**Nuclear Development**
244 Chestnut Street, Salem, NJ 08079

PSEG
*Power LLC*

ND-2013-0005
March 11, 2013

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: **PSEG Early Site Permit Application**
**Docket No. 52-043**
**Response to Request for Additional Information, No. Env-09S,**
**ESP EIS 9.0 - Environmental Impacts of Alternatives**

References:
1) PSEG Power, LLC Letter No. ND-2012-0031 to USNRC, Submittal of Revision 1 of the Early Site Permit Application for the PSEG Site, dated May 21, 2012

2) Env-09S, Review Section: ESP EIS 9.0 - Environmental Impacts of Alternatives, dated February 11, 2013 (eRAI 7028)

3) PSEG Power, LLC Letter No. ND-2012-0058 to USNRC, Response to Request for Additional Information, No. Env-13, ESP EIS 8.0 - Need for Power, dated October 3, 2012

4) PSEG Power, LLC Letter No. ND-2012-0059 to USNRC, Response to Request for Additional Information, No. Env-14, ESP EIS 9.0 - Environmental Impacts of Alternatives, dated October 3, 2012

The purpose of this letter is to respond to the request for additional information (RAI) identified in Reference 2 above. This RAI addresses Question No. ESP EIS 9.0-15 for the Environmental Report (ER), as submitted in Part 3 of the PSEG Site Early Site Permit Application, Revision 1.

Enclosure 1 provides our response for RAI No. Env-09S, Question No. ESP EIS 9.0-15 (ESP EIS 9.0-9S).

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Enclosure 2 includes the revisions to the ER resulting from our responses to RAI No. Env-09S.

If any additional information is needed, please contact David Robillard, PSEG Nuclear Development Licensing Engineer, at (856) 339-7914.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 11th day of March, 2013.

Sincerely,

James Mallon
Early Site Permit Manager
Nuclear Development
PSEG Power, LLC

Enclosure 1: Response to NRC Request for Additional Information, RAI No. Env-09S, Question No. ESP EIS 9.0-15 (ESP EIS 9.0-9S), Review Section: ESP EIS 9.0 - Environmental Impacts of Alternatives
Enclosure 2: Proposed revisions, Part 3 – Environmental Report (ER)

cc: USNRC Project Manager, Division of New Reactor Licensing, PSEG Site (w/enclosures)
USNRC Environmental Project Manager, Division of New Reactor Licensing (w/enclosures)
USNRC Region I, Regional Administrator (w/enclosures)
Oak Ridge National Laboratory (w/enclosures)

**PSEG Letter ND-2013-0005, dated March 11, 2013**

**ENCLOSURE 1**

**RESPONSE to RAI No. Env-09S**

**QUESTION No.**
**ESP EIS 9.0-15 (ESP EIS 9.0-9S)**

**Response to RAI No. Env-09S, Question ESP EIS 9.0-15:**

In Reference 2, the NRC staff asked PSEG for information regarding Environmental Impacts of Alternatives, as described in Chapter 9 of the Environmental Report. The specific request was:

> *ESP EIS 9.0-9S: Explain whether importing power into New Jersey instead of generating it with new nuclear units at the PSEG ESP site is a feasible([1]) option. If it isn't a feasible option, provide an analysis that explains why not. If it is feasible, explain the basis for that conclusion and provide an analysis of the environmental impacts associated with importing power as an alternative to building new nuclear units at the proposed PSEG ESP site.*
>
> *Supporting Information: ER Sections 9.2.1.3 and 9.2.1.4, as well as the Applicant's response to RAI ESP EIS 9.0-30, state that "importing power may be a feasible alternative . . . ." Such imported power would originate from outside the state of New Jersey.*
>
> *The approach the staff uses in its consideration of importing power is discussed in ESRP 9.2.1 (dated 2007), pages 3 and 4. The ESRP directs the reviewer to consider power available from the regional grid and existing transmission interties. It also states that, if transmission lines and interties are not available to move the necessary power, the reviewer should "make general estimates of the costs([2]) to construct and maintain such lines and estimates of the environmental impacts associated with their construction and maintenance."*
>
> *Provide an updated discussion as to whether or not imported power is a feasible alternative to the power that would be generated by new units at the PSEG ESP site. In discussing the feasibility of imported power include consideration of the availability of surplus power from areas near the PSEG region of interest.*
>
> *If imported power is not a feasible alternative, provide the analysis supporting that position. If imported power is a feasible alternative, explain the basis for that conclusion and provide an analysis of the environmental impacts associated with importing power as an alternative to building new nuclear units at the proposed PSEG ESP site. Include an explanation regarding how PSEG considered and included existing and reasonably foreseeable transmission lines (such as the Susquehanna-Roseland Transmission Line Project) in its analysis of the feasibility of importing power. If one or more new transmission lines would be required to import the power, provide a general estimate of the monetary costs and environmental impacts of building and operating such lines. The environmental impacts would also include the impacts of generating the power from locations outside New Jersey.*

*The NRC staff is directed to compare the environmental impacts and health effects among competitive alternatives, defined as alternatives that are feasible and compare favorably with the proposed project in terms of environmental and health impacts. Furthermore, the staff is instructed to consider whether the characteristics of the alternatives have been described in sufficient detail that a decision can be reached regarding environmental impacts. (ESRP 9.2.1)*

*Under ESRP 9.2.1 and 9.2.3, the NRC staff needs to consider the environmental impacts of feasible alternatives. Detailed information is therefore requested in regard to the alternative of importing power from outside New Jersey.*

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*([1])To be feasible for the purposes of the National Environmental Policy Act (NEPA), an alternative must be reasonable or practical. NEPA does not require the consideration of alternatives that are not reasonable (e.g., prohibitively expensive).*

*([2]) The cost analyses should be made on the basis of data available in references or that can readily be supplied by the applicant. Costs should include environmental compliance costs.*

**PSEG Response to NRC RAI:**

New Jersey is a net importer of power through its interties with PJM, and a net exporter of power to NYISO, as discussed in Chapter 8, Need for Power, in the PSEG ESPA Environmental Report.

