PJM INTERCONNECTION, L.L.C.

RE: ARTIFICIAL ISLAND OPEN WINDOW SUBMISSION PROCESS

PUBLIC SERVICE ELECTRIC AND GAS COMPANY'S
RESPONSE TO PJM'S SUPPLEMENTAL PROPOSAL REQUEST

Public Service Electric and Gas Company ("PSE&G") submits the enclosed response to the August 12, 2014 Supplemental Proposal Request sent by PJM Interconnection LLC ("PJM") to the PSE&G and three "finalists" in the Artificial Island open window process.[1]

PJM was unquestionably correct when it assigned the designation of the Hope Creek – Red Lion 500 kV transmission line project to PSE&G. The soundness of PJM's conclusion is borne out by the unassailable facts that PSE&G's project proposal is least cost, technically superior, with the least amount of project execution risk, when properly compared to the other project proposals.

- PSE&G is the best technical solution: The 500-kV expansion enhances stability without the need for 500-kV to 230-kV transformers, with fast clearing times on the 500-kV grid, and requires expansion only at two existing 500-kV stations.

- The 500-kV proposal has the lowest project execution risk: Unlike the other project proposals, PSE&G's 500-kV expansion at Hope Creek will impact only one nuclear generating unit. PSE&G has property rights for approximately seven miles of the route and is a party to the Lower Delaware Valley Agreement. PSE&G has extensive experience in siting and building transmission as demonstrated by the following RTEP baseline projects: Susquehanna - Roseland, Burlington – Camden, North Central Reliability, North East Grid Reliability and Southern Reinforcement Programs. Additionally, the 500-kV aerial solution presents less construction and permitting risks when compared to submarine cable options. PSE&G's aerial option also provides for a higher transfer capacity further enhancing the value of the project.

- PSE&G's 500-kV project is the lowest cost option particularly when evaluated from a total project cost perspective: The evaluated cost for the PSE&G option 7K, inclusive of all baseline upgrades at the Hope Creek and Red Lion Stations is [redacted] PSE&G is proposing to provide guaranteed maximum price of $221,000,000 for the 500-kV line and Baseline upgrades required at Hope Creek

[1] This submission is made subject to the following reservation of rights: By submitting a response as part of PJM's Supplemental Project submission process, PSE&G does not relinquish or waive any part of its rights to challenge PJM's actions at FERC or in any other appropriate legal forum.

Station. [redacted]

For the foregoing reasons and those that follow, PJM should reaffirm its selection of PSE&G's Hope Creek to Red Lion project as the solution to the Artificial Island stability issues.

Please be advised that this submission contains PSE&G Confidential and Proprietary information and have been marked as such. Accordingly, we ask that PJM treats the documents as Confidential in conformity with the confidentiality provisions of the PJM Tariff and PJM Operating Agreement.

1. BACKGROUND

The PJM Regional Transmission Expansion Plan ("RTEP") open window for project submissions in response to the Artificial Island Problem Statement closed on June 28, 2013. On June 16, 2014, following almost a year of analysis by PJM, PJM hosted a special meeting on the Artificial Island project, where it advised all participants that it had preliminarily determined that PSE&G's Hope Creek to Red Lion project proposal was its preferred choice for addressing the Artificial Island Problem Statement. In the 36 day comment period that followed, PJM received a number of comments from the bidders and other parties regarding the recommendation. Although it was now more than a year after the June 28, 2013 closing of the Artificial Island open window, Northeast Transmission proposed to modify its proposal to add a "cap" on project construction costs.

At its July 22, 2014 meeting, and upon consideration of the various comments received during the comment period, the PJM Board directed staff to open another window to provide the top four finalists with an opportunity to supplement their submission for the Artificial Island window, particularly in response to the cost cap proposal offered by LS Power . PJM staff issued a letter the next day memorializing the Board's decision to defer decision and gather additional information and identifying the four finalists as PSE&G, Transource Energy, Dominion and LS Power (also known as "Northeast Transmission"). The letter states that "the Board is outlining these additional steps to ensure that the most technically effective and cost-efficient proposal to solve the Artificial Island stability issues is selected."[2] The letter also cautioned that cost is only one of several considerations that will drive a final decision.

On August 12, 2014, PJM sent a letter to the four "finalists" in the PJM open window process to discuss what was required as part of the supplemental submission. In this communication to finalists, PJM for the first time identified Delaware siting law as a potential issue, stating that "it has been brought to PJM's attention that the State of Delaware public utility regulations may restrict the ability of a developer to site and construct new transmission in Delaware if the Proposer does not currently have a service

[2] July 23, 2014 PJM Staff Letter Delaying AI Decision, p. 2.

territory as established by the state commission in the area of their project."[3] The letter in turn directed finalists to provide a detailed response with legal references, "as well as confirmation from the Delaware Public Service Commission or the Office of the Delaware Attorney General regarding Proposer's legal ability to site and construct transmission in the State of Delaware consistent with its project proposal."[4]

However, on September 9th, in a hearing responding to LS Power's affiliate Northeast Transmission Development LLC's petition for an expedited declaratory order and PSE&G's intervention and comments proposing a modified form of order, the Delaware PSC entered an order finding that:

> Subject to all requirements of Delaware law, including the requirement, if any, that nonincumbent transmission developers obtain a Certificate of Public Convenience and Necessity from the Commission prior to beginning the business of a Public Utility in this State, nothing in Delaware public utility law or any prior order of the Commission prohibits nonincumbent transmission developers from siting, constructing and owning in the State of Delaware transmission facilities used in interstate commerce.

A copy of the order is attached as Exhibit 1 hereto. As such, Delaware siting authority is no longer an issue in this open window process.

2. PSE&G'S SUPPLEMENTAL OPEN WINDOW PROJECT PROPOSAL SUBMISSION

(a) Lower Cost Estimate and Cost Cap Proposal

As part of this submission, PSE&G is proposing to lower its total project cost estimate from $297 million to [redacted] PSE&G is also proposing an all-in cost cap on Hope Creek Switching Station upgrade and the transmission line from Hope Creek to Red Lion, subject to two exceptions. More specifically, we are proposing a "Guaranteed Maximum Price" of $221,000,000 for all of the costs for the Artificial Island project segments encompassing both the line itself as well as the Hope Creek Switching Station baseline upgrade. [redacted]

The first exception to the Guaranteed Maximum Price involves circumstances where PJM, as the regional transmission planner, directs or approves a change to the schedule or scope of the project for whatever reason. The second exception addresses five circumstances involving cost impacts and/or delays caused by factors outside the control of PSE&G such as changes in applicable laws and regulations and environmental permitting, remediation and mitigation. Under both exceptions, PSE&G would be able to use a change order process to adjust the Guaranteed Maximum Price to recover additional costs related to those exceptions.

