



**PJM INTERCONNECTION, LLC  
TRANSMISSION EXPANSION ADVISORY COMMITTEE**

**RE: ARTIFICIAL ISLAND OPEN WINDOW SUBMISSION PROCESS**

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY'S  
POST-TECHNICAL CONFERENCE COMMENTS**

On May 19, 2014 PJM held a technical conference to review the current status of its evaluation of the various projects submitted during the open window period for the Artificial Island Request for Proposal. During that conference, PJM also responded to various questions on technical and constructability issues related to how it was evaluating the projects. PJM requested that stakeholders submit their comments and concerns within 14 days. PJM stated that they will be considering the stakeholders comments in their final evaluation and selection of the winning proposal.

For these reasons, and in accordance with the 14 day comment period established by PJM, PSE&G now submits the following Post-Technical Conference Comments.

**I. EXECUTIVE SUMMARY**

At the May 19, 2014 special TEAC meeting, PJM communicated the status of its work in evaluating the various Artificial Island project proposals. In doing so, it presented an “apples-to-apples” comparison of the technical aspects of the various projects, in addition to cost and constructability. PJM fielded many questions and ultimately invited stakeholders to submit their comments, concerns and any new ideas, modifications or enhancements that may add to or improve the current PJM short list of projects.

First, PSE&G would like to take this opportunity and commend PJM on their dedication and their extensive efforts, both on the technical analysis and constructability and cost estimating work that PJM had performed. PSE&G does recognize the significant difficulty involved in covering the broad scope of these issues for all of the specific project components. We further recognize that many of these analyses were being undertaken for the first time in the PJM RTEP process history. We hope that these comments will provide PJM with additional insights and information that will assist them in selecting the most constructible and cost effective project in this open window process.

Second, PSE&G notes that the summary table presented and reviewed by PJM at the meeting provides an excellent overview of the competing short list of projects and their associated evaluation criteria. Based on that summary table, we submit that the PSE&G Hope Creek to Red Lion solution (without the second bus tie) identified in the last column is the least cost solution with the least amount of constructability issues of all projects on the short list. Moreover, we will be providing below further information not fully captured in the Summary Table that makes it even clearer that the PSE&G 7 K Modified proposal is the winner of all the short-listed proposals. Among other things, this information will demonstrate (i) why the 230 kV options are not viable, (ii) New Freedom is the best location for siting an SVC (assuming that an SVC is used at all), and (iii) PSE&G is the best party to construct the 500 kV circuit from Hope Creek

to Red Lion. Accordingly, we stand ready to accept PJM's designation of us to build the project.

Third, while we agree with PJM's clear assessment in the Summary Table that the PSE&G 7 K Modified Project is the best of all the projects compared on that table, we would be remiss in not raising the point that we still believe that our original PSE&G 7K proposal offers the best solution to address the PJM open window RFP objectives for Artificial Island. As explained in further detail below, our original PSE&G 7K proposal meets and exceeds all objectives of that RFP. This proposal does not require an SVC and as such avoids raising NRC concerns that in turn could lead to NRC project disapproval. This project also addresses NERC Category C Failure concerns and provides significantly more stability margin over all of the projects in the short list. Said stability would greatly simplify the required instructions under the Artificial Island Operating Guide.

Fourth, to the extent PJM still decides against adoption of PSE&G 7k Original proposal, PSE&G also points to the need to factor in the likelihood of NRC review for any project that would require upgrades at Artificial Island. Nuclear facility owners must notify the NRC of any proposed upgrades occurring on plant premises and on any facility considered part of the nuclear project. This could in turn trigger a full NRC review of the proposal and in turn lead to considerable delay and/or the ultimate denial of the request. Accordingly, and to avoid triggering an NRC review altogether, PSE&G proposes that PJM also consider a modification of the PSE&G 7E proposal as discussed below.

## **II. PSE&G DETAILED COMMENTS AND CONCERNS**

The following are the details supporting PSE&G's more specific comments and recommendations. We organized our response in the following categories:

### **A. THE PSE&G 7 K MODIFIED PROPOSAL IS THE BEST OF ALL THE SHORT-LIST PROPOSALS**

In this section PSE&G will demonstrate that the PSE&G 7K and the Dominion modified proposals are (1) superior to the 230kV overhead and submarine alternatives based on a) environmental and b) cost, (2) has the least constructability and permitting concerns (the wetland and the land permitting criteria considerations should be yellow not red) of all projects on the short list, and we will also show that (3) New Freedom is the better location for the SVC and that (4) PSE&G is the best qualified entity to construct the Hope Creek to Red Lion 500kV circuit.