Importing additional baseload power into New Jersey instead of generating it with new nuclear units at the PSEG ESP site is not a feasible option for two reasons:

1. There is not expected to be any surplus baseload capacity available in PJM or NYISO near the PSEG region of interest in the 2021 time period.

2. There is insufficient transfer capability in the PJM operated transmission system to provide for additional imports into New Jersey from western areas of PJM projected for the 2021 time period. Furthermore, PJM does not plan upgrades to the bulk electric system (BES) to provide for imports beyond what is required to resolve NERC reliability criteria violations.

These findings are based on publicly available PJM reports and analyses associated with the annual Reliability Pricing Model (RPM) process and the annual Regional Transmission Expansion Plan (RTEP) process. The following paragraphs provide additional details from these reports and analyses.

No surplus capacity available for import near New Jersey

New Jersey has power interties with PJM to the west and with NYISO to the northeast. PJM is a net exporter to NYISO through the Neptune and Linden VFT transmission interties in New Jersey and the NYIS intertie in Pennsylvania. There are no plans to construct additional capacity in NYISO beyond its load requirements. Consequently, there is no expectation of being able to import power from NYISO into PJM.

Section 11 of the State of the Market (SOM) Report for PJM for January through September 2012, issued November 15, 2012, provides an estimate of the Eastern Mid-Atlantic Area Council (EMAAC) capacity available in 2018 (Reference RAI ESP EIS 9.0-15-1). New Jersey comprises four of the six Locational Delivery Areas (LDAs) in EMAAC.[1] Table 11-10 of the SOM Report shows that the estimate of 40,748 MWs is based on:

- existing capacity;
- plus active interconnection requests, which assumes that all active projects will be constructed;
- minus retirements, which are assumed to be any unit greater than 40 years old (excluding hydroelectric power plants).

The capacity of non-baseload solar and wind resources shown in Table 11-10 must be adjusted to reflect the capacity values attributed to intermittent capacity resources by PJM. Adjusting solar and wind capacity according to PJM Manual 21 (Reference RAI ESP EIS 9.0-15-2), the forecasted EMAAC capacity in 2018 is 37,887 MW.

Table 5 of the 2016/2017 RPM Base Residual Auction Planning Period Parameters Report shows a target capacity level of 38,786 MW to be procured for EMAAC in the May 2013 RPM auction (Reference RAI ESP EIS 9.0-15-3). This amount is comparable to the forecasted 2018 capacity in EMAAC. Based on these forecasts and their associated accuracies, there is no expectation for excess capacity available in EMAAC in the 2016-2018 time period.[2]

Similarly, the PJM SOM Report and the 2016/2017 RPM Base Residual Auction Planning Period Parameters Report show a deficit of capacity in the Southwestern MAAC (SWMAAC) (10,506 MWs available vs. a target capacity level of 16,932 MWs).

[1] Section 8.1 of Chapter 8, Need for Power, in the PSEG ESPA Environmental Report identifies the four LDAs in New Jersey.

[2] Section 8.3 of Chapter 8, Need for Power, in the PSEG ESPA Environmental Report makes different assumptions to forecast future New Jersey capacity levels. It assumes that of the active interconnection requests, only the New Jersey Long Term Capacity Agreement Pilot Program (LCAPP) projects and the New Jersey Energy Master Plan (EMP) projected amounts of solar and wind will be built, and only counts retirements that have made generation deactivation requests to PJM. This results in a lower forecasted capacity for New Jersey in 2018 than the forecast that appears in Table 11-10 of the PJM State of the Market Report for PJM, January through September 2012, November 15, 2012.

These same reports also show no excess capacity in MAAC (71,238 MWs available vs. a target capacity level of 70,634 MWs).[3]

The PJM SOM Report states that excess capacity is available for import into MAAC or EMAAC from the western portion of PJM, which is not adjacent to or near New Jersey. The SOM Report notes "that new capacity is being added disproportionately in the west, and includes a substantial amount of wind capacity." Consequently, the only new excess capacity to import into EMAAC must come from western PJM. A large portion of these new western resources are non-dispatchable renewable resources or are natural gas fired simple and combined cycle resources which are predominantly intended for peaking or intermediate service. Almost all of the new western resources do not provide baseload power as intended by the proposed nuclear plant at the PSEG Site.

Insufficient Transfer Capability for Imports

Based on transmission planning parameters established by PJM, there is insufficient transfer capability planned to accommodate importation of baseload power into NJ commensurate with the proposed new nuclear plant at the PSEG Site. Planned development of transmission enhancements beyond the Susquehanna-Roseland (SR) Power Line Project will not result in substantial importation capability into EMAAC.

In preparation for the Base Residual Auction conducted each May for the RPM, PJM calculates several planning parameters that are used to determine the target amount of capacity that should be purchased in the auction.[4] The planning parameters are established to assure that the capacity to be procured in the auction will be deliverable in each Load Deliverability Area (LDA).

Two key planning parameters established in the RPM process are the Capacity Emergency Transfer Objective (CETO) and the Capacity Emergency Transfer Limit (CETL) (Reference RAI ESP EIS 9.0-15-4):

- The CETO is the amount of electric energy that a given area must be able to import in order to remain within a loss of load expectation of one event in 25 years when the area is experiencing a localized capacity emergency.

- The CETL is the capability of the transmission system to support deliveries of electric energy to a given area experiencing a localized capacity emergency as determined in accordance with the PJM Manuals.