[3] August 12 2014 Finalist Letter, p. 2.
[4] *Id.*

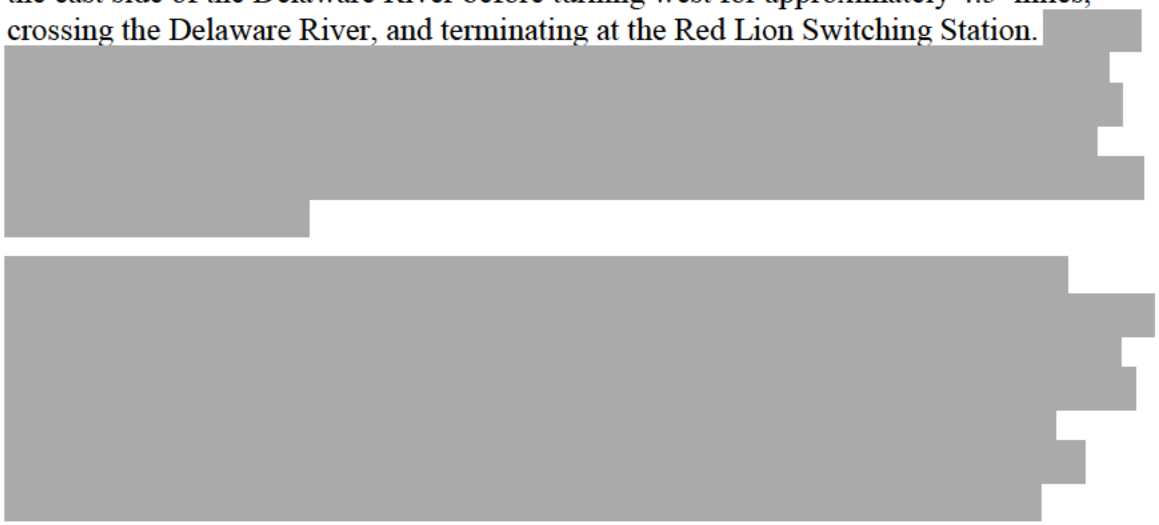
PSE&G would propose to add the Guaranteed Maximum Price language as a non-standard term and condition to the Designated Entity Agreement between PJM and PSE&G. A draft of proposed language is set forth in Exhibit 2 hereto.

PSE&G is able to present the lower price and the above price cap proposal as a result of additional detailed and more robust cost analyses. The new estimate reflects a rigorous internal and external study of the costs associated with the proposed river crossing. This expansion of knowledge has led to a significant increase in confidence on the costs and requirements required to successfully perform this project.

(b) Proposal Based on Original Proposal

a. Description of Proposal.

PSE&G is proposing to build a single circuit 500kV transmission line. This overhead transmission line project would begin at the Hope Creek Switching Station in Salem County, New Jersey and then extends approximately 12.5 miles north, generally along the east side of the Delaware River before turning west for approximately 4.5 miles, crossing the Delaware River, and terminating at the Red Lion Switching Station.



The Hope Creek to Red Lion 500kV line will be constructed and operated to current PSE&G Transmission standards, which are designed to meet or exceed the most current versions of the following guidelines and requirements:

- PJM Transmission and Substation Design Subcommittee Technical Requirements;
- PJM Manual 07: PJM Protection Standards, Revision: 0;
- PJM Relay Subcommittee - Protective Relaying Philosophy and Design Standards, Revision: 03;
- Section II – Design Criteria for Electrical Facilities Connected to the PJM 500kV, 345kV and 230kV Transmission System;

- Section V.A – PJM Design and Application of Overhead Transmission Lines 69kV and Above;
- PJM Operating Agreement and Manuals;
- Interconnection Requirements for Transmission Facilities 138kV and Higher, Revision Date June 24, 2010;
- ANSI C2-2007, National Electrical Safety Code (NESC), 2007 edition;
- SCE/SEI Standard 48-05, Design of Steel Transmission Pole Structures, 2005 Edition;
- ASCE Manual No. 74, Guidelines for Electric Transmission Structural Loading, 2002 Edition;
- Transmission Line Reference Book – Wind Induced Conductor Motion, Electric Power Research Institute, 1979; and
- New Jersey IBC, 2006.

b. <u>Project Schedule</u>

PSE&G affirms it intends to deliver the Hope Creek to Red Lion 500kV Circuit and the associated scope previously defined in this letter in an estimated project duration of 52 Months. Included in this letter is the project schedule (Exhibit 3).

c. <u>Description of Benefits Associated with Proposal.</u>

Artificial Island (AI) is a nuclear generation complex located in Salem County in Southern New Jersey. AI has three nuclear units, Salem 1 and 2 and Hope Creek, with a total generating capacity of 3,818MW.

[redacted]

3. EVALUATING COST ESTIMATES FOR ARTIFICIAL ISLAND PROJECT PROPOSALS

To properly determine which finalist has proposed the most "cost-efficient proposal to solve the Artificial Island stability issues", PJM must look at the costs of the entire Artificial Island project, not just the cost of building the line in isolation. If the line costs are reduced, but the baseline station costs associated with the line project are significantly more than any reduction, then that project may easily be less cost effective than competing projects. So, again, any proper assessment of costs in connection with the Artificial Island open window submissions requires an examination of the costs of the entire project: the baseline project costs as well as the line cost.

Any estimate that neglects a full appreciation of the costs involved with terminating in the associated stations, especially Artificial Island, cannot demonstrate a basis with which PJM can truly compare project costs. Any costs or risks neglected in this manner are passed on to the incumbent through the traditional RTEP baseline project assignment.

[redacted]

4. CONSTRUCTABILITY CONSIDERATIONS

Of the four finalists, only PSE&G has the safety, construction and operations experience at Hope Creek and Salem Switching Stations necessary to provide and execute the most appropriate solution for the Artificial Island environment. PSE&G's proposed termination at Hope Creek Switching Station has significant advantages over alternatives planning to terminate at Salem Switching Station. PSE&G's unique understanding of the requirements is further demonstrated in the low estimates for the termination at Salem Switching Station provided by alternative proposals. A lack of appreciable understanding of these complexities poses significant questions to the validity of any such total cost or schedule estimate. PSE&G believes PJM should be made aware of the following challenges and stands ready to succeed in this familiar environment.[5]

[5] We retained an independent engineering firm, Altran Solutions Inc., to evaluate expansion of the Salem

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

What continues below is an elaboration on the points asserted above based on the historic operational experience PSE&G has at Artificial Island. [redacted]

Salem and Hope Creek Stations are licensed by the NRC and as part of the process the engineering, safety, and operation of the switching stations falls under PSEG Nuclear span of control. [redacted]

The current configuration of Salem 500-kV, in particular, presents significant hurdles that will impact the cost and schedule of proposals that terminate in the Salem Switching

Switching Station. Altran's report, enclosed as Exhibit 4, addresses both cost and constructability issues associated with this expansion.

