

**COMMENTS OF TRANSOURCE ENERGY SUBMITTED TO PJM ON JUNE 2, 2014
REGARDING ARTIFICIAL ISLAND, PROJECT SELECTION DECISION**

Project Selection Decision

Transource recommends that PJM select one of the Southern Delaware Crossing projects, 230-kV submarine crossing options (Transource 2A & 2B, LS Power 5A), to address the Artificial Island objectives. We have consistently advocated to PJM that these options represent the best available solution, when considering overall cost, technical performance and constructability. In addition, we believe that these options embody exactly what the PJM sponsorship model is intended to inspire: ideas that deliver benefits to customers through innovative, cost effective transmission solutions. These comments summarize Transource's positions regarding the project selection decision.

PJM's Primary Considerations

Technical Analysis

The Southern Delaware Crossing projects, 230-kV submarine crossing options (Transource 2A/2B & LS Power 5A, hereafter referred to as the "230-kV Submarine Projects") compare favorably to other options when considering all of the Technical Analysis factors.

- PJM has confirmed that the 230-kV Submarine Projects fully satisfy the stability and thermal performance criteria with the proposed addition of an SVC at Orchard, New Freedom or Artificial Island¹.
- The 230-kV Submarine Projects also offer route diversity benefits that the other options do not provide. As we discussed in our comments submitted to PJM on May 6, 2014, routing diversity and the avoidance of creating Category D contingencies has been a factor that PJM has considered in past project selections.
- The 230-kV Submarine Projects offer greater market efficiency benefits than the other options based on PJM's analysis: \$92 million versus \$57 million for the 500 kV options to Red Lion. While these benefits do not justify the project on a market efficiency basis, this difference does represent a net present value benefits to customers of \$20 million².
- PJM notes that for projects 5A and 2B, Short Circuit analysis shows that three 230-kV breakers are overdutied; this issue was recognized in Transource's proposal for 5A and

¹ Later in this document we discuss the performance criteria PJM is using for this analysis, versus the performance criteria initially presented in the Artificial Island Problem Statement. This discussion is not relevant for the project selection decision; rather, we argue that it is highly relevant to the project designation decision.

² Assuming the total \$35 million differential is evenly spread over 15 years and an 8% discount rate.

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recommended to be addressed by replacing these breakers without significantly increasing the overall cost of the project.

Cost Effectiveness

The 230-kV Submarine Projects are comparable in construction cost to other options based on the PJM cost estimates and offer other important costs benefits versus other options. Most importantly, we believe the projects that involve a new overhead crossing of the Delaware Bay present considerably more cost risk factors, both in construction and maintenance costs, than the 230-kV Submarine Projects. As discussed in our May 6th comments, the existing line was completed at a price of approximately three times the original budgetary cost estimate (see page 299 of 432 in DOE report included with that submittal). There were a number of variables that led to the cost increase, not the least of which was permitting and construction delays. It is very likely that many of the same factors that resulted in higher costs in 1977 may still apply today. In addition to these risks, we also noted in our May 6th comments that we disagree with the scope additions involving spare equipment in developing the PJM cost estimates for the 230-kV Submarine Projects.

PJM also notes that the 230-kV Submarine Projects also deliver Outage Cost savings and Blackstart advantages versus other projects, which could be very significant. For perspective, a 2006 report from the Nuclear Energy Institute (attached) estimated the annual benefits from the Salem and Hope Creek stations to be over \$1.2 billion, which translates to over \$3 million of benefit per day. Clearly, any advantage in outage time for the plants could have a very significant economic benefit.

We also appreciate that PJM is considering additional cost factors in the project selection decision; this also speaks to the overall customer value that the PJM sponsorship process can deliver by identifying innovative ideas. We discussed above the additional \$20 million of net present value market efficiency benefits.

PJM's Secondary Considerations

Overall Constructability

Transource has consistently advocated that the 230-kV Submarine Projects are more constructible than other options and that any new overhead crossing of the Delaware Bay presents more serious risk factors than the underwater alternatives. In fact, PJM's independent constructability consultant, UC Synergetic, observed the same in their report on page 5: "it's UCS's opinion that the submarine crossing options will provide the most publicly acceptable solutions." We believe the overall complexity of any new overhead crossing does not appear to be adequately represented in any single category in PJM's presentation of "Risks to Cost and Schedule" in the May 19th Artificial Island Review

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slides. We ask that PJM again consider the strong evidence in support of our overall conclusion in our May 6th comments, specifically:

