

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

Project Designation Decision

Overall Comments Regarding Designation

Prior to delving into the specifics of the Artificial Island project designation decision, Transource would like to offer some overall comments regarding the implementation of PJM's sponsorship model for competition going forward. In Artificial Island, PJM is faced with making two *distinct* tie-breaking decisions: first, the project selection decision and, second, the project designation decision. This creates the opportunity for PJM to establish two important precedents for its competitive process going forward.

Regarding the project selection decision, we fully agree with PJM's approach to make modifications to the proposed projects to identify the ideal project and ensure that maximum benefits are delivered to PJM's transmission customers. Transource and AEP are equally committed to achieving the same goal. All of the comments provided earlier in this document are based on our comparison of the proposed projects, as modified by PJM.

In contrast, for the project designation decision, PJM must decide between proponents of very similar projects. Transource urges PJM to most strongly consider the relative merit (technical, cost, constructability, developer qualifications, etc.) of the competing projects **as-proposed** rather than comparing the projects after the modifications made by PJM. This will send a strong signal to developers that the relative quality of their work will be rewarded in the PJM process and that the burden is on the developers, not PJM, to get the details right within their project proposals.

A number of the proposals have been *significantly* modified by PJM (major transmission line components removed, connection points moved, station configuration issues corrected). These major modifications represent the correction of deficiencies in the original proposals; this is a key point that PJM should heavily weigh in the designation decision.

Another higher-level comment regarding designation is that it would set a concerning precedent if PJM decided that none of the proponents "sponsored the selected project", based on the modifications made by PJM, and designated the project to the incumbent transmission owner(s). Going forward, it is likely that the majority of competitive project proposals will need some level of modification; for example, this may be caused by certain important information about the layout of existing substations that may not be available to proponents or included in the problem statement posted by PJM at the opening of the proposal window. PJM should not try to create an arbitrary point at which a proposed project shifts from "the proponent's project" to "PJM's project". Rather, as discussed above, PJM should heavily consider the extent of the required modification in the tie-breaking process for the designation decision.

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Comments Regarding the Artificial Island Technical Performance Evaluation Criteria

Transource disagrees with PJM's assessment that "only two of the highest cost solutions worked as submitted". Rather, we assert that certain proposals did satisfy the technical performance criteria defined in the Artificial Island Problem Statement, while other proposals fell short. Only after PJM established technical performance criterion *beyond* the Artificial Island Problem Statement did the great majority of proposed projects fall short and, as a result, need modifications by PJM. We believe this is a pivotal point regarding the project designation decision. PJM should very heavily weigh which proposals, **as-proposed**, did or did not pass the original problem statement criteria. Transource strongly advocates that it would set a very poor precedent for PJM to designate the project to an entity whose proposal did not satisfy the original problem statement criteria, and only meets the criteria after modifications made by PJM.

Specifically, Transource is concerned that PJM is misemploying the language in Manual 14B pertaining to "unity power factor" requirement for assessment of Artificial Island proposals. This criterion as stated applies to new generators requesting interconnection to PJM system. Applying this criterion consistently for all transmission expansions would mean that no generator in PJM is required to provide reactive support to address issues on the transmission system. However, recent queue interconnection studies demonstrate that PJM requires the generators to either provide reactive support by utilizing their over-excitation and under-excitation capabilities or by paying for network upgrades. Similarly, all units in PJM footprint are studied for stability with their reactive capabilities fully utilized.

The most compelling support for our concerns is that none of the proposing entities applied the "unity power factor" criteria to assess the performance of their proposals. Most of these participants are PJM Transmission Owners that helped shape Manual 14B. Clearly, if any of these PJM Transmission Owners had been aware that PJM was consistently implementing this criterion, they would have modified their proposals to satisfy the criteria. For example, Transource considered the addition of an SVC in our original proposal. However, we concluded that the additional cost was not justified given that the performance criteria described in the original problem statement could be met without an SVC. Similarly, we considered the less complex option of interconnecting our project to Red Lion at the Hope Creek Station; but, determined that a complex tie would be needed between the two plants (an issue corrected by adding the SVC at Artificial Island).

As discussed earlier, Transource has no objection to PJM adding an SVC to meet supplemental operational goals as part of the project selection decision. However, Transource would like PJM to clarify that such operational goals were not included in the original problem statement and SVC additions will be considered supplemental improvements to the as-proposed projects.