Station.

There are a number of challenges that need to be outlined for engineering and construction activities within the Salem Station OCA.

The execution of RTEP projects at this location has historically shown that there is an incremental difficulty factor in execution that translates to approximately 40% – 50% increase in cost.

These considerations also have implication from the schedule and cost perspective and

are part of the 40% - 50% cost incremental increase.

A decisive assessment of the physical limitations of a station expansion such as Salem or Hope Creek exceeds what is possible in a preliminary review. Due to experience with multiple historical RTEP baseline projects at Artificial Island, PSE&G can state that NRC governing requirements, critical site power maintenance and outage complexities, as well as known controls expansion limitations, will all contribute to design constraints potentially limiting a Salem expansion. PJM should carefully consider the implications of allowing such risks or costs to be understated or excluded from a total project cost comparison.

5. PSE&G'S PROPOSAL ADDRESSES ALL PERMITTING AND SITING CHALLENGES

PSE&G's substantial, up-to-date experience siting major transmission projects enables us to prudently anticipate and evaluate the permitting and siting challenges facing a new project. As with our prior projects, PSE&G has planned the project to use or run adjacent to existing rights of way, minimize new disturbance of environmentally sensitive areas and meet all known regulatory requirements. PSE&G has selected tower locations and construction techniques to avoid or minimize the impact to wetlands and other environmentally sensitive areas.

There are some key points discussed in further detail below, that strongly favor selection of the PSE&G proposal:

- Notwithstanding claims that there are hundreds of acres of wetland impact associated with PSE&G's proposal, PSE&G has tailored its proposal to avoid most impacts, with only minimal wetlands impact.
- PSE&G's project avoids and minimizes impacts on public resources of all types and users of the Delaware River's federal navigation project channel.
- The southern cable projects (i.e., the Transource and LS Power projects) will have significant permitting challenges associated with use of submarine cables.
- PSE&G has the ability to obtain necessary permits for Supawna Meadows National Wildlife Refuge ("Supawna").
- PSE&G's project is uniquely configured to meet the interests of the Maritime industry and standards of the US Army Corp of Engineers for the Delaware River crossing.
- Our proposal for crossing the Delaware River is simpler, more predictable and less costly than any of the other proposals.
- PSE&G will be able to satisfy New Jersey permitting requirements.
- Other projects will have permitting challenges associated with the State of Delaware, specifically covering the crossing of Delaware-owned coastal zone property and the paralleling of a designated historically significant corridor.
- We have a proven track record in obtaining necessary permits.

(a) The PSE&G Project Has Minimal Wetlands Impact

Contrary to claims made by other entities in comments to the PJM Board, there are not hundreds of acres of wetlands impacts associated with PSE&G's route. Rather, PSE&G has tailored this project to avoid almost all permanent wetland impacts. Indeed, our project would result in the loss of only .05 acres. An additional 27 acres of forested wetlands would be converted to non-forested wetlands. Although this activity is regulated by the State of New Jersey, it is not subject to federal regulation and, with mitigation, will lead to no net loss of wetlands. The table below provides details of the permanent wetland impacts based upon the following project assumptions:

- 41 out of 59 towers are located in wetlands in NJ.
- 4 out of 59 are located in wetlands in DE
- 45 lattice tower foundations have mapped wetlands overall, 28 have structure foundations completely within mapped wetlands, 17 structures are partially in wetlands.
- Lattice towers assume 4 legs with an approximate 4' diameter for each.

NJDEP Landuse/Landcover Wetlands (2007)	Anticipated Permanent Wetlands Disturbance (acres)
AGRICULTURAL WETLANDS (MODIFIED)	0.0026
CONIFEROUS SCRUB/SHRUB WETLANDS	0.0013
DECIDUOUS SCRUB/SHRUB WETLANDS	0.0017
DECIDUOUS WOODED WETLANDS	0.0017
DISTURBED WETLANDS (MODIFIED)	0.0020
FRESHWATER TIDAL MARSHES	0.0051
MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)	0.0013
PHRAGMITES DOMINATE COASTAL WETLANDS	0.0254
PHRAGMITES DOMINATE INTERIOR WETLANDS	0.0077
NJ SUM	**0.0489**

Delaware Statewide Wetlands	Anticipated Permanent Wetlands Disturbance (acres)
ESTUARINE	0.0030
DE SUM	**0.0030**

GRAND TOTAL (acres)	**0.0519**

Further, PSE&G pioneered innovative construction methods, such as helicopter tower construction, as a means of minimizing wetland and other impacts.

(b) PSE&G's Project Minimizes Impacts on Public Resources and on Users of the Delaware River Federal Navigation Project Channel

Each project under consideration by PJM will require permitting decisions from the U.S. Department of the Interior's U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (USACE), and several offices within the National Oceanic and Atmospheric Administration (NOAA), among other agencies. Each project will trigger substantial analyses and public engagement processes under the National Environmental Policy Act (NEPA) and other laws. Each proposed project will impact natural resources by the very nature of the location of the Artificial Island Generation Plant and the fact that each proposed alternative crosses the Delaware River.

PSE&G submits that the best way to minimize impacts on terrestrial and aquatic resources and conflicts with important public uses of the area is to expand the existing overhead transmission line corridor that has for decades connected the Artificial Island facilities with the grid in Delaware. There is no better choice to avoid and minimize impacts on public resources of all types and users of the Delaware River's Federal Navigation Project Channel.

(i) Delaware River Federal Navigation Project Channel

The Federal Navigation Project Channel in the Delaware River, commonly referred to as the "federal channel," presently has a Congressionally-authorized width of between 400 and 1,000 feet (depending on location) and an authorized dredge maintenance depth of -45 feet below the Mean Lower Low Water (MLLW) of the Navigational Chart Datum of Soundings. The Philadelphia District of the USACE is responsible for maintaining the authorized widths and depths in this federally authorized and maintained general navigation channel. The USACE typically employs 3:1 dredge cut side slopes (for unconsolidated sediment) beyond the authorized width of the channel bottom in order to avoid or minimize sediment slumping into the channel bottom from its flanking shoals once dredged to depth so as to maintain that authorized depth within the federal channel limits for navigational transit and safety.

