Via electronic submission

April 27, 2023

Herb Schrayshuen
New York Reliability Council

RE: Orsted comments on NYRC PRR 151: Establish minimum interconnection standards for Large Inverter Based Resources Generating Facilities based on IEEE Standard 2800-2022

Dear Mr. Schrayshuen,

I. Introduction

Please accept the following comments in response to PRR 151: Establish minimum interconnection standards for Large Inverter Based Resources (IBR) Generating Facilities based on IEEE Standard 2800-2022. PRR 151 was developed to address concerns about reliability issues following events in Texas and California; the cumulative magnitude of IBRs in the New York Control Area (NYCA); recent NERC recommendations regarding the adoption of IEEE Standard 2800-2022; and FERC's RM22-12-000 NOPR on Reliability Standards to Address Inverter Based Resources.

Orsted, either directly or through its affiliates, develops, constructs, owns, and operates offshore and onshore wind resources, solar farms and offshore transmission facilities. Orsted is among the world's largest renewable energy companies and the global leader in establishing utility-scale energy projects at sea, including developing more than 28 offshore wind farms and 17 offshore transmission systems. This portfolio includes the world's first offshore wind farm (Vindeby, 1991); America's first offshore wind farm (Block Island); and the world's largest (Hornsea 2). Orsted's current installed offshore wind capacity is 7.6GW with another 3.5GW under construction.

Orsted holds various leases from the US Bureau of Ocean Energy Management (BOEM) (specifically, Commercial Leases of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf) for areas off the coasts of the Mid-Atlantic and New England states. North East Offshore LLC is a joint venture between Eversource and Orsted that is currently developing two projects interconnecting in NYSIO's territory: South Fork Wind (132MW), and Sunrise Wind 1 (924MW). North East Offshore has also proposed Sunrise Wind 2 in response to NYSERDA's 2022 Offshore Wind Renewable Energy Credit Request for Proposals.

As a large IBR developer with over 1 GW of resources in development, and potentially many more on the way, PRR 151 has the potential to directly impact Orsted. Overall, we recognize that maintaining reliability with a grid made up of growing numbers of large IBRs will be challenging and critically important. We realize that standards like IEEE 2800 will have an important role in the grid of the future and we look forward to continued dialog with the NYRC and NYISO on how PRR 151 can improve system reliability.

In the comments below, Orsted offers some specific comments as related to offshore wind resources and some general comments. For offshore wind resources, the complex federal and state permitting requirements and the NYISO interconnection process present challenges for an IBR developer regarding the implementation timing and compliance with, PRR 151. Orsted also suggests that the IEEE 2800-2022 standard incorporate a "good cause" exemption to recognize the use of new technologies that are not able to comply.

II. Comments

A. PRR 151 needs to clearly indicate at which stage of the interconnection process compliance with IEEE 2800 will be mandatory.

Unlike any other generation resources, offshore wind is built primarily within leased federal waters, and as a result of this offshore wind projects are subject to the National Environmental Policy Act[1] (NEPA). The US Department of Interior's Bureau of Ocean Energy Management (BOEM) is the lead federal agency responsible for NEPA's permitting process for offshore wind generation. Developers are required to submit project design details to BOEM for permitting, including the turbine layout within the leased area, offshore and onshore cable routes (including the onshore cable connection to the transmission owner's substation), major equipment ratings, construction methods, and any other project features that could cause visual, cultural, historical, or environmental impacts. Project design submissions also require the inclusion of alternatives to many aspects of the design (including the onshore cable route and mainland landing location, turbine rating, number of offshore wind turbines, and location and number of reactive power compensation stations). These design alternatives are required because the NEPA process includes the opportunity for federal, state, and local agencies, as well as the public, to provide input on a project's design and to provide alternatives for BOEM's consideration. Historically BOEM has relied on input from this disparate set of stakeholders in its determination of a project's final characteristics for permitting approval.

Offshore wind developers face challenges finalizing project design given the potential for project changes due to the iterative NEPA permitting process. These challenges are magnified considering Offshore wind developers also need to proceed through the various stages of the NYISO interconnection process. There is always a risk that a change required by NEPA, may require re-study in the NYISO interconnection process, and any changes required by the NYISO, could require additional permitting steps by BOEM. Because the NEPA permitting

[1] 42 U.S.C. §4321 et seq.

process and the NYISO interconnection process may take many years, Offshore wind developers must engage in these two processes simultaneously.