The ratio of CETL to CETO is an important determinant of the need for additional transmission capability. Because of historical reliability issues in the eastern areas of PJM, CETO and CETL values are published for EMAAC, SWMAAC, and WMAAC. The

[3] The Middle Atlantic Area Council (MAAC) is comprised of EMAAC, SWMAAC, and the Western MAAC (WMAAC), all of which are groups of LDAs in New Jersey, Delaware, and eastern Pennsylvania and Maryland.
[4] Section 8.3 of the Environmental Report provides a discussion of the RPM auctions.

CETL to CETO ratio is monitored for EMAAC, SWMAAC, and MAAC in each year's RPM process. If the CETL to CETO ratio for EMAAC, SWMAAC, MAAC, or any individual LDA falls below 115%, a Variable Resource Requirement (VRR) Curve is established, which could result in a price adder for capacity because import capability to the LDA is becoming constrained. This price adder is intended to spur development of generation in areas that are constrained. If the CETL to CETO ratio falls below 100%, additional transmission capability is needed.

The 2016/2017 RPM Base Residual Auction Planning Period Parameters shows that the CETL to CETO ratio for EMAAC is 145% (Reference RAI ESP EIS 9.0-15-3). Figure RAI ENV 9.0-9S-1 depicts the trend in the CETL to CETO Ratio for the 2016/2017 Delivery Year and the previous four Delivery Years.

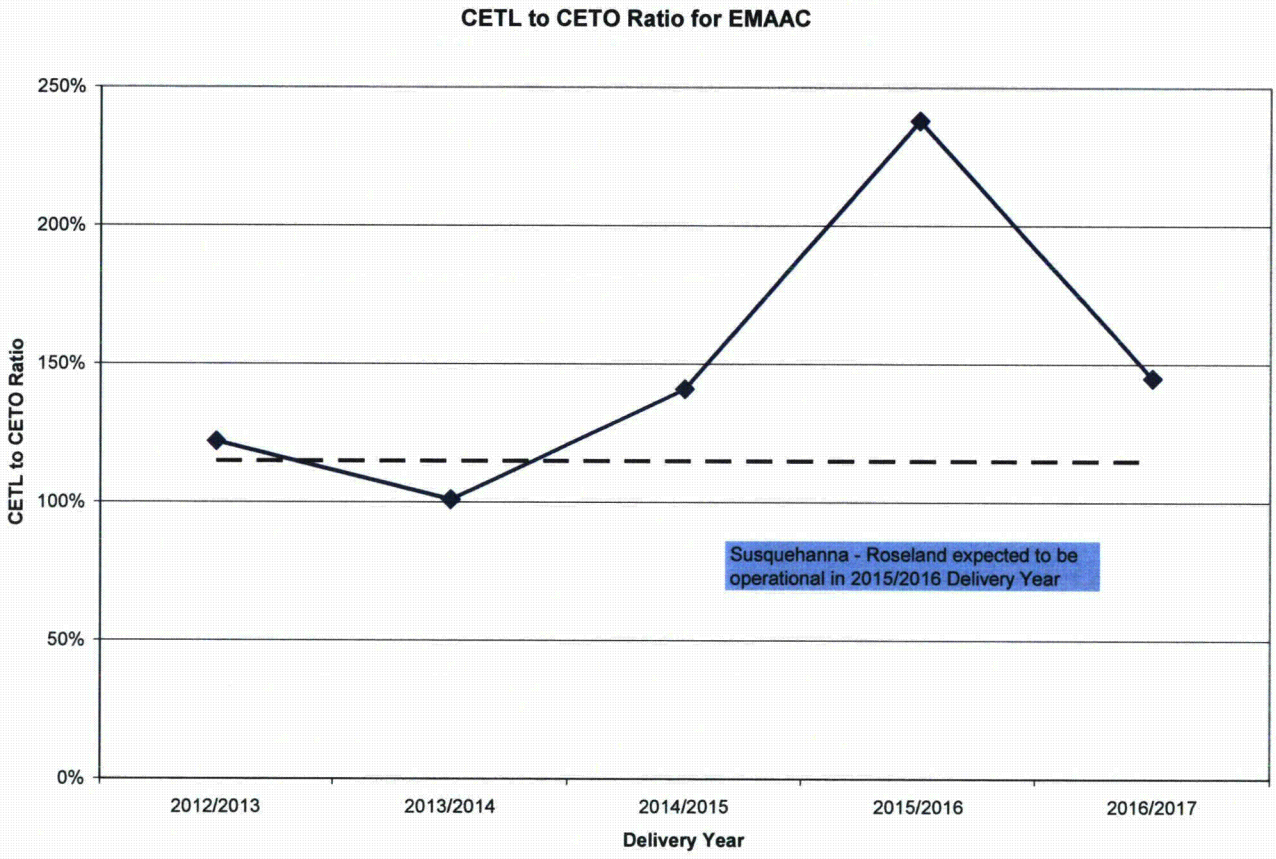



Figure RAI ENV 9.0-9S-1

The figure shows that import capability into EMAAC is constrained prior to the expected completion of various transmission enhancement projects, most notably the SR Project in 2015. These identified constraints justify the need for the transmission enhancement projects. Among the several transmission projects planned by PJM, the SR project provides the predominant amount of constraint relief in EMAAC. To accommodate delays in the completion of the SR project, PJM has implemented interim operational

contingencies that manage flow on constrained transmission facilities in real time operation and adjusts generation and implements Demand Side Response (DSR) as required to maintain grid reliability. As shown in the graph, the import capability into EMAAC in the 2015/2016 Delivery Year increases substantially following the planned completion of the SR project. However, the import capacity decreases in the following years as load increases and older fossil fueled units in New Jersey are retired.[5]

With the cancellation of the Mid-Atlantic Power Pathway (MAPP) and the Potomac-Appalachian Transmission Highline (PATH) projects by PJM in 2012, no major projects to supply additional import capability into EMAAC are planned. By 2021, the proposed Commercial Operation Date (COD) of the new nuclear units at the PSEG Site, it is unlikely that there will be any substantial import capability available into EMAAC.