To protect the maintenance and improvement of federal channels in its area of responsibility, the USACE's Philadelphia District has established required minimum burial depths for cable crossings in its Delaware Regional Conditions to USACE Nationwide Permit No. 12. Delaware Regional Condition (r) states:

> *The top of the cable or pipeline crossing the Federal project channel shall be located a minimum of 6 feet below the authorized project channel depth and shall be backfilled with suitable heavy materials to the adjacent river bottom elevation (presuming the cable is installed via mechanical*

> *dredging methods). In areas outside the Federal project channel, the top of cable or pipeline shall be located a minimum of 4 feet below existing river bottom elevation and shall be backfilled with suitable material to the adjacent river bottom elevation (again presuming mechanical dredging is the installation method) as compared to jet plowing methods where there is no net removal/replacement of seabed sediment within the cable or pipeline trench cut).*

However, submarine linear projects located within the Delaware River south of Trenton, NJ, such as the proposed location of the southern cable projects (i.e., the Transource and LS Power proposals), are not eligible for project authorization under a Nationwide Permit Program, but rather require a full public interest review by stakeholders and state and federal agencies for USACE authorization by way of an Individual Permit under Section 10 of the Rivers and Harbors Appropriation Act. This gives the USACE's Philadelphia District the authority and broad discretion to establish minimum burial depth below the channels for cables or conduits located within the defined limits of the federal channel based on the specific project proposal and the prospective USACE planning and maintenance dredging guidelines for that particular reach of federal channel.

The USACE's Philadelphia District indicated to the PSE&G team on September 5, 2014 that the District's Individual Permit condition applicable to cable/conduit burial in the Delaware River is more restrictive than the terms of the NWP quoted above. The standard reflects the Corps' experience with dredging-caused damage to gas pipelines placed under the Delaware navigation channel. Under the applicable Corps rule, submarine cables in the area of the proposed underwater line from Artificial Island would be required to comply with this permit condition:

> *CABLE 5.1 - DELAWARE RIVER*
>
> *That the depth of the top of the cable/conduit crossing the Federal project channel shall be a minimum of 25 feet below the AUTHORIZED Federal project channel depth or a minimum of 15 feet below EXISTING channel bottom depth, whichever depth is greater; and the cable/conduit trench shall be backfilled with suitable heavy materials to an elevation equal to the EXISTING adjoining channel bottom elevation. In areas outside the Federal project channel, the depth of the top of cable shall be a minimum of 15 feet below existing river bottom depth and the cable/conduit trench shall be backfilled with suitable material to an elevation equal to the existing adjoining river bottom elevation.*

As currently proposed, the submarine cable options would cross the portion of the federal channel in the Delaware River known as the Baker Range (crossing located between green buoys "3B" and "1B"). A review of the April 2014 USACE bathymetric condition survey of this section of the Baker Range indicates that the bottom depth of the federal channel is generally at elevations between -45 feet MLLW and -48 feet MLLW, which means this channel section is not presently in a shoal condition, since its controlling depth is currently at or below the federally authorized maintenance depth of -45 feet

below MLLW. The proposed cable would, thus, need to be installed at least 75-78 feet below MLLW. These requirements are extremely challenging for any plan relying on use of jet plow installation techniques, and raise an array of environmental, user conflict, timing and cost issues.

(ii) Submarine Cable Projects Trigger Higher Permitting Review Requirements And Are Challenging to Repair or Replace.

The most recent proposals for submarine cable installation within the federal channel limits, an approximately 900-foot-long section of the Delaware River channel, indicates that a plan to install the submarine cable system in six separate seabed trenches, (three for the cable circuit plus one spare cable). Each cable trench would be separated by 20 to 60 feet in width from each other based on water depths along the crossing lines. Presently, the stated installation method is jet plow embedment to a depth of -8 feet below the present seabed bottom in the federal channel. If this is the case, the construction plan would not be in compliance with the current USACE - Philadelphia District channel crossing requirements for this section of the Delaware River.

The USACE's Delaware River cable crossing permit criteria for this area will require cables to be buried a minimum of -25 feet below the federally authorized depth within the limits of the federal channel and 15 below existing river bottom depth outside of the federal channel. As such, the proponents of the submarine cable crossings will need to change the proposed cable system installation methodology from jetting to mechanical dredging and backfilling. This is a very significant change in installation methodology from the proposed jet plow embedment methods proposed. It substantially impacts the assumptions made related to southern projects' environmental impact and constructability risk profile.

Mechanical dredging and backfilling will be required since utilization of jet plow embedment methods to this great a depth below present bottom (-25 feet below -45 feet MLLW) is not currently feasible for jet plow embedment methods due to equipment and technology limitations. Changing the required installation methodology from jet plow embedment to dredging and backfilling means substantially greater environmental effects, far greater water quality and aquatic resource impacts, and extended disruption and restrictions to general navigation within the river and federal channel during installation and trench backfilling. PSEG's consultant's studies of method comparisons in the past for similar project design issues have shown that the environmental and navigational impacts of dredging and backfilling to install a cable or conduit compared to jet plow embedment methods results in impacts at least two times greater in magnitude than the impacts associated with jet plow embedment methods. Several USACE Districts on the East Coast have consistently agreed with the results of this analysis for similar types of linear crossing projects, which is why the Districts almost uniformly encourage the use of low impact jet plowing methodologies over the far greater impact methodologies of mechanical dredging and subsequent trench backfilling.

The requirement to bury the cable to 15 feet below existing river bottom outside the limits of the federal channel is technically achievable by using the jet plow embedment

method of employing a 5-meter-long hydraulic plow share (also called a jetting stinger) as long as sediment conditions at those depths are conducive to in-situ sediment fluidization within the trench. This fluidization becomes more difficult with greater jetting depths due to increased consolidation of subsurface sediments with depth below the present bottom. The feasibility of jetting a cable system – four times successfully – to a depth of -25 feet below the present channel bottom would be highly questionable, particularly if there is consolidated or variable subsurface geology with depth down trench or across the trench-cut corridor.

