes. Avoidance/ minimization should be explicit and carried out in a way that compensatory mitigation is only used as a last resort. Furthermore, this analysis should also be the subject of public review and comment. The discussion of avoidance/ minimization within the DEIS uses vague qualifying language such as “most likely” (p. 3-22), “could include” (p.4-41), and “could continue to be devised” (p.4-41). Since avoidance/ minimization is not explicitly discussed, the analysis of

¹³ Kreeger and Padeletti. 2013, *supra note* 10; Kearney et al. (2002). Landsat imagery shows decline of coastal marshes in Chesapeake and Delaware Bays. *Eos, Transactions American Geophysical Union*, 83(16), 173-178.

¹⁴ Frumhoff et al. 2007. *Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions*. Synthesis report of the Northeast Climate Impacts Assessment (NECIA). Cambridge, MA: Union of Concerned Scientists (UCS).

compensatory actions is inadequate without knowing what actions are actually being implemented to avoid or minimize impacts.

The determination of whether there are unavoidable impacts should not be arbitrary. Avoidance is always the best alternative, and restored wetlands cannot replace natural wetland functions. Avoidance and minimization has received less attention, and this lack of priority on these initial steps has resulted in the ineffective wetland conservation and the preservation of aquatic ecosystem functions by allowing too often, irreparable harm and permanent destruction of wetlands.

It is imperative that these avoidance/ minimization measures are not only considered but also implemented during decision-making. Instead the DEIS states: “[a]dditional measures to avoid or minimize potential impacts... could be formulated following the selection of a reactor technology and could continue to be devised throughout the design phase as detailed site layouts were developed” (p.4-41). Avoidance/ minimization should be done during this phase of the proposal and should not be put off until the project site has been decided on and the project is moving forward.

In order to accomplish the goal of “no net loss” of wetlands, compensatory mitigation should only be used to offset unavoidable impacts after avoidance and minimization measures have been evaluated. There is limited discussion of how PSEG is avoiding and minimizing impacts to wetlands. For example, there is a simply blanket assertion that elevation of a roadway/causeway will eliminate the need for wetlands and water fill but no discussion beyond that (p. 3-21). There is no detailed discussion with regards to the large footprint of the proposed plant and associated infrastructure.

NRC should revise the DEIS to include an evaluation of specific measures done to avoid and minimize impacts, and this evaluation should be subject to public comment.

Comment 11: The DEIS underestimates the permanent impacts to wetlands because the determination of the impacted wetlands as low quality is not based on the best science available.

The EIS declares that “[t]he quality of the habitat provided by wetlands at the [PSEG] site is impacted by the fact that much of the area is dominated by the invasive common reed (*Phragmites australis*)” (p. 4-41). Asserting as a justification for the impacts that the *Phragmites* dominated wetlands are degraded and their ruination is somehow less impactful or harmful to the ecology or communities of the region is not supported by PSEG’s own science or by reality.¹⁵ Furthermore, the unsubstantiated assumption that converting a *Phragmites* dominated wetland to a *Spartina alterniflora* wetland will enhance the ecological value of proposed mitigation sites is also faulty. This false assumption makes the evaluation of the proposed project inadequate, and also influences the evaluation of mitigation measures.

¹⁵ Kiviat, E. (2013). Ecosystem services of *Phragmites* in North America with emphasis on habitat functions. *AoB Plants*, 5, plt008.; Kettenring et al. (2012). Moving from a regional to a continental perspective of *Phragmites australis* invasion in North America. *AoB plants*, 2012, pls040.

Phragmites dominated wetlands support numerous native organisms, provide important ecosystems services, and support biodiversity and habitat functions that are linked to distinctive characteristics of the plant.¹⁶ For example, a new cryptic species of leopard frog (*Rana kauffeldi*) with limited and restricted range has just been identified in the Delaware watershed and persists in *Phragmites* dominated wetlands.¹⁷ This recent discovery of *R. kauffeldi* illustrates that we must protect sensitive species where they occur not just pristine environments. Studies have shown that fish assemblages can be similar in *Phragmites* and *Spartina alterniflora* wetlands or even present in greater densities.¹⁸ Data collected by PSEG in and around Artificial Island in the Delaware River ecosystem demonstrates that *Phragmites* dominated wetlands provide both food and habitat valuable to the Delaware Bay system. For example, according to an evaluation of the restored wetlands from the previous Salem NJPDES permit:¹⁹

“It has not been demonstrated that the restoration of the *Phragmites* dominated sites is increasing fish utilization of those areas. Monitoring at Alloway Creek includes several sites dominated by *Phragmites*, *Spartina* or under treatment for *Phragmites* removal. The 2000 monitoring showed that within Alloway Creek large marsh creeks, fish abundance was similar at all three sites. In 2002, the *Phragmites* site had the highest abundance of fish, while the treated and *Spartina* sites had lower abundances. While 2002 data showed larger abundance in the treated Alloway site, it also demonstrated that the untreated *Phragmites* site had the highest species richness. Reproduction of mummichog and Atlantic silverside was seen in the *Phragmites* dominated sites both prior to and following the treatment of *Phragmites* and growth patterns were seen to be similar for mummichog and Atlantic silverside both pre and post treatment as well. Studies also indicate that mummichog are able to use *Phragmites* as a food source in *Phragmites* dominated sites. These results indicate that *Phragmites* eradication has not been proven to increase utilization of the site and increased fish production.”

The Estuary Enhancement Program (EEP) that was so often referenced in the NRC public hearing on October 1, 2014, and which is most certainly to serve as the model for any wetlands mitigation options proposed by PSEG, is based on the false premise that *Phragmites australis* is of lesser ecological value than *Spartina alterniflora*. Converting a *Phragmites* dominated wetlands to *Spartina* wetlands will not enhance the ecological value of the proposed mitigation sites. The EEP model is not substantiated by scientific research, is not a net positive contribution to the Delaware Estuary wetland system, and is not an independently sustainable mitigation option.

¹⁶ Kiviat 2013, *supra note 15*.

¹⁷ Feinberg, J. A., Newman, C. E., Watkins-Colwell, G. J., Schlesinger, M. D., Zarate, B., Curry, B. R., ... & Burger, J. (2014). Cryptic Diversity in Metropolis: Confirmation of a New Leopard Frog Species (Anura: Ranidae) from New York City and Surrounding Atlantic Coast Regions. *PloS one*, 9(10), e108213.