#### **1. 230 kV v. 500 kV Project Approaches**

PSE&G considers the RL-AI 500kV with SVC option to be significantly superior over the 230kV option. The 500kV plan gives future flexibility to expand the 500kV system to mitigate the EMAAC voltage and stability issues. It also is prudent to build the river crossing as a 500kV instead of 230kV. The potential of getting a second future 500kV crossing built will get more difficult. This is in addition to the environmental/permitting and cost issues that are addressed below.

##### **a) Environmental Assumptions/Analysis**

PSE&G reviewed the assessments of the proposed projects as prepared by UC Synergetic, LLC (UCS) and Gai Consultants (GAI). Both reports to represent fair-minded ways of assessing the regulatory

hurdles likely to confront the project proposals. PSE&G would like to note the following in their assessment of the options and additional potential permitting hurdles that may be encountered. The following L&P (licensing and permitting) concerns would start with bullet summary followed by the detailed explanation.

■ ***Submarine Southern crossing 230kV projects - Section 404 – Additional Considerations to Note***

- New Jersey is the delegated authority for Section 404
- Extensive modeling will be needed to determine river bed impacts
- Charted Dike crossing has major environmental considerations
- Sunken Ship Cove Crossing/Impacts will have major Section 106 and NJ permitting implications

It is an important consideration that the UCS analysis of the submarine cable connections does not consider that New Jersey is the delegated authority to set the terms, or deny, permits required under Section 404 of the Clean Water Act. The proposed cable routes would require federal and state approvals under the Clean Water Act (CWA) Section 404 program. The segments in New Jersey jurisdictional waters, including wetland areas, would be subject to joint permitting by the Army Corps of Engineers (Corps) and State of New Jersey.<sup>1</sup> The analyses of the Transource and LS Power proposals appear to overlook New Jersey's role in the CWA Section 404 permitting process (see, for example, slides 72 and 81). The segments in Delaware would be subject to the federal Section 404 program.

The submarine options will likely need suspended sediment modeling, geophysical and geotechnical surveys and sediment core analysis for bulk physical and chemical properties prior to filing permit applications. PSE&G estimated the temporary bottom impact of the jet plow trench and skid depression of the River to be anywhere from 14 acres (LS Power 5A) to as much as 30 acres (Transource 2A).

Additionally, it should also be noted that at least one submarine alternative crosses a charted submerged dike. Use of jet plow or other surficial installation methodology is not feasible for crossing these types of features. Installation at the crossing would require alternative construction techniques and the potential for removal of a portion of the dike which may not be approved by regulatory agencies given the habitat value of the area. Alternative construction techniques would likely include cofferdams within the river and directional boring under the dikes. This would be extremely impactful on the aquatic environmental and potentially impactful on the adjacent shipping channel and operations. These types of structures are normally considered historic in nature and will hinder the applicant's ability to permit the route. Below is a NOAA nautical chart depicting the resource (the dike is depicted as the dotted line through the submarine route aka Reedy Island Dike).

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<sup>1</sup> New Jersey assumed the Section 404 Program under the Clean Water Act on March 2, 1994, for discharges of dredged or fill material into waters of the United States in New Jersey that are not currently used, or susceptible for use, in their natural condition or by reasonable improvement as a means to transport interstate or foreign commerce shoreward to the ordinary high water mark, including wetlands adjacent thereto where the United States Army Corps of Engineers retains jurisdiction. In these non-assumable waters and adjacent wetlands both a State Freshwater Wetlands permit and a Federal 404 Permit issued by the United States Army Corps of Engineers are required.



Sunken ships are also noted on the NOAA figure south of Artificial Island. This is a line of relics of First World War ships sunk there as a protective barrier for pipe line dredging by the Army Corps of Engineers and is known as Sunken Ship Cove. If avoidance of these areas is not possible, additional investigation will be conducted to assess National Register of Historic Places (NRHP) significance and will be a critical Section 106 permitting issue. Additionally, issuance of a State permit consistent with N.J.A.C. 7:7E-3.13 will not be authorized for any activities that will have an adverse impact on fish or biological habitats associated with Sunken Ship Cove. Any use, except archeological research, which would significantly adversely affect the usefulness of this special area as a fish habitat is prohibited. Lastly, the State will not authorize any unacceptable or prohibited activities in other shipwreck or artificial reef habitats. Below is an aerial image of Sunken Ship Cove.