PJM's 2011 Regional Transmission Expansion Plan (RTEP) Report shows that the above conclusions for EMAAC also are applicable to the four EMAAC LDAs in New Jersey. Section 8.7 of Book 5 of the PJM 2011 RTEP (Reference RAI ESP EIS 9.0-15-5) states that:

> "A number of system reliability trends have emerged throughout Mid-Atlantic PJM:
>
> - Growing native load
> - Deactivation of existing generation resources
> - Development of new generating resources, where needed
> - Continued reliance on transmission to meet load deliverability requirements and access to cheaper sources of power from west of New Jersey
> - Exports to New York City and Long Island
>
> Together, these trends collectively have a sustained negative impact on system reliability in New Jersey and throughout eastern Mid-Atlantic PJM. The extent to which eastern Mid-Atlantic PJM continues to rely on transfers into the area to meet load-serving needs drives the identification and timing of NERC reliability criteria violations. To that end, a number of BES facility upgrades have been approved by the PJM Board to resolve these violations."

The RTEP Report demonstrates that BES upgrades are not targeted to provide additional import capability into New Jersey beyond what is needed to resolve reliability criteria violations.

Summary

Prior discussions within ER Section 9.2 identified that importation of power into NJ was a feasible yet undesirable alternative to the new plant at the PSEG Site. However, based on a reanalysis of available data, this alternative is no longer considered

[5] Some of these fossil units may currently have Reliability Must Run (RMR) contracts to continue operation to address transmission reliability issues. Some or all of these RMR contracts may be unnecessary after completion of the SR project

reasonable or practical and thus, per the definition associated with NEPA, not feasible. This determination is based on the lack of available baseload resources in the adjacent and western regions of PJM as well as a lack of planned transmission projects beyond the SR line to accommodate increased imports into EMAAC. Therefore, the importation of baseload power into NJ commensurate to the levels of a new nuclear power plant is not a feasible alternative to the new plant at the PSEG Site.

**References:**


RAI ESP EIS 9.0-15-1 State of the Market (SOM) Report for PJM for January through September 2012, issued November 15, 2012. http://www.pjm.com/documents/reports/state-of-market-reports.aspx

RAI ESP EIS 9.0-15-2 PJM Manual 21, http://www.pjm.com/documents/manuals.aspx

RAI ESP EIS 9.0-15-3 2016/2017 RPM Base Residual Auction Planning Period Parameters report, http://www.pjm.com/markets-and-operations/rpm/rpm-auction-user-info.aspx#Item10 (go to pull down menu for 2016/2017 Delivery Year)

RAI ESP EIS 9.0-15-4 PJM Manual 35, http://www.pjm.com/documents/manuals.aspx

RAI ESP EIS 9.0-15-5 PJM 2011 Regional Transmission Expansion Plan, http://www.pjm.com/documents/reports/rtep-documents/2012-rtep.aspx


**Associated PSEG Site ESP Application Revisions:**

ER Chapter 8 and Subsection 9.2.1 will be updated as described in Enclosure 2 of this document. The markup of ER Chapter 8 provided in Enclosure 2 is based on the ER markups provided in Reference 3. The markup of ER Subsection 9.2.1 provided in Enclosure 2 is based on the ER markups provided in Reference 4.

**PSEG Letter ND-2013-0005, dated March 11, 2013**

# ENCLOSURE 2

**Proposed Revisions**
**Part 3 – Environmental Report (ER)**
**Chapter 8 – Need for Power**
**Subsection 9.2.1 – Alternatives Not Requiring New Generating Capacity**

ADD INSERT 1 per RAI No. Env-09S.

REPLACE with "available for importation" per RAI No. Env-09S.

Offsetting these retirements are a number of new capacity additions planned in NJ. NJ's Long-Term Capacity Agreement Pilot Program (LCAPP) has resulted in three projected new natural gas fired combined cycle generation projects totaling 1,949 MWe. Due to NJ's support for renewable energy development, about 1,780 MWe of solar projects are in the analytical or under-construction phase and 1,440 MWe of offshore wind projects are in the analytical phase within PJM's generation interconnection queues. Other capacity additions include a natural gas repowering of the B. L. England coal and oil fired plant, increases in energy efficiency and demand response resources that have cleared recent PJM capacity auctions and a capacity allocation correction of 50 MWe for PSEG's Hope Creek Nuclear Plant. [c]

Despite the reduction in forecasted load due to the recession and the net positive capacity additions, the projected peak capacity in NJ is forecast to be about 2600 MWe less than the expected peak load in 2021; the projected date of new plant commercial operation. In addition, the forecast shows that the shortfall in the capacity that NJ needs to supply the PJM targeted reserve margin of 15.4% is greater than 5800 MWe.

Similarly, the projected baseload capacity in NJ is forecast to be about 7,300 MWe less than the 11,000 MWe of baseload capacity projected to be needed in NJ in 2021. The greater deficit in baseload resources reflects NJ's dependence on higher cost intermediate and peaking resources, which contribute to higher power costs. The new plant at the PSEG Site operates as a merchant baseload plant producing between 1350 and 2200 MWe. It provides ~~17~~18 to 30 percent ~~to 28 percent~~ of the 7~~900~~,300 MWe projected baseload capacity need in the relevant service area served by the new plant in 2021.