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Designation Decision regarding the 230-kV Submarine Projects (if applicable)

In the event that PJM selects one of the 230-kV Submarine Projects, Transource should be the designated entity by PJM. We believe that Transource proposals 2A and 2B outperform proposal 5A when considering technical performance, cost and constructability.

Technical Analysis is the most important point of comparison between the competing projects. Our analysis shows that proposals 2A and 2B, as-proposed, pass the original problem statement criteria, while proposal 5A does not pass these criteria without modifications. Our proposals include certain critical design details that lead to this result. These specific details, and the resulting impact on the technical performance of the project, are:

- Double circuit, steel pole configuration with two (2) bundled 959 kcmil ACSS/TW conductors to make a quad bundled, 6-wired configuration. This is pivotal to reduce the overall impedance of the 230-kV line, thus allowing for more reactive support. Furthermore, this arrangement results in a higher surge impedance loading (SIL) which allows the line to produce VARs even during heavy loading conditions. It is imperative that the line performs not only during the light load conditions, but also during the peak conditions that it will be subjected to once in operations.
- Two (2) bundle 1400 mm squared XLPE armored submarine cable that is jet plowed into the river bed at a depth of 10 feet to 15 feet below the mud line. The submarine conductors for each phase will be in the same trench spaced two (2) to three (3) feet apart between same phases. Each phase will be spaced twenty (20) to thirty (30) feet apart. This reduces the impedance of the underwater section in Transource proposal by half compared to that of proposal 5A. A reduced impedance results in higher stability margins as demonstrated by PJM in TEAC materials shared in stakeholders.
- Transource analysis shows that two 500/230-kV transformers in parallel are vital to ensure stability under all possible scenarios. Dominion also proposed two transformers in parallel in proposal 1B, which further reinforces Transource's findings. Our analysis suggests that LS Power's proposal 5A, with only one 500/230-kV transformer, is not stable for the scenarios listed below or would require a very high scheduled voltage to ensure stability.

- [REDACTED]
- [REDACTED]

These key differences between the proposals have been overlooked in PJM's assessments that focus on the technical performance of the proposals after the addition of the SVCs. In fact, even UC

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Synergetic misses the importance of these details and questions their need (Constructability Analysis of Artificial Island Delmarva Peninsula Project Proposals, page 14). We urge PJM to take the time necessary to perform the as-proposed technical analysis against the problem statement performance criteria to confirm our findings about the key differences between proposals 2A/2B versus 5A.

We would also like to address the comment from UCS on page 14 of their report regarding vertical phase spacing:

“In addition, the vertical phase spacing used on the Transource proposed steel pole is 15’, 15’, 10’ with a 7’6” insulator string. In UCS’s opinion, this configuration may not meet the Transmission Owner’s reliability and performance requirements. The right-of-way width for this overhead transmission line section is proposed to be 130’.”

Transource believes the phase spacing is sufficient provided span length and conductor sag limitations observed. However, during detailed engineering and modeling, Transource will adjust spacing as required to meet reliability and performance requirements specified at that time. A reasonable increase in the space spacing will not have a significant cost impact and is well within the tolerances of the preliminary cost estimates provided with the proposal.

Regarding the secondary considerations for project evaluation, PJM has identified outage requirements as a more significant risk for proposals 2A and 2B than for proposal 5A. In reality, the Transource proposals at Salem requires few outages and is more maintainable compared to the LS Power proposal. Transource has proposed a simple relocation of the Salem – New Freedom 500-kV line to a new 500-kV breaker position off the west bus, which can be aligned with a unit refueling outage. Unlike the LS Power proposal, the Transource proposal avoids the need for outage and relocation of unit auxiliary transformers. In accordance with NRC requirements, unit auxiliary transformer and the backup power supply can only be removed for 72 hours at a time, making the LS Power proposal impractical.

Moreover, AEP and Burns & McDonnell engineers believe that LS Power configuration at Salem is not practical as there is not enough room at the existing Salem station for a new 500-kV bay in addition to 500/230-kV autotransformers. The LS Power configuration would cut into the driving radius at the Salem station, making it difficult to maintain or replace equipment when needed. This topic was also discussed in our March 28th comments to PJM that are attached to this document.

As a final point, PJM has identified the LS Power option on a potential site for the new substation as mitigating a risk factor in RoW and Land Acquisition. As discussed earlier, we believe one of the important benefits of the underwater crossing is the routing and siting flexibility it affords for the new facilities in Delaware. The final route and substation site will be determined later in the state siting process. Transource, working with Burns and McDonnell, concluded that purchasing an option on one of multiple potential sites for the new substation would be an unnecessary added cost to the project.