Image 2. Sunken Ship Cove (2012)

Under the Section 404 program, the permitting authority (the Corps or the State) is obligated to determine that the proposed discharge of dredged or fill material is the least environmentally damaging, practicable alternative. As such the permitting authority may not permit the proposed discharge if there is a practicable alternative that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. The existence of the other proposed projects being evaluated by PJM that have less adverse impact on the aquatic ecosystem (i.e., less discharge of dredged or fill material in the Delaware River) suggests that the submarine cable options would have difficulty satisfying the CWA's "least environmentally damaging, practicable alternative" standard.

■ ***Submarine 230kV - Example of Precedent Setting USACE approvals for submarine options***

- Precedents used may not be enough to justify an easy USACE approval process in this area.

The UCS report notes the prior USACE approvals for Hudson Transmission and Bayonne Energy Center as precedent for approval. PSE&G would caution that while they indicate acceptance of submarine cable water crossing proposals where there was not a viable overhead option that would create less of an environmental impact. The PSE&G crossing of the Delaware is an existing crossing and could be expanded. The other permitted options had alternatives that considered ROW expansion on another carrier's transmission corridor and considered the requirement of extensive land acquisition and clearing. This would not be the case in the PSE&G Delaware Crossing scenario. It appears to have been assumed that the same environmental impacts would be encountered with the second overhead line across the Delaware River as a new line crossing would be. In fact a second overhead line may lead to reductions of avian impacts by making the lines more visible.

■ ***230kV Overhead and Submarine Options - Presence of Endangered Species at the southern proposed crossings of the Delaware River***

- Federal listed species documented at the Crossing Locations
- Documented Essential Fish Habitat
- Coastal Zone Management Act – State Review Considerations

The proposed submarine routes involve extensive underwater work in otherwise undisturbed submerged areas that provide habitat for protected species, including the shortnose sturgeon, the Atlantic sturgeon, the hawksbill sea turtle, the loggerhead sea turtle, Kemp’s ridley sea turtle, and the leatherback sea turtle. This area stands a good chance of being designated as critical habitat for Atlantic sturgeon, a move that will require the project proponents to avoid the destruction or adverse modification of such habitat. It is anticipated that the decision-making for this designation will occur within the project planning and permitting and could cause significant hurdles.

The analysis omits any consideration of the Essential Fish Habitat protections of the Magnuson-Stevens Fishery Conservation and Management Act. It is suggested that the analysis should be revised to give proper consideration to these factors. The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with NOAA Fisheries on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect “essential fish habitat” (EFH). Adverse effect means:

...any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

The proposed project area contains designated EFH for at least ten fish species, including Atlantic butterfish, windowpane, and winter flounder. Five of the ten species are known to have egg or larval stages with designated EFH. Through the consultation process, NOAA Fisheries will provide EFH conservation recommendations, i.e., measures to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH. The federal action agency must follow these recommendations, or explain its reasons for not following them. The substantial underwater work and its associated impacts to the Delaware may significantly affect EFH, and could result in a lengthy consultation under the Magnuson-Stevens Act, as well as onerous avoidance, minimization, and mitigation measures. It should also be noted that these impacts are not only associated with the cable itself. Approximately 3,600 feet of the proposed routes are in water less than 6 feet deep on west side of river, which could present constructability challenges for jet plow.

The construction of transition stations to facilitate the re-emergence of these submerged lines would also have the potential to affect protected-species habitat in areas adjacent to the Delaware River, including the bog turtle, sensitive joint-vetch, swamp pink, and the Indiana bat.<sup>2</sup>

While the analysis does discuss the Coastal Zone Management Act it appears to not consider, or give

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<sup>2</sup> In addition to construction impacts, additional disturbance to the Delaware River ecosystem is likely during the operation and maintenance of the submerged lines. When a cable fault occurs in submarine cable, specialized equipment is required to locate the fault, the cable must be brought up to the surface on a barge, a field splice must be handmade, and the cable must be re-buried. Such a process requires weeks and possibly months to complete.

proper weight to the authorities of the State of New Jersey and State of Delaware to withhold or deny approvals that would be required for the submarine cables and related on-shore features under the Coastal Zone Management Act and National Historic Preservation Act. It is reasonable to anticipate that the effect of the laws will be to preclude submarine cables in the locations proposed where a practicable alternative, with far fewer environmental impacts, is readily available.