Again, the USACE - Philadelphia District's requirement to bury the cable to 25 feet below the authorized depth of the federal channel will likely require a dramatic and material change in cable burial methodology from jetting to dredging and backfilling. The latter methods cause significantly greater impacts to the aquatic environment and general navigation in the river (e.g., jet plow installation takes days; dredging and backfilling take months). Moreover, to our knowledge, and to the knowledge of PSEG's consultants with 20 years' experience in successful submarine cable installations along the Eastern seaboard, there are no jetting devices that are currently capable of jetting an HV cable system to a depth of -25 feet below present bottom. Therefore, the use of dredging and backfilling seems to be the only feasible method to achieve the required burial depth, accomplished either by all dredging or additional dredging to augment the jetting device limitations.

Since the federal channel bottom is presently maintained between -45 feet MLLW and -48 feet MLLW, approximately 10 feet to 12 additional vertical feet of in situ sedimentary material would need to be dredged first and removed from the channel bottom to then allow the jet plow with a 5 meter plow share to jet the cable to the additional 15 feet of installation depth of trench to achieve the -25 foot burial below the authorized depth standard. In addition, mechanical dredging would need to occur simultaneously with jetting to ensure the trench cut does not substantially backfill itself (side slope slumping) while jetting and cable installation is proceeding.

Using a 10-foot-deep dredge cut with side slopes with 20 feet of cable separation between the six cables and 12 feet between the two outside cables at the bottom of the 3:1 side slope, each installation trench would be of trapezoidal shape with a bottom of dredge cut width of 124 feet and the top (surface cut) width of 184 feet. These dimensions would be then compared to a 4-foot-wide by 15-foot-deep jet plow trench with natural backfilling, a difference of an order of magnitude or greater in direct impact compared to jetting methods.

Dredging this cross-section over the 900-foot-long federal channel crossing would result in dredging of approximately 51,333 cubic yards of material plus the volume of material required to create the slope transition at the edges of the channel necessary for the plow to enter and exit the dredged trench when meeting the existing 3:1 federal channel side slope condition. This volume could be substantially higher, in fact more than doubled, if the southern route options employ plans to dredge to the required cable burial depth to lay the cable on the trench bottom or if the cable trench spacing is wider than the 20 feet we assumed in our estimate.

After the cable has been installed at depth, the cable trenches will require the importation by barges of clean sand-sized backfill material to make the finished grade of the trenches comply with the USACE standard of "suitable heavy materials to an elevation equal to the existing adjoining channel bottom elevation". This would mean at least another 51,333 cubic yards of clean sand-sized backfill material would need to be barged in and placed back in the trench through the water column via mechanical disposal methods at substantial additional cost and time. The notion that the excavated trench sediments can be simply side casted along the trench cut as the dredge proceeds is very challenging from a permitting and dredged material disposal standpoint, particularly if the dredged sediments contain any contaminants of concern that could be re-introduced in the aquatic environment.

Another factor to consider is that the deeper burial depth could dramatically affect the ampacity of the submarine cable system resulting in possible de-rating of its maximum voltage carrying capacity if the specific cable design cannot accommodate this voltage drop by its own design. Inherent heat capacity dissipation by the cable system when operating would be very problematic perhaps causing performance rating reliability issues as well. The deeper the cable is buried the more difficult it is to dissipate its heat capacity efficiently to avoid over-heating issues and consequent line voltage drops. Adjusting the cable design to meet more difficult thermal capacity issues typically leads to significantly increased cable manufacturing and supply costs likely well beyond those provided by project proponents in their proposals to PJM when they proposed using jet plow embedment technology.

In light of the foregoing, it is clear that in order to comply with federal rules governing construction of infrastructure under the Delaware River navigation channel, the proponents of submarine cables will need to significantly increase their cost estimates, prepare for very challenging environmental reviews, and extend their construction schedules well beyond anything that is in the record before PJM now.

PJM should also take note of the difficulties that would be presented in the repair and/or replacement of submarine cables. If for some reason the submarine cable system's circuit(s) failed or needed to be replaced entirely, or even in just one section, exhuming the cable from the sea bed at that great a burial depth would be very difficult and would likely again require mechanical dredging which could also result in damage to the entire cable system due to required pulling tensions and associated dredging/removal activities. Once spliced or repaired, a re-install Omega loop would then need to be constructed (dredged) for cable re-burial which would be its own undertaking of magnitude in this event, assuming it was an outside cable that failed. If it is an inside cable this makes the replacement condition even more tenuous.

The federal Reedy Island Dike that exists in the vicinity of the LS Power submarine cable crossing is reportedly comprised of large boulders (i.e., the size typically used for breakwaters and jetties) and is approximately 60 feet wide at its base. Given these dimensions, the cable system would need to be pulled under the dike via a HDD-bored conduit system. This would require a more difficult water-to-water HDD subsurface conduit installation method, which is very complicated, technically difficult and

expensive since it is a wholly marine-based operation, not a typical land-based operation. Furthermore, it would not be feasible logistically or cost-effective to remove part of this federally-funded and constructed dike, jet plow the cable, and then replace the dike to pre-construction conditions without the likelihood of compromising the structural integrity of the dike. If the cost of using HDD to place the cable under this dike was not included in LS Power's original proposal, it should be, as this would lead to substantial increases in cost (two to four HDD trenches) likely well beyond those associated costs currently presented in LS Power's proposal.

(c) PSE&G's Project is Permittable through the Supawna Meadows National Wildlife Refuge.

We expect to negotiate with the U.S. Fish and Wildlife Service to acquire the rights needed to cross a small portion of Supawna Meadows National Wildlife Refuge [redacted] We have also successfully negotiated mitigation agreements with the U.S. Fish and Wildlife Service's manager of the Supawna Refuge. We have successfully restored more than 20,000 acres of tidal wetlands in the immediate area around Supawna-- an area more than 6 times the size of Supawna itself. According to the refuge's management plan, the tidal wetlands in the refuge require exactly the same forms of restoration and conservation that we have applied to the lands around the refuge. Restoration of tidal wetlands in the refuge is a top management priority for the Service, as is conservation of intact or restored wetlands benefitting the species and public uses Supawna was established to serve.

The assertions made by others that there will be difficulties dealing with the Department of the Interior's regulations miss the point. A legal memorandum quoting chapter and verse from a set of regulations, moreover, ignores the practical experience PSE&G has in dealing with DOI in general and with the managers of Supawana in particular. It also misses the point that there is, in fact, a USFWS permitting system available to be used for our proposed project. We are confident based upon the project as designed and our prior experience that approval to build the project in Supawna is achievable.