As drafted, PRR 151 does not provide IBR developers with any certainty regarding at what point in the NYISO interconnection process, an IBR developer must demonstrate conformance. Orsted is concerned that any potential project design changes that may be required to demonstrate compliance with IEEE 2800 may trigger either additional NEPA permitting review or trigger NYISO interconnection re-study. Orsted is concerned that any project design changes that may be required to demonstrate compliance with IEEE 2800 may be considered "material modifications" by NYISO. If this were to happen, there is a danger that offshore wind developers could be caught in a never-ending loop of redesign and restudy.

Orsted requests that the NYRC clarify, with stakeholder input, at which point in the NYISO interconnection process IBR developers will need to demonstrate conformance. This decision point needs to be designed to reduce the potential risk outlined above.

The NYRC and NYISO should provide clear guidance on when compliance with PRR 151 would be mandatory. As written, PRR 151's implementation plan states in item 9:

> "This rule change will be implemented within six months following EC approval of PRR 151 subject to comments received during the 45-day posting process. The six month implementation period is proposed in recognition of the time required for the NYISO, Transmission Owners and Large IBR Generating Facility Owners to develop compliance procedures. However, if a longer implementation period is deemed appropriate per comments received, the objective is to have implementation of PRR 151 complete prior to the next Class Year which would begin after CY2023 is completed."[2]

However, in Attachment A – IEEE 2800 Adoption Document, Section 1 Clause 1.4 the PRR states "General Remarks and Limitations Application of the Standard shall be limited to all projects in the NYISO Interconnection Queue that fall under the Large Generating Facility definition with project capacities greater than 20 MW."[3] Given this inconsistency, there is a risk that the current draft could be interpreted to mean PRR 151 is applicable to all existing projects in the interconnection queue, including those in current Class Years. Having PRR 151 apply to existing projects in the interconnection queue would be infeasible as it would require extensive project redesign resulting in project delays, subsequent restudies, and unanticipated redesign costs.

Therefore, Orsted urges the next draft of PRR 151 to clearly indicate in all sections that implementation would begin in the Class Year following the completion of CY2023.

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[2] PRR 151, Item 9.

[3] PRR 151, Section 1.

B. A "good cause" exemption is needed as part of PRR 151 as the drafters of IEEE 2800 envisioned.

Some technologies used by IBR developers may not be able to demonstrate conformance with IEEE 2800. The standard itself plainly recognizes this fact. IEEE 2800 1.4 General Remarks and Limitations the standard provides:

> "It is not the intent of this standard to limit the adoption of emerging use cases of synchronous machines, for example, the use of a synchronous condenser as a supplemental IBR device to improve the ride-through capability of an IBR plant under extreme contingency conditions. At the time of writing of this standard, neither design details, test data, nor technical literature is available to confirm that these emerging use cases (i.e., synchronous condenser as a supplemental IBR device) will be able to meet all specified requirements of this standard, unless the synchronous condenser exceeds applicable equipment standards, for example, IEEE Std C50.12™ [B60], IEEE Std C50.13 [B61], and IEC 60034-3 [B30] for synchronous machines, including synchronous condensers, and ANSI/NEMA MG-1 [B4] for motors and generators. Due consideration should be given to the benefits and risks of the emerging use cases of synchronous machines in deciding which IBR plant requirements of this standard should be adopted and which may be exempted. This should be done in coordination between IBR owner and TS owner/TS operator not later than the IBR plant design evaluation where capabilities and performance of a synchronous condenser are adequately considered."

Therefore, Orsted recommends that the NYRC amend PRR 151 to clearly establish a "good cause" exemption provision. Under such a provision, IBR developers who incorporate new technologies, such as synchronous condensers, would qualify for a good cause exemption and would not need to demonstrate conformance with IEEE 2800.

C. In order to comply with PRR 151, IBR developers will need accurate and detailed information from NYISO and Transmission Operators early in the interconnection process.

As drafted, Item 6 subsection 1 reads "NYISO's Interconnection Studies for Large (>20 MW) IBR Generating Facilities shall include applicable IBR models, data bases, model validation methods and performance criteria." In order to comply with the intent of this section, IBR developers will need data from the NYISO and Transmission Owners (TOs) early in the interconnection process. For example, IBR developers will require NYISO transmission system models including PSCAD models with accurate data on transmission facilities in the vicinity of the point of interconnection (POI). If IBR developers are unable to obtain this accurate data from the NYISO and TOs early in the early in the interconnection process, they may not be able to comply with PRR 151.