■ ***Submarine and Overhead 230KV Options Use Delaware Owned Lands***

- All options for southern crossing of the Delaware River have landfall on Delaware preserved and state owned lands
- States have leverage through CWA Section 401 Water Quality Certification Process

With the exception of the Red Lion crossing all of the other options have landfall on the Delaware side in preserved and state owned lands. These lands have trails and public recreation use. There is no infrastructure in these largely wetlands and coastal areas. The state of Delaware would have to approve the purchase/use of these properties. Construction of new structures that would encroach on state lands is prohibited. Structures that were preexisting at the time the State acquired the property would be allowed to stay and could be repaired or replaced. Delaware-owned forest lands would need to be acquired for overhead lines, and new roads would be needed on public lands. State-designated historic and scenic roads would be crossed by the new lines.

All proposals are subject to regulatory veto by the states of New Jersey and Delaware under the Coastal Zone Management Act (CZMA). The rating system applied by PJM draws distinctions among the projects in a manner that obscures the fact that the states are positioned under existing federal law to stop projects they disfavor. A state decision related to use of state forest lands, as proposed for Delaware, could provide the opportunity for a veto under the CZMA.

The states also have leverage through the CWA Section 401 water quality certification requirement. Under Section 401, an applicant for a Section 404 permit must obtain a certification from the state in which the discharge originates (or will originate) that any such discharge will comply with certain state water quality requirements of the CWA. States may delay decision making on a 401 certification request for up to one year. If a state denies the 401 certification, the federal permit may not be issued. The greater the impacts to water quality, the more difficult it is for a project applicant to obtain the requisite 401 certifications.

Individual 404 permits and certain Nationwide Permits from the Army Corps of Engineers also require 401 Water Quality Certification from the DNREC Wetland and Subaqueous Land Section and Coastal Zone Federal Consistency Certification from the DNREC Division of Soil and Water Conservation, Delaware Coastal Programs Section. Each of these certifications represents a separate permitting process.

These state approval processes involve agencies with missions entirely unrelated to the missions of utility regulatory commissions and no mission orientation that would favor a submarine cable with substantial direct and indirect impacts on wetlands, species habitat, and cultural resources over the status quo or a competing transmission project with fewer impacts on protected resources.

For the purpose of the color-coded ranking system shown on slide 191 and subsequent slides, any project proposing to acquire new land from the State of Delaware, or impacting cultural resources such as scenic highways, or requiring a CWA 404 permit from any state or the Corps, or impacting EFH or critical

habitat under the ESA should be coded red, not yellow or green, properly reflecting the multifaceted *de facto* veto power held by the state and the federal rules set to protect aquatic ecosystems. This is particularly important here, where other less environmentally damaging and practicable alternatives are available to meet the need identified by PJM. The Transource and LS Power submarine cables should be ranked as unlikely to be approved and, in a comparative sense, far less likely to be approved than the PSE&G proposal that has fewer environmental impacts.

**b) Cost Assumptions/Analysis**

Additionally PSE&G has reviewed the 230kV option vs. the 500kV option incorporating O&M Cost and Useful Life. PSE&G believes:

- The cost of the 230kV Solution must include 3 addition breakers and substation work at for a total potential additional cost of \$2.5M.
- The incremental O&M Costs of the 230kV Solution over the 500kV Solution must be considered when evaluating the two solutions. The 230kV solution has a new 230kV station and transformers that will require more maintenance outages and O&M cost than the 500kV solution.
- The useful life of a 500kV Transmission Circuit is greater as compared to the useful life of a 230kV Transformer and Breakers. This should be included in the cost of the 230kV solution.

We believe this adds to the overall superiority of the 500kV Solution over the 230kV Solution.

**2. Constructability and Permitting**

The PSE&G 7k Modified Proposal does not require any work at Salem Generating Station. Any proposal with work at Salem will be very challenging; the location of the switchyard controls and protection are located inside of the Nuclear Generating Station. This significantly limits the access to the controls and requires that all engineering for modifications follow the Nuclear Facility Design Change Package (DCP). PSE&G believes any proposal that includes large DCP work at Salem should be considered a Negative Impact. Additionally additions and modifications to the 500-kV bus which are outage dependent are very difficult to obtain. This difficulty is directly related to requirements to provide off site power to the Station mandated by the NRC. Additionally the configuration of the station power transformer and the critical busses serviced by these transformers requires close outage support from the nuclear department and are only obtained while the units serviced are off line in the refueling cycle. Outage work at Salem for either 230-kV or 500-kV have negative impacts and should be evaluated based on the magnitude of the modifications proposed in the Salem Switching Station. The larger the proposed project it the more difficulty it will have in execution.