The challenges of securing approval from the USFWS are no greater than those facing the proponents of the southern route projects that require new rights of way in Delaware. In many ways, those projects appear to face greater siting difficulty. Nothing is evident in the record that shows specifically how the proponents intend to build lines through state owned lands. Nothing suggests how the state or private landowners might agree to set aside land and resource protection standards that limit development of energy infrastructure on much of the land along the Delaware shoreline. Unlike the route we propose, there is no uniform, established permitting system applicable to the routes

crossing conservation lands and other protected areas along the Delaware side of the river.

(d) PSE&G's Project Is Uniquely Configured To Meet The Interests Of The Maritime Industry And Standards Of The US Army Corp Of Engineers.

U.S. Army Corps of Engineers permits will be needed to cross the Killcohook dredge material storage area and to build towers in the Delaware River alongside the existing line spanning the river between the dredge storage area and the Red Lion substation. As an integral part of the permitting process with the Corps, we expect that maritime shipping interests will express a very strong interest in ensuring that our project does not reduce the height of the clearance for vessels using the Delaware River navigation channel or otherwise interfere with current or future shipping operations, including operation of the next generation of deep-draft commercial shipping vessels.

In reviewing the Southern Submarine Crossing versus PSE&G's overhead transmission line, it is apparent that the expansion of an existing overhead transmission corridor is the superior alternative. While it may be technically feasible to install the underwater cable under the dike and under the federal channel, the ACOE will require that the cable be installed at a depth of-25 feet below the federally authorized project depth of -45 feet, if the ACOE even concurs that a submarine cable is an appropriate alternative to an overhead transmission line. It should be noted that the PJM process has provided ample public documentation that overhead transmission is a viable alternative to potentially impacting a federal channel through the installation of a new submarine transmission line.

PSE&G's project is uniquely configured to meet the interests of the maritime industry and the regulatory standards of the Corps. We have an existing corridor and line in the dredge spoil area and have operated and maintained the line successfully in partnership with the Corps for more than forty years. Our towers and conductors spanning the river would not degrade the existing navigation channel, lower vessel clearances, or otherwise interfere with current or future navigation, including further dredging to accommodate larger vessels expected in the coming years.

By contrast, proposals to place submarine cables in the Delaware River or to build new overhead structures in a new corridor would directly impact the Corps' regulatory and navigation programs and maritime interests. A new overhead line in a new corridor would degrade the navigation channel, imposing substantial new obstacles to shipping. A portion of the Delaware River utilized for the proposed submarine cables is located within an anchorage area used heavily by tankers, container ships and other commercial shipping. New towers or new submarine cables would conflict directly with use of the area as an anchorage. Whether ships are moving or anchoring, their operations will be harmed by new cables or towers proposed for other projects now being assessed by PJM. The risk to shipping translates immediately to a risk for the grid itself, the generation facilities relying on it, and the mid-Atlantic's power customers.

The public record of materials submitted to PJM by parties proposing submarine cables does not disclose or consider the implications of a critical requirement of the Corps' permitting system for the Delaware River. The information in the record before PJM shows that the proposed submarine cable project will not meet the Corps of Engineers minimum permit requirements.

Our prior submissions to PJM documented the array of natural and cultural resource protection issues associated with the submarine cable proposals presented to PJM. We emphasized, among other things, the requirements imposed by the resource protection laws administered by NOAA, including the agency's endangered species, essential fish habitat and Coastal Zone Management programs, and the cultural resource protection requirements arising from the National Historic Preservation Act. The difficulty of securing permits for the project described to PJM by the cable proponents would be great. However, there are significant additional natural and cultural permitting implications stemming from the changes that would need to be made to the submarine cable proposal in order to meet the Corps of Engineers' minimum permit requirements. The amount of riverbed disturbed, habitat damaged, protected species impacted, water quality impaired and submarine cultural resources harmed would all increase greatly with the requisite dredging, plowing and backfilling. These changes all cut against any assertion that the submarine cable crossing can reasonably be expected to secure permits on terms or a schedule consistent with PJM's grid management goals or responsibilities.

In theory, the submarine cable project might seek to comply with the Corps' regulatory requirements by using directional drilling instead of trenching or caissons. Directional drilling would only be possible by placing drilling sites squarely inside the Salem Nuclear Power Plant and on Delaware shoreline lands in an area where almost every acre is protected under state or other conservation laws and are habitat for State and federally protected species. The cost of drilling, when combined with the distinct problems associated with the location of drilling pads, would substantially decrease the likelihood that the project could be permitted or built on terms or a schedule consistent with PJM's grid management goals and responsibilities.

PSEG's proposal for crossing the Delaware River would also involve in-water construction, and would require compliance with NOAA's programs, cultural resource laws and the USACE requirements tied to the Delaware's vital role in maritime commerce – but the impacts of PSEG's proposed river crossing would be negligible when compared to those of the submarine cable proposal or the overhead line in a new corridor. The permitting process for PSEG's proposed river crossing is not simple, but it is far simpler, more predictable, and less costly than any other proposal.

(e) PSE&G Will Be Able To Satisfy New Jersey Permitting Requirements

New Jersey has assumed responsibility for federal regulatory programs and jurisdictions from both the U.S. Environmental Protection Agency (USEPA) and the USACE. As a result, regulatory compliance standards and alternative sequencing differs from the rest of

the country in many instances. New Jersey assumed control of the Coastal Zone Management program through its CAFRA (Coastal Area Facility Review Act) and Waterfront Development Regulatory permit programs. Even where a federal individual permit is issued by the USACE, the NJ Department of Environmental Protection issues the Water Quality Certificate for the activity (not the USEPA). New Jersey also has primary responsibility for permits concerning wetlands impacts and fills, both in freshwater and tidal environments. Like the above cited prohibition of the use of NWP (12) in impacts to navigable waters, many of the Nationwide Permits utilized in other state jurisdictions in wetlands areas are not available to the proposed projects currently under consideration by PJM.

In general, NJ's Coastal Zone Management Program prioritizes development of its coastal zone waters for uses that are water dependent. In the instance of any proposed submarine transmission line, protection of the port facilities and maintenance of modern "post-Panamax" shipping channels would be a paramount consideration.

Natural features and resource protection also are a specific focus of the Coastal Zone Management policies. These policies are divided into Special Areas where resources are a paramount concern; Location Policies, and Use Policies.