The only potential baseload capacity additions in regions near NJ which could be ~~imported~~ to address the baseload capacity need in NJ are 650 MWe of nuclear uprate projects and the proposed 1,600 MWe Bell Bend nuclear plant in Eastern Pennsylvania. The completion of the Susquehanna-Roseland 500 kV Transmission Line, currently scheduled for 2015, will resolve numerous overloads on critical 230 kV circuits in Eastern Pennsylvania and Northern NJ, and will facilitate imports of baseload capacity from Eastern Pennsylvania. Even considering the congestion relief projected by the approved Susquehanna-Roseland transmission project, the types of generating units that supply imported power from the western portion of PJM are often fossil-fueled and typically coal-fired. Due to lower load growth, the installation of new intermediate and peaking gas fired power plants, and the increase in demand response programs, PJM cancelled the Middle Atlantic Power Pathway (MAPP) and Potomac-Appalachian Transmission Highline (PATH) projects, which in combination were designed to increase the capability to transfer power from western PJM into the Eastern Mid-Atlantic Area Council (EMAAC), of which NJ is a part. While nuclear baseload capacity additions planned in areas near NJ will displace imports from fossil fueled resources, any increase in imports will still cause increased congestion, higher power prices, and potential reliability issues.

REPLACE with "substantial increase in the levels of imports is not considered feasible as discussed in Subsection 9.2.1.3" per RAI No. Env-09S.

Due to its location and operating characteristics, the new plant provides several ancillary benefits that supplement the overall need for baseload capacity. As a baseload nuclear plant, the new plant generates electric

ADD "limited" per RAI No. Env-09S.

[c] ed a 50 MWe increase in PJM capacity rights to recognize the final net increase in capacity resulting from the Hope Creek extended power uprate completed in 2008.

ADD INSERT 1 per RAI No. Env-09S.

## 8.4.3 OTHER CONSIDERATIONS AFFECTING NEED FOR BASELOAD CAPACITY IN NEW JERSEY

The current NJ baseload capacity need is being met through imports and by increased use of peaking and intermediate resources. Utilization of higher operating cost (and often higher emitting) peaking and intermediate units is a likely cause for higher LMPs in NJ. In addition, the imports and the current fleet of intermediate and peaking resources are predominantly fossil fueled plants, with associated greenhouse gas and other air emissions that are projected to carry increased regulatory costs. ~~Exports~~ As discussed in Section 8.3, exports from NJ to New York City are also increasing imports to NJ, which results ~~in greater air and greenhouse gas~~ emissions from generating units to the west of NJ and c[illegible] transmission congestion resulting in higher LMPs.

REPLACE with "present potentially importable" per RAI No. Env-09S.

Baseload capacity additions in the remainder of EMAAC and other areas of MAAC immediately adjacent to NJ ~~could provide imported~~ baseload capacity to NJ. A combined license application (COLA) for the Bell Bend plant in Pennsylvania has been submitted to the U.S. Nuclear Regulatory Commission (NRC) ~~that poses~~and identifies an RSA that includes all of NJ (Reference 8.4-5). In addition, the RSA in the Bell Bend COLA includes the remainder of the EMAAC region and other portions of MAAC. The scheduled commercial operation date for the Bell Bend plant, which has a proposed capacity of approximately 1600 MWe, originally was 2018 but is ~~expected to begin commercial operation in 2018 and is located outside NJ. To the extent that this plant exports into NJ, it may displace some of the imports from fossil fueled resources. However~~now under review. The only other significant baseload capacity additions anticipated in areas near NJ are 648 MWe of uprates to Limerick and Peach Bottom (in PECO territory), Susquehanna in (Pennsylvania Power & Light [PPL] territory), and Three Mile Island (in Metropolitan Edison [MET ED] territory). As discussed in Section 8.3, the Susquehanna-Roseland 500 kV transmission line creates a strong link from generation sources in northeastern and north-central PA, across northeastern PA and into NJ. This new line could facilitate imports from the Bell Bend plant and the Susquehanna uprates. To the extent that these and the PECO and MET ED plant uprates export into NJ, it may displace some of the imports from fossil-fueled resources.

ADD "limited" per RAI No. Env-09S.

As discussed in Section 8.3, the PJM Board cancelled the 500 kV circuit Mid-Atlantic Power Pathway (MAPP) and the 765 kV Potomac-Appalachian Transmission Highline (PATH) projects. Consequently, imports of baseload capacity from western PJM to NJ cannot be substantively increased without causing increased congestion, higher power prices, and potential reliability issues. The new plant at the PSEG Site can supply baseload power within NJ and reduce the potential for transmission congestion, and its impact to LMPs resulting from increased imports. This is consistent with the NJEMP goal to promote a diverse portfolio of new, clean, in-state generation and to fulfill 70 percent of the State's electric needs from "clean" energy sources by 2050 (Reference 8.4-6).

## 8.4.4 SUMMARY OF THE NEED FOR POWER

The new plant at the PSEG Site operates as a merchant baseload plant producing between 1350 to 2200 MWe and is expected to be operational in 2021. It provides ~~17 percent~~18 to ~~28~~30 percent, respectively, of the additional ~~7900~~7300 MWe of the projected baseload capacity needed in the market area served by the new plant in 2021.

**RAI No. Env-09S, Insert 1:**

As discussed in Subsection 9.2.1.3, the alternative of purchasing power to provide baseload capacity in NJ is neither feasible nor desirable. Importing additional baseload power into New Jersey instead of generating it with new nuclear units at the PSEG Site is not a feasible option because there is not expected to be any surplus baseload capacity available in PJM or NYISO near the PSEG region of interest in the 2021 time period. In addition, there is insufficient transfer capability in the PJM operated transmission system to provide for additional imports into New Jersey from western areas of PJM projected for the 2021 time period. Furthermore, PJM does not plan upgrades to the bulk electric system (BES) to provide for imports beyond what is required to resolve NERC reliability criteria violations.

Imports of baseload capacity from western PJM to NJ also is not desirable because imports cannot be increased without causing increased congestion, higher power prices, and potential reliability issues.

ADD INSERT 2 per RAI No Env-09S.

DELETE per RAI No Env-09S.

as planned retirements, there are no available reactivations or service life extensions that can replace the baseload need that is provided by the new plant.

9.2.1.3 Purchasing Power from Other Utilities or Power Generators

This section discusses the alternative of purchasing power to provide the baseload capacity needed in NJ instead of constructing the new plant at the PSEG Site.