**The PSE&G 7K Modified Proposal Has The Least Constructability And Permitting Concerns; So The Wetland And The Land Permitting Criteria Should Be Yellow, Not Red, In The PJM Summary Table.**

**a) Wetlands Impacts will not be excessive.**

- Forested Wetlands Impact is much less than previously documented.
- Recent Oblique Aerial Imagery and State wetlands datasets confirm analysis

It had previously been considered that the PSE&G proposal to widen the New Jersey side of the existing

ROW would have a large impact (approximately 320 acres) of deciduous wooded wetlands in New Jersey (as noted in the GAI report). PSE&G counters that this is not the case. Available state mapped wetlands were reviewed and were compared with November/December of 2013 oblique aerials showing tree cover. The following table is the summation of potential wetlands impacts for the proposed ROW expansion:

<b>Mapped Wetlands Type (NJDEP 2007 Landcover Dataset)</b>	<b>Expand ROW option closer to River (in acres)</b>	<b>Expand ROW option inland (in acres)</b>
Agricultural wetlands (modified)	14	15
Coniferous scrub/shrub wetlands	0	0
Deciduous scrub/shrub wetlands	7	9
<b>Deciduous wooded wetlands</b>	<b>27</b>	<b>27</b>
Disturbed wetlands (modified)	1	8
Former agricultural wetland (becoming shrubby, not built-up)	0	3
Freshwater tidal marshes	8	4
Herbaceous wetlands	0	0
Mixed scrub/shrub wetlands (coniferous dom.)	0	1
Mixed scrub/shrub wetlands (deciduous dom.)	6	1
Phragmites dominate coastal wetlands	55	50
Phragmites dominate interior wetlands	40	39
Wetland rights-of-way	1	1
<b>total wetland area within ROW (acres)</b>	<b>159</b>	<b>157</b>

This table was created from the New Jersey Department of Environmental Protection available wetlands data and the assumption that the ROW expansion would be 200 feet on either side of the existing ROW. Oblique imagery was matched with existing tower locations to check the available data. The total anticipated wetlands area within the new ROW would be 157-158 acres depending on which side of the ROW the expansion would occur. Both expansion options would be expected to disturb approximately 27 acres of deciduous wooded wetlands. It is important to note that permanent disturbances are only associated with filling associated with foundations, resulting in very minimal permanent wetland disturbance. The GAI report performed an analysis from available NWI wetlands data. The State of New Jersey has documented that NWI maps have been determined to be unreliable for the purposes of locating an actual wetlands boundary and it is proposed that the New Jersey freshwater wetlands maps and soil surveys have more accurate data (N.J.A.C. 7:7A-2.3). Verification by aerial imagery supports the use of NJ freshwater wetlands data.



Image 3. Aerial Assessment of Existing Forested Wetlands along NJ ROW



Image 4. Aerial Assessment of Existing Forested Wetlands along NJ ROW



Image 5. Aerial Assessment of Existing Forested Wetlands along NJ ROW

In areas of the proposed ROW expansion where the state data had mapped deciduous wooded wetlands, PSE&G performed a desktop analysis to confirm impacts. This is shown in Image 6 below.