¹⁸ Fell et al. (2006). Short-term effects on macroinvertebrates and fishes of herbiciding and mowing *Phragmites australis*-dominated tidal marsh. *Northeastern Naturalist*, 13(2), 191-212. ; Warren et al. (2001). Rates, patterns, and impacts of *Phragmites australis* expansion and effects of experimental *Phragmites* control on vegetation, macroinvertebrates, and fish within tidelands of the lower Connecticut River. *Estuaries*, 24(1), 90-107.

¹⁹ Delaware Riverkeeper Network. 2003. Evaluation of special conditions contained in salem nuclear generating station NJPDES permit to restore wetlands, install fish ladders, and increase biological abundance within the Delaware Estuary. Prepared by Carpenter Environmental Associates, Inc. Dec 3, 2003.

The “potential” mitigation measures (Section 4.3.2.2) are based on the false premise that converting *Phragmites* dominated wetlands to *Spartina alterniflora* dominated wetlands will enhance the ecological value of the proposed mitigation site.²⁰ The proposed mitigation measures would be to transform existing tidal marshes through the removal and conversion of the dominant vegetation. This type of mitigation will not restore more valuable (enhancement) nor return natural (restoration) wetland functions - two of the appropriate forms of compensatory mitigation.²¹

Because the scientific research on the value of *Phragmites* dominated wetlands was not discussed or evaluated, the identification of the wetland ecological resources and description of the functional attributes of the wetland ecosystems that could be affected by the proposed project are inadequate (Section 2.4 Ecology). Until the value of the impacted sites has been fully evaluated, the conclusions and the determinations of the impact category levels are also inadequate and inaccurate (Section 4.1).

Comment 12: The review of mitigation measures is based on insufficient information due to the lack of detail and use of qualifying language. More information is necessary in order to make an informed decision.

Potential mitigation measures for unavoidable and permanent impact to wetland resources is discussed in Section 4.3.2.2. However, the description is vague and uses qualifying language such as “may include,” “could include,” or “could be undertaken.” The mitigation plans should be explicitly developed and evaluated, especially given the likelihood for adverse impacts that some of the “potential” mitigation methods could have on the local environment (i.e. herbicide use, see comment 13). NRC should not prematurely grant approval before it can properly demonstrate, with any degree of certainty, that proper environmental mitigation measures have been fully agreed upon and evaluated. Furthermore, the mitigation measures and mitigation plan should be subject to public review. The review team concluded that “... habitat loss would not destabilize wetland resources in the vicinity” (p 4-43). However, this conclusion, which falsely assumes proper mitigation for unavoidable and permanent impacts, is unsubstantiated and inaccurate without a full analysis of the mitigation plans.

Wetlands are an important terrestrial resource and provide habitat for wildlife in the Delaware River watershed. It is imperative that any impacts to these important resources are mitigated appropriately and that an approved wetlands restoration or rehabilitation program actually enhances the ecosystem resources. According to the DEIS, wetland mitigation methods “... might include the control of *Phragmites*, restoration of the hydrologic state (Levee removal, channel design, and reestablishing a connection of upland areas to tidal influences), and wetland enhancement that include restoration of desirable and native vegetation.” (p 4-42). Without explicit descriptions of the methods that PSEG intends to utilize to accomplish mitigation, we can only assume that PSEG is proposing the same mitigation measures for this project that it used for previous projects. PSEG has applied tens of thousands of pounds of herbicides, as well as engaging in discing, mowing, and burning, all of which adversely impact the habitat and

²⁰ Kiviat 2013, *supra* note 15; Kettenring et al. 2012, *supra* note 15.

²¹ U.S. Environmental Protection Agency. Wetlands Compensatory Mitigation Factsheet. EPA-843-F-08-002.

introduce dangerous chemicals into our environment. For example, one-time applications of herbicide are never effective, and therefore, herbicides must be used in a multi-year application, resulting in a long-term commitment and ongoing environmental damage.²² Due to the potential for environmental impact from specific mitigation measures, a full mitigation plan should be established and the environmental impact of such measures should be fully evaluated by the NRC as part of their analysis of the environmental impact of this project.

The NRC should also consider whether PSEG will, in fact, fully and adequately implement all mitigation measures. PSEG is proposing the same “potential” mitigation measures for this project that it made, and subsequently failed to implement, in previous projects. While scientists studying the previous PSEG restoration projects have published peer-reviewed journal articles on the management approach, final results assessing if the objectives to restore vegetative diversity and functioning wetlands were achieved have yet to be published.²³ The EEP model for compensatory mitigation used by PSEG in the past is not sustainable because the change in vegetation that is proposed can only persist through continual and often invasive interventions – the Delaware Bay area is home to large swaths of *Phragmites* and so there is a perpetual source for the species which will repopulate any area of appropriate habitat condition that is not concertededly managed to prevent this. For example, PSEG eliminated 1,200 acres in the Mill Creek area from the EEP program because of an inability to convert *Phragmites* to *Spartina* after 5 years of herbicide application. The Alloway Creek EEP site was also reduced in size (p 4-43).

The fact that these wetlands will not be sustainable in the absence of an ongoing obligation by PSEG to continue these damaging activities is indefensible for achieving the goal of wetlands protection or mitigation. Scientific research has documented that land-use patterns on adjacent sites influence the success of restoration plans, and for *Phragmites* management to be successful, plans should be developed at the watershed-scale (vs. a site level scale) so to address the source of invasion and should focus on restoring native plant communities rather than simply eradicating *Phragmites* stands.²⁴ The methods used by PSEG in the past do little to reduce the dominance of *Phragmites* in the long term. For example, mowing can actually stimulate shoot production resulting in an increased density of *Phragmites* shoots.²⁵ The fact that PSEG has made identical mitigation plans in past projects, and has been unsuccessful in enhancing the wetland resources of the watershed, weighs heavily against PSEG’s credibility. Furthermore, it demonstrates the inadequacy of the NRC’s review to specifically and substantively respond to this criticism in this DEIS.

²² Kettnering, K. M., & Adams, C. R. (2011). Lessons learned from invasive plant control experiments: a systematic review and meta-analysis. *Journal of Applied Ecology*, 48(4), 970-979.

²³ Hazelton et al. (2014). *Phragmites australis* management in the United States: 40 years of methods and outcomes. *AoB plants*, 6, plu001.

²⁴ Hazelton et al. 2014, *supra note 23*.

²⁵ Derr, J. F. (2008). Common reed (*Phragmites australis*) response to mowing and herbicide application. *Invasive Plant Science and Management*, 1(1), 12-16.; Warren et al. (2001). *supra note 18*.