~~As discussed in Subsection 8.4.2, there currently is a need for approximately 5800 MWe of additional baseload capacity in NJ. Hence, NJ already is relying on the alternative of purchasing power through imports to serve baseload demand. The need for baseload capacity via imports or future new NJ generation is forecasted to grow to 7900 MWe by the year 2021.~~

~~As discussed in Section 8.3, PJM expects NJ to continue relying on transmission capability to replace retired generation and to meet growth in demand. Table 8.4-1 shows that reserves in the EMAAC area (of which NJ provides over half of the power) are inadequate to meet summer peak power demand. Consequently, imports are needed to meet the summer peak load.~~ ~~As discussed in Section 8.3, PJM expects NJ to continue relying on transmission capability to replace retired generation and to meet growth in peak power demand. Using updated 2012 information, Table 8.4-1 shows a shortfall of over 5,800 MWe in generating resources to meet the peak load in NJ in 2021. Consequently, imports are needed to meet the summer peak load. However, Table 8.4-2 also shows that the need for baseload capacity in NJ is 7300 MWe by the year 2021. The finding of Section 8.4 that the need for baseload capacity in NJ is greater than the need for generating resources to meet the peak load in NJ helps explain why the cost of power in NJ is high. To assure the reliability of the power grid in congested areas of NJ, transmission congestion is relieved by dispatching higher cost intermediate and peaking units in NJ because insufficient baseload capacity with lower dispatch costs is available. This is the cause for higher LMPs in NJ. In addition, the potential for more power exports to New York City and Long Island further increase the demand for instate generating resources and/or transmission capability, as discussed in Sections 8.1 and 8.3 and depicted in Figure 8.1-3. This increased demand challenges bulk transmission facilities and potentially increases congestion, costs and reliability criteria violations in NJ.

~~Per~~As discussed in Section 8.3, construction of new transmission lines and upgrades to existing transmission lines is a long, costly and publicly contentious process that will be required to allow more purchase power imports. ~~Three~~ One major new ~~500 kV~~backbone transmission ~~facilities have~~facility has been approved by the PJM Board to resolve ~~North American Electric Reliability Corporation (NERC)~~ reliability criteria violations in the ~~Middle Atlantic Area Council (MAAC)~~ sub-region ~~and will increase the capability to import power into and throughout NJ. Transmission projects in NJ present financial and permitting challenges due to the dense commercial and residential development in congested areas.~~ The Susquehanna-Roseland 500 kV transmission line creates a strong link from generation sources in northeastern and north-central PA, across northeastern PA and into NJ. However, due to lower load growth, the installation of new gas intermediate and peaking fired power plants, and the increase in demand response programs, the PJM Board cancelled the 500 kV circuit Mid-Atlantic Power Pathway (MAPP) and the 765 kV Potomac-Appalachian Transmission Highline (PATH) projects. These projects were designed to increase the capability to transfer power from western PJM into the EMAAC, of which NJ is a part.

ADD "a combination of development of new native generation, demand response curtailments, and to the extent possible, " per RAI No. Env-09S.

**RAI No. Env-09S, Insert 2:**

New Jersey is a net importer of power through its interties with PJM, and a net exporter of power to NYISO, as discussed in Chapter 8, Need for Power. For the reasons described below, the alternative of purchasing imported power to provide baseload capacity in NJ is neither feasible nor desirable.

Importing additional baseload power into New Jersey instead of generating it with new nuclear units at the PSEG Site is not a feasible option for two reasons:

- There is not expected to be any surplus baseload capacity available in PJM or NYISO near the PSEG region of interest in the 2021 time period.

- There is insufficient transfer capability in the PJM operated transmission system to provide for additional imports into New Jersey from western areas of PJM projected for the 2021 time period. Furthermore, PJM does not plan upgrades to the bulk electric system (BES) to provide for imports beyond what is required to resolve NERC reliability criteria violations.

Availability of Surplus Capacity for Import

PJM is a net exporter to NYISO through the Neptune and Linden VFT transmission interties in New Jersey and the NYIS intertie in Pennsylvania. There are no plans to construct additional capacity in NYISO beyond its load requirements. Consequently, there is no expectation of being able to import power from NYISO into PJM.

The State of the Market (SOM) Report for PJM for January through September 2012 provides an estimate of the Eastern Mid-Atlantic Area Council (EMAAC) capacity available in 2018 (Reference 9.2-39). New Jersey comprises four of the six Load Deliverability Areas (LDAs) in EMAAC; the four LDAs in NJ are described in Section 8.1. The forecasted capacity in EMAAC in 2018 is 40,748 MWs, based on the existing capacity, new capacity with active interconnection requests, and retirements of any unit greater than 40 years old (excluding hydro). Adjusting non-baseload solar and wind resources to reflect the capacity values attributed to intermittent capacity resources, the forecasted EMAAC capacity in 2018 is 37,887 MW.

The 2016/2017 RPM Base Residual Auction Planning Period Parameters Report shows a target capacity level of 38,786 MW to be procured for EMAAC in the May 2013 RPM auction (Reference 9.2-40). This amount is comparable to the forecasted 2018 capacity in EMAAC. Based on these forecasts and their associated accuracies, there is no expectation for excess capacity available in EMAAC in the 2016-2018 time period. The same comparison shows a deficit of capacity in the Southwestern MAAC (SWMAAC) (10,506 MWs available vs. a target capacity level of 16,932 MWs) and no excess capacity in MAAC (71,238 MWs available vs. a target capacity level of 70,634 MWs). SWMAAC and MAAC are comprised of LDAs in eastern Pennsylvania and Maryland.