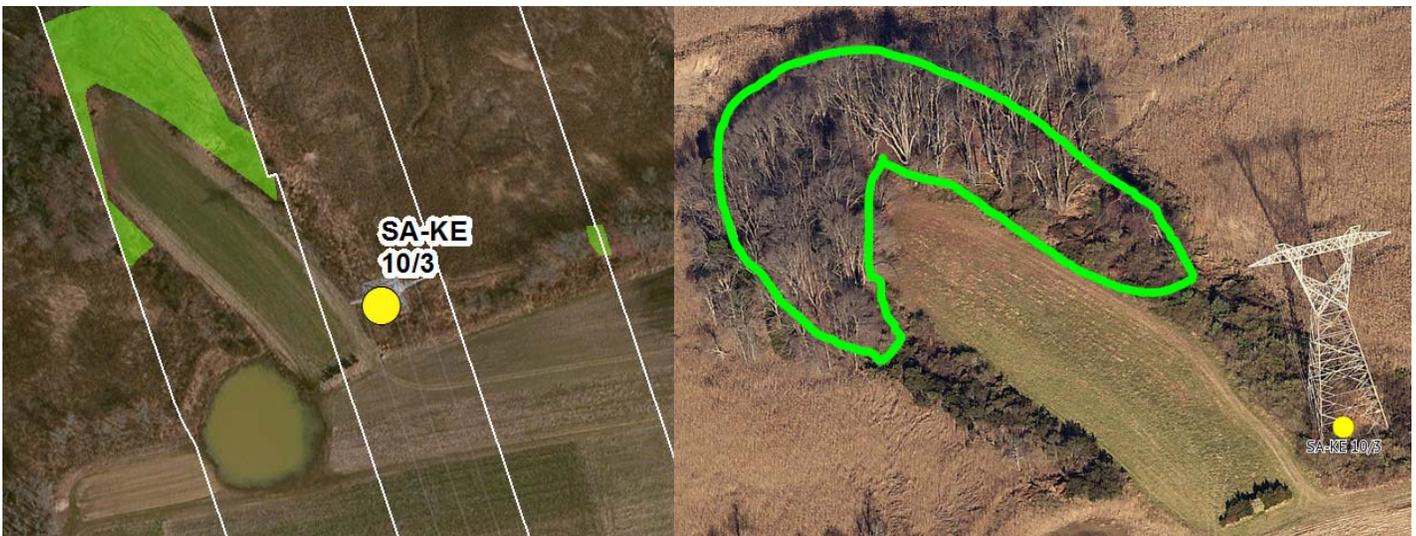


Image 6. Desktop Forested Wetlands Assessment

Delaware also has its own state wetlands dataset. The below image shows the existing Red Lion station as the existing ROW mapped with the Delaware state wetlands map layer. Forested wetlands impacts would again depend upon which side of the ROW that is expanded. The northern and southern sides of the existing ROW are not mapped wetlands in a large section but as with any assessment, ground investigation would need to be performed. Both ROW expansion locations have the potential for 4 acres of total mapped wetlands impact on the DE side. This is significantly different than the 69 acres of wetlands that GAI anticipated. Forested wetlands were determined using oblique aerial imagery of the area. (See Images 7 & 8). It is thought that both expansion options would impact less than 2 acres of forested wetlands.



Image 7. Aerial Assessment of Existing Forested Wetlands along DE ROW



Image 8. Aerial Assessment of Existing Forested Wetlands along DE ROW

The regulatory hurdle for all proposals is very high, a factor that dictates selection of a sponsor able to demonstrate recent experience successfully resolving analogous transmission siting challenges in one or more of the relevant jurisdictions. Any such proposal, particularly PSE&G's proposal, should be ranked more favorably than projects offered by entities with purely speculative or aspirational plans to meet relevant state and federal siting and environmental protection standards and procedures.

It is suggested that the PJM analysis should take into account a project sponsor's demonstration of recent experience successfully navigating these complex, multilayered permitting processes. A proposal from an entity with recent, relevant success should receive a more favorable ranking than an identical proposal from another entity with a purely speculative assertion of ability to meet regulatory requirements.

**b) 500kV Permitting has the least concerns**

- Potential to be the least onerous permitting option
- PSE&G has a successful history working with the National Park Services
- The 500kV option is on and along an existing ROW. The use has already been established.
- Expanding the existing ROW along the Delaware River may have the least amount of environmental impacts
- Forested wetlands impacts would be minimal in NJ and DE.

PJM has assessed the 500kV option as red and determined it to be very difficult to permit. PSE&G would suggest that all the options presented have significant permitting obstacles as we have discussed in detail earlier in this response document and have been previously documented by GAI and UCS. We believe that our 500kV option is likely to be the least restrictive for permitting based upon our years of successful permitting in the state of New Jersey. Our recent dealings with the National Park Service have ultimately allowed for construction and have also been deemed to be successful from both parties involved. PSE&G has been seen at the forefront of permitting for utilities in the State of New Jersey and we have a reputation for a utility that will work with the agencies for approvals that are in both the utility and agency's interest.

Further, our proposal is based on the existing ROW and existing stations. We have studied the existing ROW in detail and know exactly what sections would require expansion. We are not proposing a new use in any location but rather an expansion of an existing use that has been in place since the early 1970's. The general public is aware of the ROW and few residential homes and developments have been developed in close proximity. The line already crosses the Delaware in a location that does not have the same threatened and endangered species habitat as the southern options do. It is likely that no new River crossing option (either overhead or submarine) will meet with public and agency approval. If an additional line were to be added along the Delaware it would make not only aesthetic sense but also may support avian protection to add the line in close proximity to what is in existence. While a complete wetlands delineation has not been completed for the ROW expansion it can be noted that the state mapped wetlands for deciduous wooded wetlands corresponds with recent high resolution imagery. Forested wetlands would be anticipated to be negligible when compared with the GAI assessment of impacts.