Comment 13: There is insufficient information about mitigation methods that involve “control of Phragmites.” The review of “potential” mitigation methods is necessary because methods using herbicides and more specifically, glyphosate, have detrimental impacts to the environment.

The “potential” mitigation methods listed in the DEIS focus on *Phragmites* control without specifying how the vegetation removal will occur. The EEP has been largely dependent upon the use of the broad spectrum herbicide glyphosate that is dangerous to the environment and to people. There has been ongoing use by PSEG of glyphosate since 2004 (see below), although we have been unable to dedicate the resources necessary to continue to count the volumes used. The NRC should engage in that assessment as the ongoing application of glyphosate into our sensitive ecological systems is a high priority concern that should not be perpetuated by the NRC in their consideration, review and approvals of the Salem 4 proposal. The ecosystem services provided by *Phragmites* and the wetland mitigation sites should be weighed against the environmental damages caused by the removal of *Phragmites* through the use of herbicides and glyphosate.

Glyphosate is a broad spectrum, non-selective herbicide. Roundup (as a trade name) and other herbicide formulations that include glyphosate as their active ingredient also contain surfactants that are designed to help deliver the glyphosate into the plant cells for action. In the case of some formulations, the volume of “other ingredients” including the surfactant can outweigh the volume of glyphosate in a named herbicide product. So when considering the toxicity of glyphosate-based herbicides, one must also know and consider the impacts of the surfactants and other ingredients contained therein.

At last assessment:

- In 1996, PSEG applied glyphosate to 2,364 acres.
- In 1999, PSEG applied glyphosate to 330 acres.
- In 2000, PSEG applied glyphosate to approximately 850 acres, using 600 gallons of glyphosate (3,240 pounds active ingredient).
- PSEG has applied glyphosate on 419 acres in Lower Alloways Creek and the Cohansey River site, using 1271 pounds of glyphosate.
- In 2002, PSEG applied glyphosate on 402 acres, using 1,233 pounds of glyphosate.
- In 2003, PSEG applied glyphosate on 400 acres, using 1,233 pounds of glyphosate.
- Between 1996 and 2004, PSEG applied cumulatively 22,000 pounds of glyphosate on approximately 2,500 acres of wetlands in the Delaware Bay region.

Glyphosate is usually assumed to be quickly and tightly adsorbed to soil particles and as a result it is assumed to not have adverse effects beyond its target. But glyphosate is known to enter aquatic systems, e.g. by accidental direct application, by drift of the herbicide spray, or as the result of surface runoff. Furthermore, the product that is formed after the active ingredients are degraded by chemical, microbial or photochemical processes can adversely impact the

environment.²⁶ Research shows that “[o]nce in the aquatic environment, glyphosate may become toxic to living organisms, including plants, animals and microorganisms.”²⁷ The introduction of glyphosate can cause a major change in water chemistry (namely a significant increase in total phosphorous concentrations), can be toxic to aquatic macrophytes, and can stimulate nuisance algae resulting in cyanobacteria blooms which have adverse effects on both human and animal health.²⁸

It has been generally believed that glyphosate, which is designed to kill plants, has only minor effects on animals that may be exposed. However, studies have shown a negative effect on aquatic and amphibian populations. For example, a study conducted by the University of Pittsburgh’s Department of Biological Sciences, tested the negative effects of four well-known pesticides on the biodiversity of aquatic communities containing algae and 25 species of animals and found that species richness was reduced by 22% with Roundup.²⁹ Roundup completely eradicated two species of tadpoles and nearly exterminated a third species, resulting in a 70% decrease in the species richness of tadpoles overall.³⁰ “The most striking result from the experiments was that a chemical designed to kill plants killed 98% of all tadpoles within three weeks and 79% of all juveniles within one day.”³¹ The population impacts of losing 96 to 100% of tadpoles combined with 68 to 86% of juvenile frogs and toads on land could be substantial.³²

There continues to be emerging research that demonstrates that glyphosate, surfactants like polyoxyethylene tallow amine (POEA), and the herbicides like Roundup containing them are not safe for humans as is often asserted. A 2009 published study looked at the effects of different Roundup formulas on human cells and found that four Roundup herbicides and glyphosate mixtures “available on the market could cause cell damage and even death around residual levels to be expected....”³³ Glyphosate-based herbicides have endocrine disrupting effects at dilutions 800 times lower than the level authorized in some food or feed causing DNA damage and carcinogen, mutagen, and reprotoxic effects on human cells.³⁴ The researchers further concluded that the dilution of glyphosate in a Roundup formulation may multiply its endocrine effect and that the addition of surfactants “greatly facilitated” the penetration of glyphosate through animal

²⁶ Ongley, E. D. (Ed.). (1996). Control of water pollution from agriculture (No. 55). Chapter 4 Pesticides as Water Pollutants. Food and Agriculture Organization Irrigation and Drainage. Natural Resources Management and Environment Department. Retrieved from:

<http://www.fao.org/docrep/w2598e/w2598e07.htm#chapter%204:%20pesticides%20as%20water%20pollutants>.

²⁷ Perez et. al. 2007. Effects of the Herbicide Roundup on Freshwater Microbial Communities: a Mesocosm Study. *Ecological Applications*. 17(8): 2310-2322.

²⁸ Perez et al. 2007, *supra note 27*.

²⁹ Relyea, R. 2005. The Impact of Insecticides and Herbicides on the Biodiversity and Productivity of Aquatic Communities. *Ecological Applications* 15(2): pp. 618–627; Another study of significance: Paganelli et al. (2010). Glyphosate-based herbicides produce teratogenic effects on vertebrates by impairing retinoic acid signaling. *Chemical Research in Toxicology*, 23(10), 1586-1595.

³⁰ Relyea 2005, *supra note 29*.

³¹ Relyea, R. 2005. The Lethal Impact of Roundup on Aquatic and Terrestrial Amphibians. *Ecological Applications* 15(4): 1118-1124.

³² Relyea 2005 *supra note 31*.

³³ Benachour N. and Seralini G. 2009. Glyphosate Formulations Induce Apoptosis and Necrosis in Human Umbilical, Embryonic, and Placental Cells. *Chem. Res. Toxicol.* 22: 97-105.

³⁴ Gasnier, C. et al. (2009). Glyphosate-based herbicides are toxic and endocrine disruptors in human cell lines. *Toxicology* 262, 2009 : 184-191.

cell membranes, as it does for plant cell membranes.³⁵ The Institute of Science in Society reported that glyphosate "...reduced testosterone levels in testicular cells at very low concentrations; and at the higher concentrations – still 10 times below agricultural use – the cells died in 24-48 hours."³⁶ At the very least, there is science which calls into question the impacts of herbicides like Roundup and supports implementation of a precautionary principle whereby these herbicides are not allowed for use until they are conclusively proven safe.