The PJM SOM Report states that excess capacity is available for import into MAAC or EMAAC from the western portion of PJM, which is not adjacent to or near New Jersey. The SOM Report notes "that new capacity is being added disproportionately in the west, and includes a substantial amount of wind capacity." Consequently, the only new excess capacity to import into EMAAC must come from western PJM. A large portion of these new western resources are non-dispatchable renewable resources or are natural gas fired simple and combined cycle resources which are predominantly intended for peaking or intermediate service. Almost all of the new western resources do not provide baseload power as intended by the proposed nuclear plant at the PSEG Site.

Availability of Transfer Capability for Imports

Based on transmission planning parameters established by PJM, there is insufficient transfer capability planned to accommodate importation of baseload power into NJ commensurate with the proposed new nuclear plant at the PSEG Site. Planned development of transmission enhancements beyond the Susquehanna-Roseland (SR) Power Line Project will not result in substantial importation capability into EMAAC.

In preparation for the Base Residual Auction conducted each May for the Reliability Pricing Model (RPM), PJM calculates several planning parameters to establish that the capacity to be procured in the auction will be deliverable in each LDA. Two key planning parameters are the Capacity Emergency Transfer Objective (CETO) and the Capacity Emergency Transfer Limit (CETL) (Reference 9.2-41):

- The CETO is the amount of electric energy that a given area must be able to import in order to remain within a loss of load expectation of one event in 25 years when the area is experiencing a localized capacity emergency.

- The CETL is the capability of the transmission system to support deliveries of electric energy to a given area experiencing a localized capacity emergency as determined in accordance with the PJM Manuals.

The ratio of CETL to CETO is an important determinant of the need for additional transmission capability. The CETL to CETO ratio is monitored for EMAAC, SWMAAC, and MAAC in each year's RPM process. If the CETL to CETO ratio for EMAAC, SWMAAC, MAAC, or any individual LDA falls below 115%, a Variable Resource Requirement (VRR) Curve is established, which could result in a price adder for capacity because import capability to the LDA is becoming constrained. This price adder is intended to spur development of generation in areas that are constrained. If the CETL to CETO ratio falls below 100%, additional transmission capability is needed.

The trend in the CETL to CETO Ratio for the past five Delivery Years for which RPM auctions have been held (Reference 9.2-42) shows that import capability into EMAAC prior to the expected completion of the Susquehanna Roseland (SR) Power Line Project in 2015 is constrained, thus indicating a need for the project. To accommodate delays in the completion of the SR project, PJM has implemented interim operational

contingencies that manage flow on constrained transmission facilities in real time operation and adjusts generation and implements Demand Side Response (DSR) as required to maintain grid reliability. The CETL to CETO ratio for Delivery Year 2015/2016 shows that the import capability into EMAAC increases following the planned completion of the SR project. However, the import capacity decreases in the following years as load increases and older fossil fueled units in New Jersey are retired.

With the cancellation of the Mid-Atlantic Power Pathway (MAPP) and the Potomac-Appalachian Transmission Highline (PATH) projects by PJM in 2012, no major projects to supply additional import capability into EMAAC are planned. By 2021, the proposed Commercial Operation Date (COD) of the new nuclear units at the PSEG Site, it is unlikely that there will be any substantial excess import capability available into EMAAC other than what is needed to resolve reliability criteria violations. This conclusion is equally applicable to import capability into NJ since NJ comprises four of the six LDAs in EMAAC.

Cost and Reliability Issues in New Jersey due to Imports

Currently NJ is a net importer of power which presents cost and reliability challenges to the region.

DELETE per RAI No. Env-09S.

REPLACE with ", to the extent it is available, " per RAI No Env-09S.

~~Although construction of grid upgrades and new transmission lines within NJ to increase import capability are feasible, it should be noted that relying on imported power purchases increases power costs to consumers and will likely lead to greater emissions from fossil-fueled plants. To assure the reliability of the power grid in congested areas of NJ, transmission congestion is relieved by dispatching regional higher cost units out of economic order. These units are typically fossil fueled.~~ Consequently, imports of baseload capacity from western PJM ~~to NJ~~ cannot be increased without causing increased congestion, higher power prices, and potential reliability issues. Transmission projects in NJ also present financial and permitting challenges due to the dense commercial and residential development in congested areas. ~~Increasing~~ the reliance on imported power purchases is ~~therefore~~ not aligned with one of the five overarching goals of the NJ Energy Master Plan (NJEMP)--to drive down the cost of energy for all customers.

REPLACE with "Therefore, in addition to not being feasible, increasing" per RAI No Env-09S.

The intermediate and peaking units in NJ that are dispatched due to the lack of baseload capacity also are fossil-fueled. Even considering the congestion relief projected by the approved Susquehanna Roseland transmission projects ~~planned within NJ~~, the types of generating units that supply imported power from the western portion of PJM also are often fossil-fueled and typically coal-fired. In addition to the environmental impacts of ~~these~~imported fossil-fueled generation ~~resources~~, the prospect of federal limits on power plant emissions of greenhouse gases creates uncertainty about the cost of power from these fossil-fueled sources. The uncertainty arises from the likelihood of paying emissions allowance for $CO_2$ and/or laws or regulations to remove or reduce $CO_2$ in the future. This increase in emissions cost of fossil-based generation, especially coal-fired generation, will likely lead to financially-driven deactivations of units that are currently relied on for imports. The Department of Energy's Energy Information Administration projects that 30,000 MW of coal capacity is projected to be retired by the next decade due to age and financial impacts f
9.2-23).

REPLACE with "present potentially importable" per RAI No. Env-09S.