The Delaware River has been defined as a Special Water's Edge Area. In addition, any project in this area would be analyzed as to its impacts to Shellfish Habitat (NJAC 7:7E-3.2) and Finfish Migratory Pathways (NJAC 7:7E3.5). One of the species of special concern that has been specifically identified by these rules is the Atlantic Sturgeon (Acipenser oxyrhychus), In addition, this portion of the Delaware River is known habitat for many other federal- and state-listed species. Both the state and federal environmental reviews would scrutinize any impact to these species, and project environmental assessments may require timing restrictions and other special construction considerations that may impact project schedules, particularly for "in water" construction activities such as the proposed southern submarine alternative. Consideration is also given to areas of Submerged Vegetation Habitat (NJAC 7:7E-3.6) which would require an alternative analysis particularly for submarine utility cables. If these areas are identified, directional drilling may be required for any submarine utility installation, or an alternative not directly impacting habitat and special area species (such as the expansion of an existing overhead line v. a submerged route) may be recommended to avoid impacts to these areas of special concern.

Many other Coastal Zone Management policies are applicable to the project proposal at hand, including Ports (NJAC 7:7E-3.11); which prohibits any uses which would preempt or interfere with port uses of the water area; Overhead Transmission Lines (NJAC 7:7E-4.15) which are conditionally acceptable as long as vertical clearance is provided (in this case, for the post-Panamax vessel); and Submerged Cables (NJAC 7:7E-4.20), which requires that the cable not be located in a Special Area; that the preferred construction method is directional drilling; and that anchorage areas are identified and avoided.

As noted earlier, Coastal Zone Management standards apply both in considerations for

state permits, and for both Coastal Zone Consistency determinations. In addition, the CZM standards serve as a valuable tool in preparing the Water Quality Certificate for federal approvals and actions.

In terms of mitigating wetlands impacts under NJ's Freshwater Wetlands Permit Program, the State has assumed this responsibility and jurisdictions from the USEPA. In agreement with USEPA, NJ's sequencing of priorities for mitigation differs from the national program. New Jersey is the most densely developed state, and as such, the hydrology already influencing wetland existence and creation is well established. For this reason, on-site or near-site creation is allowed over obtaining credits from an approved wetlands mitigation bank. Based upon our extensive experience, creation or restoration of wetlands can be accomplished at a minimal cost as compared to wetland bank credits. Due to the minimal wetland impacts associated with the PSE&G project, wetland mitigation under the State program will not be a substantial cost.

All of the proposals result in unavoidable impacts that must be mitigated in accordance with NJ's Freshwater Wetlands Protection Act Rules (NJAC 7:7A) and Coastal Zone Management Rules (NJAC 7:7E), and the requirements of the US Army Corps of Engineers (Corps). PSE&G is experienced at meeting the requirements of the wetlands mitigation process in NJ, having routinely met the requirements for unavoidable wetlands impacts on numerous projects including the recent Susquehanna-Roseland project.

Under NJ's and the Corps' permitting requirements, impacts to wetlands must be avoided, where feasible, and minimized. An alternatives analysis is required to determine if there are ways to achieve the project with less wetlands disturbance. Permits are approved only for activities that have no viable alternative. Mitigation is required as a condition of the permits to compensate for wetland functions lost as a result of the regulated activity.

(f) Other Projects Will Have Permitting Challenges Associated With The State Of Delaware.

The State of Delaware jointly regulates activities in wetlands with the Army Corps as well as designated Coastal Zones. The Transource and LS Power options propose the approximate crossing of Delaware State owned coastal zone property for a distance of 1.5 miles and 2 miles respectively. The impacts associated with a new 230Kv overhead transmission line crossing and Right–of–Way designation where none currently exist are significant. In addition, the lines would parallel Route 9 which has been designated as a historically significant corridor. The area of potential affect associated with a line being sited where none currently exists will be a significant regulatory hurdle from a historical resource perspective.

(g) PSE&G's Has A Proven Track Record In Permitting This Type of Project

PSE&G's approach to siting and permitting for this project will draw heavily upon the company's recent, successful experience working with an array of federal agencies to site

and build the Susquehanna-Roseland Project. Our interaction with the federal government involved more than mere routine permitting activities. With our co-developer, we worked with the White House Council on Environmental Quality and the Administration's Rapid Response Team on Transmission to evaluate the project under the Administration's core initiatives to expedite and improve transmission siting.

Beginning in 2009 and continuing to the present, we have worked directly with the leaders of the Administration's efforts to improve transmission project siting to achieve more timely decisions and better results for the public and developers, including those initiatives arising under Presidential Executive Order 13604, *Improving Performance of Federal Permitting and Review of Infrastructure Project*s. We were not bystanders to the development of cutting-edge transmission siting policy and practices, we were directly and substantially involved in shaping the policy and implementing the practices.

PSEG's voluntary commitment to and participation in federal policy innovation was the right thing to do from all relevant perspectives: The Susquehanna-Roseland Project became the first transmission project approved and built from among the small group of other transmission projects placed on the Administration's list of top-priority infrastructure projects. PSEG's work helped advance policy-making that has broad benefits for all transmission developers and the public.

If our project is selected by PJM, we would anticipate working closely with the Administration to integrate the siting and permitting effort with the best practices outlined in the Administration's May 2014 *Implementation Plan for the Presidential Memorandum on Modernizing Infrastructure Permitting*. We would expect to renew our engagement with the array of White House and departmental leaders charged with advancing transmission siting practices and agency decision-making. We see ample opportunity to use this project to help advance the state-of-the-art in federal siting and permitting of key transmission infrastructure. There are many reasons why PSEG's project might appropriately be considered as a pilot for the interagency coordination practices proposed under the May 2014 plan, including innovative approaches to pre-filing consultations, public engagement, and impact mitigation.

(h) Other Considerations

(i) Delaware River and Federal Regulatory Constraints

All proposed crossings, both submarine and overhead, will be subject to individual permits under the USACE's Clean Water Act Section 404 and Rivers and Harbors Act Section 10 regulations. While Section 404 deals with filling issues in navigable waters and wetland, Section 10 gives absolute authority to the USACE to regulate uses that would interfere with navigation and harbors, reflecting the Constitutional doctrine of the federal navigation servitude. The Corp's consideration of any proposed crossing of the Delaware River channel will turn on both environmental considerations and on the project's potential impact to navigation. Further, the nature of the environmental review

(either an Environmental Assessment or Environmental Impact Statement) will be determined by the nature and extent of impacts associated with the selected transmission line route. The use of Nationwide Permit 12 is not available for any of the proposed transmission line crossings: specifically, the Regional conditions for the Delaware River south of the Penn-Central Bridge in Trenton, New Jersey prohibit the use of NWP (12) for utility lines in the river. Among the major areas of concern in the preparation of environmental studies and reviews will be the Delaware River's function as a major shipping channel and port, as well as the special resources of the river, including impacts on critical habitat for threatened and endangered aquatic species, such as the Atlantic Sturgeon.