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Designation Decision regarding the 500-kV Projects to Red Lion (if applicable)

In the event that PJM selects the overhead 500 kV line to Red Lion, PJM needs to carefully consider the precedent it will set going forward with the designation decision. As discussed earlier, Transource urges PJM to consider the relative merit of the proposals as-proposed and to heavily weigh the scope of the required modification in the designation decision. Transource's proposal 2C compares favorably to competing proposals when considering as-proposed performance and constructability.

Transource's proposal 2C required the least amount of modification by PJM to satisfy the technical performance requirements. In contrast, Transource believes that several proposals required modifications to satisfy even the original problem statement. In some instances, PJM changed the configuration to address instability for a pair of events that was overlooked by the proposer; in other instances, the inclusion of the SVC improved the performance of the proposals to satisfy the problem statement. Some of the notable changes are as follows:

- In its report, Dominion eluded to adding only one 500-kV breaker at Salem station. In the revised configuration shared by PJM, a modified configuration has appeared with two 500-kV breakers in parallel to address a breaker failure event that Transource identified in our discussion with PJM in March 2014. The addition of the second breaker addresses the stability concerns; however, Transource believes that adding a fourth breaker in a three-breaker string is not physically possible.
- PHI-Exelon, in the submission document, stated its intent to establish a new 500-kV terminal off the East end bus at Salem station. PJM moved the terminal to West end bus as depicted in the CEII document containing the one-line diagrams for various options. This concern was also raised by Transource during a call with PJM staff in March 2014.
- PJM has stated that a second Salem – Hope Creek tie line is not required for proposals by Dominion and PSE&G with the SVC located at the Artificial Island. PJM's configuration of the SVC automatically creates a second tie between Salem and Hope Creek 500 kV yards thus making the Hope Creek – Red Lion 500 kV line stable for all events.

Transource believes that even after PJM's modifications, some of the proposals are unstable or the fixes identified by PJM are impractical. Below are some examples:

- On page 41 of the CEII document distributed by PJM showing the one-line diagram for PSE&G 7K proposal with SVC at Orchard, an outage of Salem – Hope Creek 500 kV line followed by a 1LG fault with delayed clearing on Salem – Orchard 500 kV line will result in instability.

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- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

Regarding constructability, Transource advocates that its proposal 2C offers the most constructible option available to PJM. Specifically, Transource proposal 2C requires only one 500-kV overhead crossing of 5023 line that does not need to occur near the switching yard. In our assessment, making crossings of 500-kV lines near these yards is highly impractical and would require significant outages. Transource achieved this result by the relocation of two 500-kV lines at Salem switching yard, which can be easily achieved during a refueling outage of one of the units at Salem. To our dismay, this relocation of lines was flagged as a serious risk factor in the Project Complexity summary. We strongly disagree with this assessment and advocate to PJM that this configuration was carefully considered to *minimize* the 500-kV line crossings and associated outage time and overall complexity.

Other proposals did not propose similar steps to avoid line crossings near the Salem and Hope Creek yards. For example:

- PHI/Exelon proposal 4A requires crossing of three 500-kV lines next to the switching yards
- LS Power proposal 5B requires relocation of one 500-kV line and crossing of two 500-kV lines next to the switching yards

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- Unmodified Dominion proposal 1C requires significant outages at both Salem and Hope Creek switchyards to establish a new tie between the two stations
- Unmodified PSE&G 7K proposal requires significant outages at both Salem and Hope Creek switchyards to establish a new tie between the two yards.

We are particularly concerned about the treatment of the final two proposals listed by PJM: 'Dominion Red Lion to Hope Creek with 2nd Tie Removed' and 'PSE&G to Hope Creek with 2nd Tie Removed'. By adding the SVC, PJM has removed the highly complicated and challenging tie line between the two yards, which would require more outages than other proposed projects. For purposes of the project designation decision, PJM should not "give credit" to these proponents for issues with their proposals that were fixed by the modification made by PJM. As an additional point regarding these proposals, Transource analysis suggests that these projects are not stable if the SVC is located at New Freedom or Orchard and may only be stable if the SVC is located at the Artificial Island based on the specific configuration of the SVC.

Finally, as discussed above, 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. This situation "looks good on paper", but may not offer any real advantage in the relative constructability of the project.