The NRC should evaluate the environmental impact of the methods that PSEG will use to compensate for permanent wetland losses as a result of the proposed project. Scientific research has shown that the herbicide glyphosate is dangerous to the environment and to people, and therefore, should not be used for compensatory mitigation because it will cause greater harm.

Comment 14: The best available science was not used to evaluate the aquatic impacts from building activities, and therefore, the conclusion that impacts would be small is based on insufficient information. The DEIS should reevaluate the construction impacts on aquatic species, specifically the science related to noise impacts and avoidance behavior related to pile driving and increased vessel traffic.

The impacts to aquatic resources are "expected to be temporary because fish and mobile invertebrates likely would avoid areas of building activity..." (p 4-49) and impacts "would be largely controlled by the use of BMPs associated with the management of water quality [sedimentation and erosion]" (p 4-50). The review team concluded that impacts to aquatic biota during construction would be small and no mitigation measure would be warranted. However, no scientific research was analyzed or referenced to support the assumptions of this assessment, and therefore, this conclusion is based on insufficient information. The NRC needs to evaluate both the short-term and long-term impacts of construction noise and increases in barge/ vessel traffic noise as a result of the proposed project.

The DEIS lists numerous species that not only use the habitat that will be disturbed but have been found within the local area: Silver Hake, Eastern oyster, horseshoe crab, Blueback Herring, Alewife, Atlantic Silverside, Bay Anchovy, federally threatened and endangered sea turtles (Loggerhead, Kemp's Ridley, Green, Leatherback, Hawksbill), federally endangered sturgeon (Shortnose, Atlantic). The Delaware River is one of the remaining two breeding locations for the endangered New York Bight distinct population segment of sturgeon. These facilities impact that endangered population. Furthermore, the Delaware River is an essential habitat for a wide variety of other fish, water fowl, and aquatic animals and plants.

There is an increasing amount of awareness and research on the effect of anthropogenic sounds in the aquatic environment and how these sounds affect aquatic mammals, diving birds, fishes, amphibians, reptiles, and invertebrates.³⁷ Fish actually gain a good deal of information about the

³⁵ Richard et al. (2005). Differential effects of glyphosate and roundup on human placental cells and aromatase. *Environmental health perspectives*, 716-720.

³⁶ Sirinathsinghji, E. (2012). Glyphosate Kills Rat Testis Cells, ISIS Report 27/02/12, retrieved from: www.isis.org.uk/glyphosate_kills_rat_testis_cells.php.

³⁷ Dow Piniak et al. (2012). Underwater hearing sensitivity of the leatherback sea turtle (*Dermochelys coriacea*): Assessing the potential effect of anthropogenic noise. U.S. Dept. of the Interior, Bureau of Ocean Energy

world around them from listening to sounds underwater including sounds of waves on the shore, geologic events, rain on the water surface, and other numerous non-biological sounds. Many fish also utilize sound as a source of communication. Many species depend on the ability to detect sound for survival because impaired hearing leaves them vulnerable to predators, unable to locate prey and/ or unable to communicate.³⁸ Furthermore, excess anthropogenic noise has the potential to interfere with the detection of noises in the environment, affecting fish in a similar manner as those with damaged hearing.³⁹

Therefore, the construction phase of a project, despite being temporary, has the potential for impact on aquatic species; of particularly grave concern is pile driving and increased vessel traffic.⁴⁰ Offshore energy development in recent years has resulted in research around the world involving the biological and population effects of underwater noise associated with construction and pile driving. This research should be evaluated as part of the analysis of aquatic impacts of the proposed project, and the impacts should be mitigated.

Pile-driving sounds underwater are typically characterized by multiple rapid increases and decreases in sound pressure over short periods of time. Bridge construction projects along the West Coast of the U.S. have been routinely trying to minimize, monitor, and mitigate for underwater noise, whereas projects along the East Coast have been behind in these regards. Pile driving is the only anthropogenic sound source except explosives that has caused documented fish kills.⁴¹ Mortality caused by exposure to pile-driving sounds is caused by bleeding and damage to the swim bladder.⁴² Alternatively, effects could cause tissue damage or temporary hearing loss that can result in behavioral changes and/or lower the chance of survival. Habituation might also occur if the same school of fish is subjected to repeated exposure over time.⁴³ Although different animals may have different tolerances making extrapolating data from one sound type or species to another difficult,⁴⁴ bridge construction projects have routinely identified sturgeon and sea turtles as needing protection from excessive noise.⁴⁵

Management, Headquarters, Herndon, VA. OCS Study BOEM 2012-01156. 35pp.; Popper & Hastings (2009). The effects of anthropogenic sources of sound on fishes. *Journal of Fish Biology*, 75(3), 455-489.; Hastings & Popper (2005). Effects of sound on fish (p. 82). California Department of Transportation.; NRC (National Research Council). (2005). *Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects*. Washington, DC: National Academy Press.

³⁸ McCauley et al. (2003). High intensity anthropogenic sound damages fish ears. *The journal of the acoustical society of America*, 113(1), 638-642.

³⁹ Popper & Hastings 2009, *supra note 37*; Amoser et al. (2004). Noise emission during the first powerboat race in an Alpine lake and potential impact on fish communities. *The Journal of the Acoustical Society of America*, 116(6), 3789-3797.

⁴⁰ Hawkins et al. (2014). Responses of free-living coastal pelagic fish to impulsive sounds. *The Journal of the Acoustical Society of America*, 135(5), 3101-3116.; Bailey et al. (2014). Assessing environmental impacts of offshore wind farms: lessons learned and recommendations for the future. *Aquatic biosystems*, 10(1), 8.

⁴¹ Popper & Hastings 2009, *supra note 37*.

⁴² Caltrans (2001). "Pile Installation Demonstration Project, Fisheries Impact Assessment." PIDP EA 012081, Caltrans Contract 04A0148. San Francisco - Oakland Bay Bridge East Span Seismic Safety Project.

⁴³ Thomsen et al. (2012). Effects of pile driving on the behavior of cod and sole. In *The Effects of Noise on Aquatic Life* (pp. 387-388). Springer New York.

⁴⁴ Popper & Hastings (2009). The effects of human-generated sound on fish. *Integrative Zoology*, 4(1), 43-52.