D. Other comments on PRR 151 Attachment A

Orsted is concerned about both the feasibility and timing of implementing PRR 151 in the NYISO interconnection process and provides suggested clarifications to conform these processes.[4]

SECTION 5 – REACTIVE POWER-VOLTAGE CONTROL REQUIREMENTS WITHIN THE CONTINUOUS OPERATION REGION

Clause 5.2.2 – Voltage Control (dynamic performance)
This clause provides: "The voltage control small-signal dynamic performance specified in Table 5 of the Standard shall be applicable when the system short-circuit strength at the RPA is at least 90% of the minimum short-circuit strength identified in the system impact study for a minimum feasible generation scenario without transmission system contingencies (N-0). The maximum step response time for this condition shall be less than 10 seconds."

Because IBR developers and grid reliability will benefit, Orsted recommends that this clause be applicable when the minimum short-circuit strength is identified in the NYISO study process. In addition, this requirement should be applicable to PRR 151 Sections 6 & 7.

SECTION 7 – RESPONSE TO TS ABNORMAL CONDITIONS

Clause 7.2.2.4 – Consecutive Voltage Deviations Ride-Through Capability (ride-through for dynamic voltage oscillations)

The clause provides: "Where interconnection system impact studies for an IBR plant indicate post-fault voltage oscillations repeatedly exceeding the limits of the continuous operating region, the studies shall define voltage ride-through performance requirements applicable to such situations. The IBR plant shall provide the performance thus required."

The clause says that the studies shall define the requirements. Orsted recommends that the standard provides these requirements to avoid ambiguity during the study process and prolonged studies.

Clause 7.2.2.4 – Consecutive Voltage Deviations Ride-Through Capability (energy dissipative device limitations)

This Clause provides: "Where IBR plants interconnected to the New York Transmission System via HVDC transmission apply energy dissipative devices to meet ride-through requirements, the IBR plant interconnection studies shall define the credible magnitude and duration of repeated fault events, within the timeframe of the energy dissipative device's

[4] Orsted's comments here pertain to the existing interconnection rules. However, NYISO is currently in the engaged in a stakeholder process that could result in significant changes to its interconnections rules. Therefore, we reserve our rights to provide additional comments and seek any necessary changes once the NYISO interconnection revision process is complete.

thermal cool-down period, that may be credibly experienced within New York Reliability Council planning criteria and reasonable engineering judgement."

The cluse asks for the energy capability to be defined through the interconnection studies. Orsted is concerned that this could delay the procurement of the HVDC system by needing to wait for studies before a key component can be specified. Orsted recommends that the standard defines requirements for any energy absorption capability.

SECTION 10 – MODELING DATA

In order to comply with the draft provisions contained in Section 10, IBR developers will need access to transmission system data and models. Specifically, the NYISO will need to provide developers with grid/transmission data and models including but not limited to EMT models for equipment within the POI vicinity, and dynamic models for the transmission system prior to the application phase. PRR 151 needs to reflect this need for IBR developers.

CLAUSE 12 – TEST AND VERIFICATION REQUIREMENTS

It is critical that the NYRC and the NYISO not adopt the draft provisions under this section at this time. The testing and self-certification elements of IEEE 2800-2202 are under development and for the foreseeable future, developers will have no way to self-certify compliance with the standard. Therefore, Orsted urges the NYRC to strike in full the existing draft language proposed under Clause 12. It may be appropriate at some future date to consider verification requirements, but at this point in time because the standard is still under development, it would be premature to require compliance.

Before PRR 151 is finalized, Orsted urges the NYRS to work closely with NYISO and stakeholders to discuss exactly how PRR 151 and the ongoing changes the NYISO's interconnection rules are to be interwoven. IBR developers need to have a complete understanding and overview of how the two processes would interplay. As discussed above the timing of these two processes is critical to IBR developers. Given the existing interconnection queue backlog, it is critical that PRR 151 not add unnecessary delay to the interconnection process.

III. Conclusion

Orsted appreciates the efforts of the NYRC to maintain reliability in the NYCA. We recognize that standards like IEEE 2800 will have an important role in the grid of the future and we look forward to continued dialog with the NYRC and NYISO on how PRR 151 can improve system reliability. We intend that the comments provide herein assist the NYRC. Orsted is concerned that without additional clarifications, there is a potential for unintended consequences that will delay the adoption of IBRs. We urge the NYRC to address compliance and verification at an appropriate time in the future when those portions of the standards are available.

Respectfully submitted,
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