**3. New Freedom is Optimum Location for an SVC**

The PSE&G New Freedom Switching Station has available upland property that can accommodate the required SVC. PSE&G has a strong working relationship with Winslow Township and has been able to obtain municipal siting and permitting for numerous RTEP baseline projects on this site. These projects include the loop in of the 5021 500-kV circuit, addition of 500-1 transformer bank and the replacement and rehabilitation of the 500-4 transformer bank.

With respect to siting additional facilities at Orchard Substation, we note that PSE&G and ACE have experienced opposition from local stakeholder groups, property owners and Upper Pittsgrove Township in connection with the Churchtown-Cumberland line project. Based on that past experience, we believe that it will be difficult to obtain the necessary property, siting and permitting of the SVC on the Orchard Substation Property. In addition the property is bound by farmlands currently owned by Larchmont Farms. If PJM recalls this is the same property owner that provided opposition to the initial development and that subsequently created operational hurdles that delayed return of the 5021 500-kV Circuit. To date the baseline requirements for sectionalizing the Churchtown-Cumberland line has not been completed as

a result of these permitting challenges.

Moreover, New Freedom has much stronger system ties to PSE&G, AE, JCPL and PECO. Orchard, on the other hand, is only tied to the 500kV system with one transformer and has one three ended 230kV circuit to AE system. New Freedom is tied to the 500kV with four transformers and six strong 230kV ties. 650 MVAR SVC will provide much better reactive support to the system at New Freedom.

Finally, the SVC at New Freedom would eliminate the need to replace aged 200MVAR capacitor banks at New Freedom.

#### **4. PSE&G Is The Best Party To Construct PSE&G 7k Modified Proposal Facility**

PSE&G has a long history of successfully developing transmission infrastructure and currently has a dedicated team of project managers, permitting specialist, construction managers and commissioning experts. This team has recently executed substantial RTEP projects including Susquehanna – Roseland 500-kV transmission line, Burlington – Camden, North Central Reliability and the North East Grid Projects all of which has complex siting and permitting issues at the Federal State and Local level. PSE&G has demonstrated the ability to navigate these issues to complete these projects. PSE&G has establish good relations with the NJ BPU and other Permitting and licensing agencies in New Jersey. The PSE&G Delivery Projects and Construction team is prepared to deploy necessary resources to meet the requirements of the project. In addition to these resources PSE&G was a founding member of the Lower Delaware Valley Agreement for construction of the 500-kV backbone from its formation and as a founding member PSE&G has the rights to construct on the previously acquired ROW.

Currently PSE&G operates and maintains over one thousand mile of transmission facilities in New Jersey. This includes a dedicated group of transmission maintenance professionals capable of live line maintenance on circuits up to and including 500-kV lines which is currently paralleling the proposed Hope Creek – Red Lion Line. Our maintenance fleet is in close proximity to perform scheduled maintenance and to quickly respond to outages of the proposed 500kV circuit.

#### **B. PSE&G 7 K ORIGINAL PROPOSAL MEET OR EXCEEDS THE AI RFP OBJECTIVES**

PSE&G requests that PJM investigates PSE&G's original 7K proposal. See attachment A. This proposal meets and exceeds the PJM RFP criteria. This proposal does not require an SVC and the estimated cost, based on PJM per unit cost guide, is about \$200M more than the lowest PJM cost for the least expensive alternative on the short list. PSE&G 7K proposal resolves the NERC Category C relay failure concerns. This proposal also provides significantly more stability margin than any of the projects on the short list and greatly simplifies the operating guide for the AI units.

PSE&G proposals 7K is the exact proposal that we submitted earlier in response to the PJM AI RFP and all the data and working files have been provided with our proposal. Both FOG wire w/associated relay modifications and adjustment of the fixed tap settings on the units step up transformers were a part of our proposal and should be included in PJM's evaluation. Installation of FOG wire will provide faster clearing times and reduce false tripping. See attachment.