- Construction Schedule of Existing Crossing – The existing line, Delmarva Power's 500-kV Delaware River Crossing, was completed in December 1977, approximately ten years after it was initiated (see page 26 of 43 in GAO report included with this submittal).
- Construction Cost of Existing Crossing – As discussed above, the existing line was completed at a price of approximately three times the original budgetary cost estimate (see page 299 of 432 in DOE report included with this submittal).
- Potential for Shipping Accidents – Locating infrastructure in an active shipping channel brings safety concerns in addition to reliability concerns. The existing line has been prone to shipping accidents, oftentimes resulting in expensive repairs, costly legal settlements, and decreased reliability (see five articles on 1987 shipping accident included with this submittal). Most notably the line was significantly damaged in 1987 (March 1), which resulted in an extended (nine-month long) outage of the 500 kV river crossing while repairs took place (see five articles on 1987 shipping accident included with this submittal).
- Clearance Requirements – The clearance distance requirement from the conductor to the water is 226 feet, which resulted in a structure height of 400+ feet on either side of the channel for the existing line. As a matter of perspective, traditional 500 kV clearance distances are typically in the 30 feet range, with towers in the 100 foot range. Towers of this size required for the river crossing will require visual lighting for FAA regulations, impair the existing viewshed, and increase the likelihood of significant public opposition.

GAI Consultants reach a similar conclusion in the Summary and Closing of their constructability analysis (page 16):

“Significant risks that have been identified that may adversely affect the developer’s ability to construct the project within the proposed schedule and budget include possible difficulties in obtaining the following permits and approvals: Permit to cross Supawna National Wildlife Refuge; easements on public lands; approvals required for placing structures in the Delaware River; and obtaining Certificates of Public Convenience and Necessity from NJ and DE. Additional risks that may affect the project include the challenges associated with construction through environmentally sensitive areas and across the Delaware River, availability of any required transmission system outages, and Endangered Species Act compliance.”

In addition to these overall constructability comments, we offer the following comments related to specific categories of PJM’s analysis presented to stakeholders on May 19th:

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Project Schedule

PJM's summary of the constructability analysis suggests that the 230-kV Submarine Projects present greater Project Schedule risks than the other proposed projects. Transource disagrees with this assessment based on the following points:

- As discussed above, construction of the existing line, Delmarva Power's 500-kV Delaware River Crossing, was completed in December 1977, approximately ten years after it was initiated. While Transource estimated a schedule of 48 months for proposal 2C, we also consistently acknowledged the significant risk factors that could affect this schedule. We note that Dominion Virginia Power estimated a project schedule of almost ten years and we agree such an outcome is possible given the many risk factors and history of the existing line crossing.
- Long Lead Time Materials is flagged in PJM's summary as a greater risk for the 230-kV Submarine Projects. We acknowledge this as a risk, but firmly believe that the full three years allocated in our estimated project schedule for proposals 2A and 2B for materials acquisition is realistic. Attached to these comments is an email from ABB confirming that the proposed schedule for submarine cable acquisition is reasonable, and even conservative, given the current manufacturing lead times. ABB indicates in the attached email that 24 months would be the expected lead time.
- We would also like to note that each option under consideration will require the acquisition of an SVC, which is also a long lead time item. Based on our vendor discussions, the current lead times for SVC are consistent with ABB's indicated lead time for the underwater cable. We anticipate the SVC and underwater cable acquisitions would run in parallel for our proposals 2A and 2B.

Project Complexity

Transource agrees with PJM's assessment that the key Project Complexity risk factors are either favorable or similar for the 230-kV Submarine Projects as compared to other options.

RoW and Land Acquisition

Transource does not agree that the potential to use a portion of existing right-of-ways involving multiple owners presents a significant constructability benefit for the 500-kV projects to Red Lion. As discussed in our May 6th comments, we urge PJM to carefully review such multi-owner arrangements

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before attributing any routing advantage to proposals that call for the use of such existing right-of-ways. In fact, such joint ownership may potentially complicate efforts by any of the owners to utilize that right-of-way as part of their proposal that may be competing with proposals submitted by the other owners.

Regardless if some existing ROW is used, all of the proposed 500-kV projects to Red Lion will require significantly more new ROW acquisition to accommodate the approximately 14 miles of new overhead transmission line in New Jersey. We believe this represents a greater schedule and cost risk than the 1.5 to 3.0 miles of new right-of-ways needed to be acquired in Delaware for the 230-kV Submarine Projects.