⁴⁵ Thalheimer et al. (2014). Development and Implementation of an Underwater Construction Noise Program. Development.

A review of research and data related to construction noise impacts to aquatic and marine species within the Delaware Estuary is needed, including the adverse effect on natural behavior, feeding, or reproductive habits and the potential to cause injury or even death. Since the best available science indicates a potential for impact, construction specification and guidelines should be used to avoid and minimize impacts to, at a minimum, Atlantic Sturgeon and sea turtles. A review of West Coast construction projects should be conducted along with other major bridge construction projects in the Mid-Atlantic States which have developed and implemented underwater noise monitoring and mitigation measures.⁴⁶ Furthermore, impact analyses and mitigation methods have been utilized in other industries for pile-driving activities including offshore wind farms and oil exploration, and the outcomes and research resulting from these projects should be reviewed.

In addition to the direct impacts of construction noise, indirect impacts to aquatic resources from increased vessel/ barge activity were also not evaluated. Vessels have the potential to have major negative population level effects on fish due to increased noise levels and propeller strikes.⁴⁷ Lower-level and chronic vessel noise can impact fish through masking acoustic communication and triggering endocrinological stress responses.⁴⁸ Additionally, both vessel and towboat propellers are a major turbulent force entraining high volumes of water with the potential of killing or striking large numbers of organisms.⁴⁹

The urbanization of the Delaware Estuary in the vicinity of the proposed project makes alternative habitat less available and displacement of fish more impactful on the aquatic populations. An analysis of the impacts of increased vessel traffic on ambient noise and the potential for boat strikes should be conducted. This information is necessary in order for the NRC to make an informed decision regarding the need for a new mooring facility that might facilitate increased vessel/ barge activity.

Comment 15: The dredging and construction of a new barge mooring facility will cause immediate and ongoing damage to the Delaware River which was not fully analyzed. The negative effects on water quality through the resuspension of toxics from dredging and through vessel-related discharges were not evaluated.

The proposed project will include the construction of a new barge unloading and mooring facility resulting in new dredging of the river, permanent impact to tidal waters, and on-going impacts

⁴⁶ Thalheimer et al. 2014, *supra note 45*.

⁴⁷ Becker et al. (2013). Does boat traffic cause displacement of fish in estuaries? *Marine pollution bulletin*, 75(1): 168-173.

⁴⁸ Slabbekoorn et al. (2010). A noisy spring: the impact of globally rising underwater sound levels on fish. *Trends in Ecology & Evolution*, 25(7), 419-427.; Codarin et al. (2009). Effects of ambient and boat noise on hearing and communication in three fish species living in a marine protected area (Miramare, Italy). *Marine pollution bulletin*, 58(12), 1880-1887.; Smith et al. (2004). Noise-induced stress response and hearing loss in goldfish (*Carassius auratus*). *Journal of Experimental Biology*, 207(3), 427-435.

⁴⁹ Miranda & Killgore (2013). Entrainment of shovelnose sturgeon by towboat navigation in the Upper Mississippi River. *Journal of Applied Ichthyology*, 29(2), 316-322.; Kilgore et al. (2005). Interim Report for the Upper Mississippi River-Illinois Waterway System Navigation Study, Evaluation of Towboat Propeller-Induced Mortality of Juvenile and Adult Fishes. US Army Engineer, ENV Report 56.

from the use of the barge slip and barge storage and unloading facility. The DEIS indicates that the Delaware River bottom would be “lowered 4.5 ft over a 92-acre area, requiring dredging 665,000 yd³ of sediment” (p 4-22) and “[d]redging may be required to maintain use of the Hope Creek Generating Station barge slip ... during operation” (p 5-39). The expansion of the existing barge slip and the new barge storage and unloading facility are “to be in use to transport large plant components to the site during building activity” (p 4-46), but the use of these facilities “...are expected to be infrequent during operation.” (p 5-39). This is in contrast to the dredging and other maintenance needed to allow access to the facility, which will be continuous. Both the dredging proposed in order to construct the barge facility and the increased vessel traffic will have negative water quality impacts to the Delaware River system which were not evaluated.

Dredging can resuspend and reintroduce toxics back into the Delaware River system. Research has shown that dredging operations via the resuspension of large amounts of sediment, can release chemical contaminants that are bound to the fine-grained estuarine/ marine sediments into the water.⁵⁰ This resuspension can therefore reintroduce heavy metals, pesticides, and other toxins back into the River and into the food chain, resulting in both negative impacts on organisms that rely on good water quality but also putting at risk drinking water aquifers important to communities in New Jersey and Delaware. For example, contaminants can be transferred to higher trophic levels after ingestion by filter feeders through biomagnification.

Among the negative effects that have not been adequately considered or addressed by the NRC is the impact of vessel related discharges as a result of a new mooring facility and increased vessel/ barge activity. There would definitely be increased vessel and barge activity during the construction phase, but the DEIS does not specify how “infrequent” the barge facility will be used during operation. Furthermore, why are permanent impacts being permitted to construct an “infrequently” used facility? Despite this, vessel-related operational discharges have not been evaluated.

Vessel-related operational discharges represent one of the largest anthropogenic inputs of pollutants into estuary environments and pose a long-term and substantial threat to coastal ecosystems. Vessel discharges result in negative environmental impacts by releasing both traditional pollutants (i.e., oil, nutrients, toxics, sewage) and by contributing to the spread of aquatic invasive species. Furthermore, alterations to sedimentation and wave patterns caused by vessels entering and exiting the mooring area could also increase turbidity which can decrease dissolved oxygen, can mask pheromones used by migratory fishes, and can smother immobile benthic organisms.

The negative impacts associated with both the dredging and construction of a new barge mooring facility should be fully evaluated by the NRC, and the permanent impacts of this activity weighed against the need for this facility in the long-term.

⁵⁰ Yeager et al. (2010). Impacts of dredging activities on the accumulation of dioxins in surface sediments of the Houston Ship Channel, Texas. *Journal of Coastal Research*, 743-752.; Bocchetti et al. (2008). Contaminant accumulation and biomarker responses in caged mussels, *Mytilus galloprovincialis*, to evaluate bioavailability and toxicological effects of remobilized chemicals during dredging and disposal operations in harbour areas. *Aquatic Toxicology*, 89(4), 257-266.; Sundberg et al. (2007). Dredging associated effects: maternally transferred pollutants and DNA adducts in feral fish. *Environmental science & technology*, 41(8), 2972-2977.