(ii) <u>Federal Channel and Port Development "POST-PANAMAX"</u>

The Delaware River dredging project is critical to the Port of Philadelphia in light of the Panama Canal expansion currently underway. When the Panama Canal expansion is completed in 2015, supersized "post-Panamax" ships from Asia will be able to traverse the canal and, for the first time, have direct all-water shipping access to U.S. east coast ports. The significance of this is that, prior to the Panama Canal expansion, these huge ships would off-load in west coast ports and then send their goods and cargo via land (i.e. trains and trucks) to the rest of the mainland United States. Having an expanded Panama Canal will increase the options for delivery of cargo to the rest of the country, and also will result in decreased transportation costs for these goods. Conversely, the opportunity now also exists for cheaper export options from the east coast back to Asia and beyond.

To meet the "post-Panamax" port opportunity, a massive $300 million project known as the Delaware River-Main Channel Deepening Project is underway, and is expected to be completed by 2017, with a federally authorized project channel depth of 45 feet. When the deepening project is completed, 102 miles of the Delaware River will be at that depth. In addition, the Corps' permit that governs installation of cables crossing the Delaware River requires new cables to be installed "a minimum of 25 feet below the authorized Federal project channel depth or a minimum of 15 feet below existing channel bottom depth, whichever depth is greater…[and in] areas outside the Federal project channel, the depth of the cable shall be a minimum of 15 feet below existing river bottom depth." Corps of Engineers, Philadelphia Division, Cable Condition 5.1. As explained by USACE officials to PSEG, this requirement is aimed at protecting the Corp's ability to maintain the authorized channel, or to deepen it in the future, without damaging or requiring relocation of cables, pipelines and other infrastructure.

The Delaware River-Main Channel Deepening Project will not only serve the existing port facilities in Philadelphia, but will also serve many other public and private maritime facilities along the Delaware River in Pennsylvania, New Jersey and Delaware, including many struggling urban areas that can benefit from new port facilities and the ancillary developments supporting the "post-Panamax"shipping opportunities.

The USACE and the U.S. Coast Guard will closely examine any proposed crossing that could negatively affect the new port opportunities in this tri-state area. Any new

submarine crossing would be scrutinized in terms of interference with safe navigational activities, including non-interference with anchoring opportunities in expanding port scenarios. We believe that expansion of the ROW of the existing Delaware River crossing at the proper height consistent with "post-Panamax" vessel size is the preferred alternative to a new submarine crossing of the River.

6. CONCLUSION

PSE&G has proposed the most technically effective and cost-efficient solution for the Artificial Island stability issues that can be constructed and permitted on a timely basis. Moreover, with PSE&G as the builder, PJM can rest assured that the project will be completed on time and consistent with budget. We have a demonstrated track record of building complex projects on time and on or under budget and successfully handling significant permitting challenges, including receiving federal permits and challenges associated with going through sensitive areas.

For all the reasons stated above, PJM's management should reaffirm its selection of

PSE&G's Hope Creek to Red Lion project to the PJM Board as the best project to address the Artificial Island stability issues.

Submitted on behalf of:

Public Service Electric and Gas Company

By: 

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Dated: September 12, 2014

Exhibit 1

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF DELAWARE

IN THE MATTER OF PETITION OF NORTHEAST TRANSMISSION DEVELOPMENT, LLC FOR EXPEDITED DECLARATORY ORDER (FILED AUGUST 29, 2014)	))))	PSC DOCKET NO. 14-0297

ORDER NO. 8632

AND NOW, this 9th day of September, 2014, the Public Service Commission (the "Commission") determines and orders as follows:

WHEREAS, on August 29, 2014, Northeast Transmission Development, LLC ("Petitioner") filed a Petition for Expedited Declaratory Order confirming that neither Delaware public utility law nor prior orders of the Commission prohibit nonincumbent transmission providers such as the Petitioner from siting, constructing and owning electric transmissions facilities used in interstate commerce, upon receipt of necessary approvals; and

WHEREAS, PJM Interconnection L.L.C. ("PJM") is the regional transmission organization that coordinates the movement of wholesale electricity in the State of Delaware and all or parts of 12 other states and the District of Columbia; and

WHEREAS, in April, 2013, PJM issued a request for proposals pursuant to its Regional Transmission Expansion Plan for transmissions solutions to improve operational performance in the Artificial Island area; and

WHEREAS, Petitioner is a finalist sponsor of a proposed transmission project in the Artificial Island RFP; and

WHEREAS, PJM has raised a question of whether Delaware law restricts the ability of nonincumbent transmission developers to site,

construct or own new transmission facilities in this State, and directed finalists to provide confirmation from the Delaware Public Service Commission or the Delaware Attorney General's Office by September 12, 2014, of the finalist's legal ability to site and construct transmission in the State of Delaware; and

WHEREAS, the Artificial Island RFP represents PJM's first competitive bid solicitation for transmission under the Federal Energy Regulatory Commission's Order 1000 requiring, subject to state law, *inter alia,* competition and coordinated regional planning in the construction of new electric transmission; and

WHEREAS, the Commission has determined, as a matter of public importance and its exclusive original jurisdiction to regulate public utilities in the State of Delaware, that it should clarify and confirm that Delaware public utility law does not prohibit nonincumbent transmission developers from siting, constructing and owning in the State of Delaware electric transmission facilities used in interstate commerce, upon receipt of necessary approvals.

NOW, THEREFORE, IT IS ORDERED BY THE AFFIRMATIVE VOTE OF NOT FEWER THAN THREE COMMISSIONERS:

1. The Petition of Northeast Transmission Development, LLC for a declaratory order is hereby **GRANTED**. Subject to all requirements of Delaware law, including the requirement, if any, that nonincumbent transmission developers obtain a Certificate of Public Convenience and Necessity from the Commission prior to beginning the business of a public utility in this State, nothing in Delaware public utility law or any prior order of the Commission prohibits nonincumbent

transmission developers from siting, construction and owning in the State of Delaware transmission facilities used in interstate commerce.

BY ORDER OF THE COMMISSION:

Chair

Commissioner

Commissioner

Commissioner

Commissioner

Attest:

Secretary

Exhibit 2

EXHIBIT 2 HAS BEEN REDACTED IN ITS ENTIRETY.

Exhibit 3

EXHIBIT 3 HAS BEEN REDACTED IN ITS ENTIRETY.

Exhibit 4

EXHIBIT 4 HAS BEEN REDACTED IN ITS ENTIRETY.