PJM has also highlighted Substation Land Required and No Eminent Domain Authority in Delaware as unfavorable risk factors for the 230-kV Submarine Projects (proposals 2A and 2B only for the substation site). We acknowledge these risks, but continue to advocate that they are mitigated by the routing and siting options afforded by the proposed underwater crossing. Transource, working with Burns and McDonnell, has identified multiple potential routes and substation sites on the Delaware side, with the final outcome to be determined by the state approval and siting process. Attached to these comments is a land ownership for Delaware (please treat as confidential information); as this map demonstrates the Delaware underwater-to-overhead transition point for either proposals 2A or 2B will likely be on land currently owned by the state of Delaware. For proposal 2B, there are multiple parcels of land, owned by a number of public and private owners, which are suitable for the site of the new substation. Unlike other proposals, the 230-kV Submarine Projects are not tied any one particular route or parcel of land and can accommodate different routing and siting outcomes.

Siting and Permitting

Transource agrees with PJM's assessment that the key Siting and Permitting risk factors are either favorable or similar for the 230-kV Submarine Projects as compared to other options. However, we do not think the Public Opposition Risk category adequately captures the overall constructability risks of a new overhead crossing, as discussed above and in our May 6th comments. View-shed impacts is the only consideration highlighted for this category in PJM's summary; Transource strongly advocates that the potential for disruption to this highly active shipping channel and shipping accidents is likely to generate greater public opposition than view-shed impacts.

Operational Impacts

PJM identified "salt spray" as a concern for the 230-kV Submarine Projects. It appears that this concern is only noted for proposals that include 500/230-kV transformers. We have significant experience in maintaining transmission facilities in coastal environments on AEP's western footprint in ERCOT along the Gulf coast, where the dry weather conditions in Texas add to the challenge. Based on

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this experience and understanding of the mitigation methods that are readily available, Transource believes that the “salt spray” concern is not a factor that differentiates the proposed options. We offer the following specific points:

- There are many cost effective ways to avoid outages that may be needed to decontaminate the insulators. Some of the options are as follows:
 - Use of higher Basic Insulation Level (BIL) for insulators that adds more creep distance. Transource proposes the use of Extra Creep 1800 kV BIL insulators for the 500 kV equipment and 1050 kV BIL for the 230 kV equipment.
 - Use of porcelain insulators with Room Temperature Vulcanization (RTV) coating to delay the maintenance cycle of insulator by at least 10 years.
 - Transource will be specifying galvanized steel for the transformer radiator to better manage contamination effects. In addition, cabinets and junction boxes will be built from stainless steel or aluminum to address rust, deterioration and vibration concerns.
 - Energized washing of the insulator using deionized water. The washer needed to perform the task costs approximately \$50,000 and deionized water can be easily obtained. AEP regularly performs energized washing of insulators when an outage is unobtainable. A video clip is included with these comments to demonstrate the effectiveness of this procedure.
- Transource believes that any specialty maintenance of the transformers to address salt spray impacts can be easily aligned with the outage of nuclear plants. This sequencing is common at nuclear switchyards across the country. Furthermore, Transource has proposed two transformers in parallel, so one transformer can be removed from service when needed to perform maintenance without taking the 230 kV line out of service.
- The concern is not unique to transformers and, therefore, not unique to the 230-kV Submarine Projects. Salt spray impacts all equipment in coastal areas with insulators. As a result, circuit breakers, bus bars and even transmission lines are prone to performance concerns due to salt spray.

Final Point: Cost Allocation Cannot Impact the Project Selection Process

We understand the desire of stakeholders to know the cost allocation that will likely result from the selection of a given project proposal, and we understand PJM wanting to fulfill such stakeholder requests by providing sample calculations for various project proposals. We fully support the clarifications PJM provides to stakeholders during such cost allocation discussions. However, we

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recommend that PJM remind stakeholders that cost allocation is not part of the PJM planning criteria nor a factor that PJM is allowed to consider when deciding which project should be recommended to the PJM Board for approval and inclusion in the RTEP.

In that regard, we request that PJM take the extra step of including clarifying language on each slide that presents results from any sample cost allocation calculations that cost allocation is not part of the PJM planning criteria nor a factor that PJM is allowed to consider when deciding which project should be selected for recommendation to the PJM Board for approval and inclusion in the RTEP, irrespective of whether that selection decision involves greenfield (competitive) or upgrade (non-competitive) projects.

List of Attachments:

- Report on Economic Benefits of Salem and Hope Creek Nuclear Generating Stations
- GAO Report
- DOE Report
- Five Articles on 1987 Shipping Accident
- Delaware Ownership Map (Confidential)
- Email from ABB regarding Cable Lead Time
- Link to Maintenance Video regarding Salt Spray