Comment 16: The evaluation of federally endangered Atlantic Sturgeon is based on outdated information.

In Section 3.3.3.2 of the DEIS, the NRC references observations of Atlantic Sturgeon juveniles from 1991 and 1998 as well as tagging studies in 2005 and 2006. All of these documents are dated and therefore, the NRC did not provide due consideration to current conditions and/or impacts. Since these reports were completed, there have been a number of significant changes in and around the project areas. For example, the Atlantic Sturgeon was declared endangered in 2012.⁵¹

The Delaware River has been determined to have a genetically unique line of Atlantic Sturgeon,⁵² one that reproduces only in the Delaware River system. Juvenile Atlantic Sturgeon from this line has been found in the Delaware River, thus supporting its ongoing existence and survival. This genetically unique line is known to rely heavily on various parts of the estuary for various critical stages of its life cycle, and in fact in 2014 alone, over a dozen Atlantic Sturgeon have been found dead, dying or seriously injured in PSEG's Salem Nuclear Generating Station cooling water intake structure located on Artificial Island⁵³ – all of which is new and vitally important information.

The dated and deficient nature of the data reviewed in the DEIS makes it deficient. Furthermore, the DEIS does not take into account the cumulative impact of PSEG's existing nuclear facilities at Salem Nuclear Generating station which kills some number of both Shortnose and Atlantic Sturgeon due to impingement despite not undertaking mitigation measures that benefit or enhance impacted fish populations. Before further impacts are permitted, PSEG should be required to comply with mitigation requirements. The fact that PSEG has failed to mitigate past damages should weigh heavily against PSEG's credibility.

Comment 17: There is no justified need for a new three lane causeway to be built on environmentally sensitive deed restricted lands.

PSEG proposes to construct a new three lane elevated access roadway, but there is no explanation as to why the current three lane roadway is inadequate for servicing the construction and operation of this new plant especially since it was sufficient for the construction of three other nuclear power plants on the same site (Section 4.1.2.). The DEIS does not discuss who will be ultimately paying for the construction of this expensive roadway and what will happen to the existing three lane roadway. This proposed causeway will be five miles long and will permanently impact at least 45 acres of wetlands on deed restricted land.

⁵¹ NOAA. 2012. NOAA lists five Atlantic sturgeon populations under Endangered Species Act. Retrieved from: http://www.nmfs.noaa.gov/stories/2012/01/31_atlantic_sturgeon.html.

⁵² Grunwald et al. 2007. Conservation of Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus*: delineation of stock structure and distinct population segments, Printed Springer Science+Business Media, B.V. 2007; Wirgin, I., Grunwald, C., Stabile, J., & Waldman, J. (2007). Genetic evidence for relict Atlantic sturgeon stocks along the mid-Atlantic coast of the USA. *North American Journal of Fisheries Management*, 27(4), 1214-1229.

⁵³ Reports can be found on the Nuclear Regulatory Commission website, filed by PSEG.

Virtually all of the roadway traverses either enhanced wetlands or wildlife management areas and will require deed restriction releases from the State of New Jersey. In fact, one of these areas is property that PSEG previously purchased as compensation for other properties that it damaged as part of previous construction.

The DEIS ignores any discussion of justified need for this causeway which should be discussed and evaluated. DRN can identify no justified need for this causeway and the resulting effective elimination of productive wetlands and “protected” wildlife areas. DRN strongly opposes any lifting of these deed restrictions by the State of New Jersey, since it will fragment existing productive wetlands and the replacement lands may not be worthy of acquisition by the State.

Comment 18: A nuclear power plant decommissioning analysis with associated costs should be included in the DEIS.

The DEIS very briefly discusses decommissioning of a future nuclear power plant in Sections 6.3 and 7.11.3. NRC discusses the impacts and concludes they are “small.” The level of discussion and consideration of the costs of decommissioning is seriously lacking. They will not be “small.” At the end of the life cycle of this 2200 MW plant, huge volumes of low-level radioactive waste will need to be disposed. New Jersey has no low-level radioactive waste disposal facility but has a fifty year contract to dispose of low-level radioactive waste in Barnwell, South Carolina. All of the decommissioned low-level radioactive waste and intermediate level waste volume will need to be trucked to Barnwell, South Carolina at a distance of about 661 miles. This will be a very expensive disposal operation, and may equal a significant percentage of the actual cost to construct the plant.

The NRC should have provided past experiences and information on prior nuclear power plant decommissioning in order to present information for the public to consider as to the costs, the risks, and the wisdom of building a new nuclear reactor.

Decommissioning also raises the critical concern that the DEIS fails to identify and analyze the terminology of a “life cycle analysis” (a.k.a. life cycle assessment or total cost assessment) into this whole proposal to build a nuclear power plant. Life cycle analysis is also the only standard method (ISP 14040 series international standards) capable of assessing environmental impacts through the entire process of a nuclear power plant from the mining, refining of nuclear fuel, to the resources necessary to build a plant, to the irreversible environmental and social impacts, to the operation, and then ultimately the demolition, disposal and restoration of the site. It will include all of the financial costs, environmental impacts and an attempt to identify if constructing the facility actually makes sense in the long term. Without this whole life cycle approach, highly polluting stages associated with the facility could be overlooked. For instance, if one were to study just the operational phase of a nuclear power plant, such as has been done in the DEIS, one could conclude that it produces less pollution than other sources. However, if you look at other life components of the plant, like the costs of construction, the costs of securing radioactive components, the high costs of decommissioning and transportation and disposal costs of low-level radioactive wastes 660 miles away, the viability and the costs of dealing with the storage and the long term disposal of high level radioactive wastes or a nuclear accident (Three Mile Island, Chernobyl, Fukushima) or impacts from refining uranium or its sources (95% is imported

from a non-aligned country like Russia) you can begin to identify the actual full costs to society and the environment.

The DEIS should conduct a form of a life cycle analysis since NEPA mandates a “big picture” review so that both the NRC and the affected public can make the best decisions possible as to whether investing in new nuclear power plants makes sense in 2014.

It is also important to note that nuclear power is not carbon-free, it is on the contrary rather carbon intensive when you include the cost to mine, refine, safely transport uranium fuel, the energy involved in constructing a nuclear power plant, the safe storage of high level radioactive waste for thousands of years, and the energy involved in dismantling and decommissioning the plant. Also, the energy cost and carbon utilized to refine uranium is increasing as the available uranium ore concentrations continue to decrease. The only time that nuclear is low-carbon is when it is operating. The DEIS is deceptive, particularly Table 9-5, since it only includes carbon emission during plant operations. The NRC should calculate carbon emissions over the life cycle of all power plants, from cradle to grave as doing so would result in a dramatic change in these numbers.