~~Overall, importing power may be a feasible alternative to construction of the new plant at the PSEG Site, but is undesirable due to significant cost uncertainties and environmental impacts.~~ Nuclear capacity additions in the remainder of EMAAC and other areas of MAAC immediately adjacent to NJ ~~could provide~~ baseload capacity to NJ, as discussed in Section 8.4.3. A combined license application (COLA) for the Bell Bend plant in Pennsylvania has been submitted to the U.S. Nuclear Regulatory Commission (NRC) and identifies an RSA that includes all of NJ. The scheduled commercial operation date for the Bell Bend plant, which has a proposed capacity of approximately 1600 MWe, originally was 2018 but is now under review. The only other significant baseload capacity additions anticipated in areas near NJ are 648 MWe of uprates to Limerick and Peach Bottom in PECO, Susquehanna in PPL, and Three Mile Island in METED. The Susquehanna-Roseland 500 kV transmission line could facilitate imports from Bell Bend and the Susquehanna uprates. To the extent that nuclear baseload capacity additions are exported into NJ, they may displace some of the imports from fossil-fueled resources, but they are still imports. Increasing the reliance on imported power purchases, whether fossil or nuclear fueled, is therefore not aligned with a second of the five overarching goals of the NJEMP--to promote a diverse portfolio of new, clean, in-State generation.

ADD "limited" per RAI No. Env-09S.

~~Overall, importing power may be a feasible alternative to construction of the new plant at the PSEG Site, but is undesirable due to higher costs to consumers, environmental impacts, and potential reliability issues. It also is inconsistent with the goals of the NJEMP. Accordingly, it is not considered to warrant further consideration.~~



REPLACE with INSERT 3 per RAI No. Env-09S.

**RAI No. Env-09S, Insert 3:**

Summary

Given the lack of available baseload resources in the adjacent and western regions of PJM as well as a lack of planned transmission projects beyond the SR line to accommodate increased imports into EMAAC, the importation of baseload power commensurate to the levels of a new nuclear power plant is not a feasible alternative to the new plant at the PSEG Site. Importing power also is undesirable due to higher costs to consumers, environmental impacts, and potential reliability issues. It is also inconsistent with the goals of the NJEMP. Accordingly, it is not considered to warrant further consideration.

REPLACE with "is neither feasible nor desirable" per RAI No. Env-09S.



9.2.1.4 Summary

As discussed in this section, conservation (energy efficiency) programs have already been factored into the need for power analysis, and so are not viable alternatives to building the new plant. The possible options for reactivating or extending the service life of existing plants within NJ are also not viable. Purchasing power from other utilities or power generators may be feasible but has significant undesirable attributes and is inconsistent with the goals of the NJEMP. Accordingly, none of these alternatives are considered to be viable, they do not satisfy the purpose of the proposed project, and therefore they are not considered further.

9.2.2 ALTERNATIVES REQUIRING NEW GENERATING CAPACITY

This section assesses possible alternative energy sources to determine if they are competitive or noncompetitive with the proposed new plant. The following alternative energy sources are considered in this assessment:

- Wind
- Geothermal
- Hydropower
- Solar Power
  - Solar Thermal Power
  - Photovoltaic Cells
- Biomass
  - Energy Crops and Forest Residues
  - Municipal Solid Waste and Urban Wood Residues
  - Methane from Landfills and Wastewater Treatment
- Petroleum Liquids (Oil)
- Fuel Cells
- Coal
- Natural Gas
- Integrated Gasification Combined Cycle

The alternative energy sources are analyzed in the subsequent sections based on the following evaluation criteria:

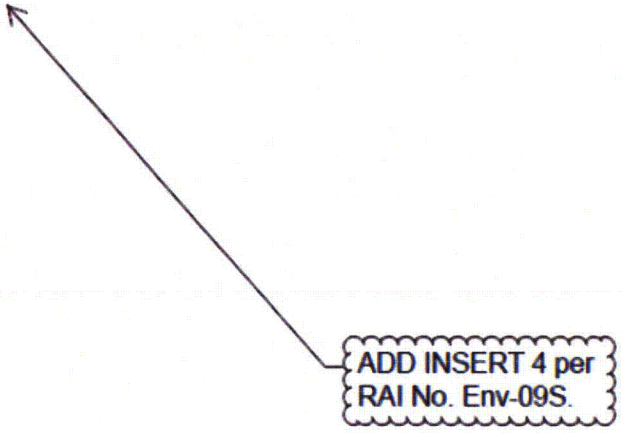
- The alternative energy conversion technology is developed, proven, and available in the RSA within the life of the new plant.
- The alternative energy source provides baseload-generating capacity equivalent to the capacity needed and to the same level as the proposed nuclear plant. The new plant at the PSEG Site is proposed to serve as a baseload generator; therefore, any feasible alternative would also need to be able to generate baseload power.
- The alternative energy source does not result in environmental impacts in excess of a nuclear plant.

Alternative energy sources are considered to be competitive only if they are able to satisfy all of these criteria. Accordingly, if an alternative energy source is unable to satisfy all of the criteria it

9.2-36 U.S. Department of Energy, "Feasibility Assessment of the Water Energy Resources for the United States for New Low Power and Small Hydro Classes of Hydroelectric Plants", January 2006

9.2-37 U.S. Department of Energy, Solid State Energy Conversion Alliance, website, http://fossil.energy.gov/programs/powersystems/fuelcells/fuelcells_seca.html, date accessed, September 16, 2009.

9.2-38 Ken Belson, "Air Storage is Explored for Energy," New York Times, August 26, 2008.



**RAI No. Env-09S, Insert 4:**

9.2-39 State of the Market Report for PJM for January through September 2012, issued November 15, 2012. (see Section 11, Table 11-10). http://www.pjm.com/documents/reports/state-of-market-reports.aspx

9.2-40 2016/2017 RPM Base Residual Auction Planning Period Parameters Report, http://www.pjm.com/markets-and-operations/rpm/rpm-auction-user-info.aspx#Item10 (go to pull down menu for 2016/2017 Delivery Year; see Table 5)

9.2-41 PJM Manual 35, http://www.pjm.com/documents/manuals.aspx

9.2-42 RPM Base Residual Auction Planning Period Prameters, http://www.pjm.com/markets-and-operations/rpm/rpm-auction-user-info.aspx#Item10