Based on our analysis, PSE&G original 7K proposal's stability performance will meet and exceed the 230kV or the AI to RL 500kV options with SVC. In addition, using PJM per unit cost estimate values (\$

3.6 M per mile for overhead 500kV construction), we will find that the cost difference between AI to RL 500kV with SVC and PSEG proposal 7K is not significant. The following is a cost and benefit comparison the 500kV with SVC vs. proposal 7 K:

**Proposal 7K - cost comparison against RL-AI 500kV with SVC**

- a. Cost of SVC is \$ 80 M
- b. Cost of 500kV circuit from NF to Deans (68 miles at \$ 3.6M/mile) is about \$ 245M
- c. Incremental cost is about \$ 170M-200M
- d. Benefits
  - i. Eliminates all reliability risks associated with SVC.
  - ii. Provides best option for obtaining endorsement by NRC.
  - iii. **This proposal will also address the compliance with NERC Category C standards - relay failure events that lead to multiple circuit trips.**
  - iv. The 7K proposal will also add market efficiency value.
  - v. Unlike SVCs and Transformers, transmission lines have almost 100% availability and minimal O&M cost and a 80-100 years useful life as compared to 40 years for SVCs and transformers.

PSE&G’s 7K Original Proposal does not include the use of SVCs, while all projects in the PJM short list of proposals include the application of an SVC device. Unlike transmission circuits, the SVC is an active software controlled device with a potential risk of the SVC devices failing to respond, or not performing to design when called upon. In addition, SVCs have not been used to resolve rotor angle instability before. PSE&G feels that the AI nuclear complex with 3800MWs of generation as well as the PJM 500kV backbone system is too critical to be used as a test application for the SVC device, particularly when there are other options that resolve the concerns without the use of an SVC. While we agree with PJM that this option is more expensive, we feel that the additional cost is justified by elimination of risk associated with the SVC and by providing significant system benefits from the more robust 500kV upgrades.

**C. PJM SHOULD ALSO CONSIDER THE PSE&G 7E MODIFIED PROPOSAL BECAUSE IT WOULD REDUCE THE RISK OF AN NRC REVIEW**

We request that PJM evaluates PSE&G proposal # P2013-7E without the Salem-Hope Creek bus tie and with the use of an SVC (hereinafter “PSE&G 7E Modified Proposal). See attachment A. This modified proposal will consist of an SVC at New Freedom, relocation of the New Freedom 500/230kV #4 transformer leads to same bay as SVC and a 500kV circuit from New Freedom to Deans. As per our original proposal, this plan will also include FOG wire and associated relay modifications and unit step-up transformer tap optimization.

**Construction Cost Estimate (Based On PJM Per Unit Cost Values)**

New Freedom to Deans 500kV – 68 miles at \$ 3.6M/mile	\$ 245M
1 bay w/two breakers at New Freedom	\$ 7.5M
1 bay w/two breakers at Deans	\$ 7.5M
FOG wire	\$ 5M
<b>Total cost</b>	<b>\$ 265M</b>

The 500kV circuit from New Freedom to Deans will be built on an existing ROW with portions of the ROW already cleared. The majority of the ROW is in the Pinelands and there is a parallel circuit already constructed on this ROW, which should make it easier to obtain approval.

This plan possesses the following features that make it more superior than the other proposals on the PJM short list:

1. Requires no construction at AI.
2. Requires no crossing of the Delaware River.
3. Avoids all construction and scheduled outages of critical circuits.
4. 350ft ROW already exists with portions of the ROW cleared.
5. Avoids 500kV line crossing issues at AI, Red Lion and other 500kV stations.
6. Since this plan does not require any construction at AI, it most likely will not trigger an NRC review.

PSE&G stability simulations showed this plan to pass the PJM first swing angle requirements. The following event represents the most restricting circuit maintenance outage and the associated most severe contingency.

Line maintenance outage	5015
Generator output	3818 MW/ 634 MVAR
AI voltage 500kV	1.040 pu
Critical contingency	Flt @ 5038 at NF, 9-10 CB at NF stuck
Angle swing	96 degrees

(FOG wire fault clearing timing is assumed.)

### III. CONCLUSIONS

For all the reasons stated above, the PSE&G 7K Modified Proposal is the most cost effective and constructable of all of the short listed project proposals and PSE&G is the best entity to construct that project. However, as noted above, the PSE&G 7K Original Proposal is still the best in addressing all of the PJM RFP objectives for Artificial Island and for addressing the NERC Category C criteria. So PSE&G also requests that PJM still consider this proposal as a viable solution. Finally, in light of the NRC review that would be triggered by upgrades to Artificial Island facilities, we further recommend that PJM consider a modification of PSE&G's 7E as discussed above.

#### IV. COMMUNICATIONS

All communications concerning these comments should be directed to the following persons:

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*Submitted on behalf of:*

**Public Service Electric and Gas Company**



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