Comment 19: The impact of new transmission lines should have been included in the DEIS.

Failure to analyze the impacts of new transmission lines is yet another example of the segmentation allowed by NRC for this project. The failure to include this impact information in the DEIS is a glaring omission by the NRC and demonstrates that this DEIS fails to comply with the requirements of NEPA to give a hard look at this power plant proposal. A new nuclear power plant will require new very large transmission lines and rights of way to be acquired. The DEIS lists this issue (p 7-8) but fails to include any analysis of these transmission lines and their impacts in the needs analysis, in the alternatives analysis, or in the cumulative impacts analysis. PJM has recommended the construction of new transmission lines, and the DEIS is inadequate without performing this analysis. This failure is an issue, since a thorough and objective analysis of transmission lines would have also shown that this location is a poor choice for building another power plant.

Transmission lines have a great impact on the land which they cross. PSEG currently has a network of long distance high voltage transmission lines that emanate from both Salem and Hope Creek Nuclear Generating Stations. These transmission lines consume huge acreage, fragment forests, and prevent any use of the land below it, other than farming or grassland. These transmission lines have a huge cumulative impact on the State and demonstrate that locating this plant far from the users of this electricity creates a need to permanently disrupt thousands of acres of otherwise usable lands across the State in order to deliver the power to the population centers in northern New Jersey.

New transmission lines will lower tax rates across every community that they cross, so locating another power plant on Artificial Island will negatively impact every community that is the recipient of these new lines. These new transmission lines will likely have an impact on literally hundreds of miles of land in New Jersey. Additionally, in its transmission analysis,

PSEG should examine the transmission loss between the source and end users when transporting electricity over such a great distance.

The new transmission lines should also be discussed in the alternatives analysis in the DEIS, since smaller scale and decentralized power generation alternatives can avoid the large-scale land use disruption that new transmission lines will cause.

Comment 20: The DEIS fails to identify a real need for power, and thus there is no need for this nuclear power plant.

Section 8.0 of the DEIS performs an analysis of whether there is sufficient baseload available or whether the baseload from this plant is needed by the year 2023. The analysis area is New Jersey. There is no stated real need for this plant since there is already capacity to produce this electricity and that any additional needs could readily be met with less expensive, smaller decentralized sustainable generation. Nowhere in this DEIS does NRC identify a shortage of available baseload for the PSEG service area, and nowhere in any analysis does it require NRC to only consider power generation that only comes from within the PSEG service area. Electricity is freely exchanged between all providers and that is specifically why the PJM network has been successful and cost efficient at delivering reliable baseload to the entire region.

Based upon the PSEG's own predictions, its service area might need something under 1 MW of additional supply by 2023, and this need could readily be supplied by less expensive renewable power. It appears that the only justification presented for this new plant in the DEIS is this plant would replace other baseload already available to New Jersey. DRN does not believe that this analysis demonstrates a legitimate need for a power plant that will cause irreparable harm to the environment and might cost upwards of \$10 billion or more by the time it is actually completed.

Since the DEIS concludes that there is no actual demonstrated need for this power plant, the NRC should now conclude that the granting of an ESP is not appropriate at this time. The NRC should also conclude that the "no action" alternative should be selected as the best choice for the environment and the people of New Jersey.

Comment 21: Alternative energy options have not been given adequate consideration.

Sustainable energy options such as solar, wind, geothermal, and energy efficiency and conservation measures have not been adequately considered by the NRC. The reasons given for not adequately considering these sources are that renewables require "lengthy new transmission lines" and that they cannot provide baseload power because of intermittency issues. This flippant dismissal is unfounded and does not take into account proposed transmission such as the New Jersey Energy Link by the Atlantic Wind Connection—an offshore transmission line that would run along the coast of New Jersey.⁵⁴ There appears to be a double standard in that the proposed nuclear project would require lengthy new transmission lines, but this does not seem to be a concern to NRC in that context.

⁵⁴ <http://atlanticwindconnection.com/home>

The NRC has not adequately considered all renewable energy options, such as distributed solar, which would reduce the need for new transmission and reduce the source's intermittency. It appears as though only large solar arrays and large wind farms were considered; however renewable energy sources could be placed closer to demand via distributed generation, reducing land use impacts, intermittency, and transmission costs. Distributed solar can be placed on rooftops and parking garages in cities where the demand centers are located; open fields are not required for renewable energy generation. For these reasons, the cited "land use impacts" of wind and solar are incorrect.

Additionally, a proper combination of renewable resources was not adequately considered. Intermittency is the other reason for not adequately considering renewable resources, however distributed solar and wind turbines placed in various locations throughout New Jersey would help alleviate this problem. Solar and wind are often complimentary—for example, it is windier at night when the sun is not shining. NRC's analysis fails to discuss the intermittency of nuclear energy due to planned and unplanned maintenance, and forced shutdowns due to cooling water issues related to warmer ocean temperatures. Forced shutdowns due to cooling water issues from warm ocean temperatures are only predicted to increase in frequency. For nuclear power plants, these "intermittent" maintenance times can last more than a year. When these repairs and unscheduled shut downs are considered, renewables are in fact *less* intermittent and more reliable than nuclear energy.

A recent study found that New Jersey has the ability to generate one hundred percent of its power from renewables.⁵⁵ This same study found that renewable energy sources would be cheaper for ratepayers on a time scale that falls within the lifetime of the proposed nuclear plant. Powering New Jersey with one hundred percent renewables could be done through a combination of diverse renewable energy sources and energy efficiency measures. This is another area where NRC's analysis has fallen short—NRC has failed to adequately consider energy efficiency measures. For the abovementioned reasons, NRC has not properly considered renewable energy and energy efficiency as an alternative, and therefore their analysis is deficient.

Additionally, New Jersey has set a goal of each electricity supplier obtaining 22.5% of its electricity from renewable energy sources by 2021. The DEIS fails to consider the importance of this goal.

Comment 22: The impacts of sea level rise are not adequately addressed within the DEIS especially considering the site is located in a region that will be consistently under or surrounded by water raising the potential for a catastrophic nuclear event and inhibiting the ability of emergency services to reach the facility at times when it will most likely be needed.

Although the NRC indicates that PSEG will "...provide the necessary flood hazard analysis... consistent with present-day guidance and methodologies", and "PSEG will need to demonstrate

⁵⁵ Jacobson et al. (2014) 100% Wind, Water, Sunlight (WWS) All-Sector Energy Plans for the 50 United States. July 17, 2014.

and the NRC staff will confirm that the hazards from flooding are acceptable at the PSEG Site” (p 5-99), there is no analysis or evaluation of climate change when addressing the Environmental Impacts of Postulated Accidents in Section 5.11. The potential impacts of climate change are mentioned in reference to cumulative impacts to aquatic organisms and habitat and quickly dismissed as “inconclusive” (p 7-29). However, the impacts of sea level rise are consistently predicted to be greater within the Delaware Bay and Estuary than elsewhere in the Mid-Atlantic, thus raising the concerns for placement of a new nuclear plant on wetlands at the water’s edge.

The EPA, in a report to Congress, has stated: “[p]ublished estimates of sea level rise due to global warming generally range from 0.5 to 2.0 meters (1.5 to 7 feet) by 2100.”⁵⁶ But “[t]he Mid-Atlantic States are anticipated to experience sea-level rise greater than the global average.”⁵⁷ And the former Executive Director of the Delaware River Basin Commission (DRBC), referencing science on the matter, said at a February 2010 public discussion on global climate change that the figure for our region will more appropriately range from 2.3 feet (.72 m) to 5.5 ft (1.67 m).⁵⁸ Additionally, “[a]long much of the Northeast shoreline – from New Jersey to Cape Cod – there is evidence that relative sea level is rising faster than the global average because the land is gradually subsiding.”⁵⁹ The Delaware Estuary Program, in a report focused on sea level rise for the Delaware Estuary, talks about an anticipated rise of 0.5 to 1.5 meters “or more” and goes on to say that its “best estimate for RSLR [relative sea level rise] by the end of the century is 0.8 to 1.7 m” (0.8 m = 2.62 ft; 1.7 m = 5.58 ft).⁶⁰

Inundation maps for future decades consistently show that with sea level rise, the proposed location of the new nuclear facility will be inundated and/or surrounded by water; with, at best, the nuclear plant (because of fill) being located on an island surrounded by water thus impeding emergency response that is a foreseeable need in the wake of future storm events. A 2008 study⁶¹ by the University of Pennsylvania Department of City and Regional Planning mapped lands predicted to be inundated in 2050 and 2100 with sea level rise. The maps show Artificial Island becoming a true island by 2050, surrounded by water with only the current location of Salem 1 and 2 and Hope Creek Generating stations above ground, likely due to associated fill. The same would most certainly become true with construction of a new facility, placing this fourth nuclear plant out of reach from emergency response personnel during foreseeable high hazard periods when emergency response capabilities would be an obvious potential need. According to the University of Pennsylvania study and ongoing research by others, storm surges will make matters even worse in the Delaware Estuary and watershed with storms becoming more intense, having higher wind speeds as well as heavier precipitation; Nor’easters becoming more frequent; an increasing probability of severe hurricanes in the mid-Atlantic region; and the combination of storm surge and sea level rise moving the zone of impact further inland.

⁵⁶ US EPA. (1989). Report to Congress: The Potential Effects of Global Climate Change on the US, US Environmental Protection Agency, December 1989, EPA-230-05-89-050

⁵⁷ Kreeger et al. (2010). Climate Change and the Delaware Estuary: Three Case Studies in Vulnerability Assessment and Adaptation Planning. Partnership for the Delaware Estuary, PDE Report No. 10-01.1–117 pp.

⁵⁸ Carol Collier, Executive Director Delaware River Basin Commission, Global Climate Change Talk, Heinz Refuge, February 2010

⁵⁹ Frumhoff et al. 2007, *supra note 14*.

⁶⁰ Kreeger et al. 2010. *supra note 57*.

⁶¹ UPenn Department of City and Regional Planning. 2008. Climate Change: Impacts and Responses in the Delaware River Basin

An April 2014 study⁶² released by Climate Central also talks about sea level rise and its impacts on New Jersey, including Salem County which is among the areas in the State the report predicts will experience high impacts from flooding due to sea level rise. According to the Surging Seas Risk Finder website⁶³, analysis associated with the Climate Central report, there is a greater than 50% chance of at least one flood of 6 feet in the New Jersey area by the year 2050 and a 99% risk of at least one flood exceeding 9 feet by the year 2100. At these levels, and even far lower, this analysis shows water cutting off the existing and proposed power plant areas, increasing the likelihood of hazard. At 7 feet, one of the nuclear plants on Artificial Island is below 7 feet and therefore directly at risk from flooding, with both plants being below 9 feet and so at direct risk when the waters reach those levels.

Due to the effects of climate change, including sea level rise, the frequency of what is now considered a 100 year flood event will increase substantially. In fact, whether considering low or high emission scenarios, the frequency of today's 100-year flood event is expected to occur, on average, every four years in Atlantic City.⁶⁴ These new and future scenarios need to become part of the consideration in decision-making included for a new nuclear facility.

The NRC should not issue an ESP for a location in an area that will most likely flood and be inundated by sea level rise. At a minimum, climate and sea level modeling should be evaluated as part of the decision-making process instead of basing the analysis on "present-day" flooding characteristics and dismissing the likelihood and risk associated with future climate models as "inconclusive."

The importance of our state's aquatic resources cannot be overstated. The Delaware River is in great need of restoration activity. It is very important that decision-making is done such that proposed projects help improve water quality. A reevaluation of the deficient sections of the DEIS will illustrate that the project as proposed will surely not accomplish a "no net loss" of aquatic resources.

Thank you again for consideration of our comments and please don't hesitate to contact us should you seek further information.

Sincerely,



Maya K. van Rossum
the Delaware Riverkeeper



Christine M. Arnott, Ph.D.
Research Associate

Enclosures (2):

1. Reference List: documents referenced in this comment letter
2. DVD of all documents referenced in this comment letter, provided for your reference and to be include in the record.

⁶² Strauss et al. (2014). "New Jersey and the Surging Sea: A Vulnerability Assessment With Projections for Sea Level Rise and Coastal Flood Risk." Climate Central Research Report. pp 1-43.

⁶³ found at: <http://sealevel.climatecentral.org/ssrf/new-jersey>

⁶⁴ Frumhoff et al. 2007, *supra note 14*



Reference List

Documents referenced in comment letter (dated November 21, 2014) from Delaware Riverkeeper Network regarding NRC's Draft EIS for ESP and included on attached DVD. These documents are being provided for your reference and to be included in the record. (Docket ID NRC-2014-0149)

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