



Please direct all responses/queries to:
Renay Sheehan
T: +61 407 427 632
E: renay.sheehan@woodside.com

10 November 2023

Mr James Campbell-Everden
Chief Executive Officer
Pilbara ISOCO Limited
By submission portal

Woodside Energy Ltd.

ACN 005 482 988

Mia Yellagonga
11 Mount Street
Perth WA 6000
Australia

T +61 8 9348 4000

www.woodside.com

INTENDED FOR PUBLICATION

Dear James

RE: Submissions on the Interim Power System Modelling Procedure

1 Executive Summary

Power System model development, assessment, and maintenance are essential for the network connection process, often involving significant time and cost, especially for Access Seekers or Participants who are required to cover the Network Service Provider (NSP) and Pilbara Independent System Operator (ISO) Power System modelling expenses.

Woodside has concerns about the time, cost, and efficiency of the assessment criteria and process. Accordingly, feedback is provided in this submission to assist in refining the Interim Power System Modelling Procedure (Procedure) for all stakeholders involved in the Pilbara electricity market. Woodside's comments focus on clarifying and improving processes related to model validation, exemptions, provision of Electromagnetic Transients (EMT) models, and other issues that Access Seekers or Participants in the NWIS may encounter.

2 Introduction

Woodside appreciates the opportunity to provide feedback on the Interim Power System Modelling Procedure (Procedure) which came into effect on 2 October 2023. As a potential new entrant into the Pilbara electricity market, Woodside supports the development of this Procedure and the further clarity it provides regarding power system modelling requirements.

Woodside is of the view that the Procedure requires some amendment to clarify aspects of the modelling requirements and the overall process for providing and updating Power System models. It is therefore submitted that the Procedure would benefit by providing further clarity for an Access Seeker on the development and updating of models, especially for Power System strength impact assessments. Additionally, the Power System model validation Process and Exemption Process could be enhanced further for the Access Seeker and participant without compromising on Power System safety, security, and reliability requirements.

3 Provision of EMT models

Clause 4.3.2 of the Procedure discusses the EMT model requirements for generation projects and load facilities.

Issue

According to Procedure 4.3.2, the ISO can request EMT models on a project-by-project basis. However, it would be helpful if the ISO could further clarify the circumstances under which an EMT model is required. EMT modelling includes significantly higher levels of details generally resulting in a higher computational burden.

There are some specific concerns regarding clause 4.3.2 that should be addressed as follows:

- **Generators during the connection application stage**
It is important to know the precise requirements for the models that are needed for system strength assessment as it can affect both the design and vendor selection process. While clause 4.3.2 of the Procedure suggests EMT models may be required depending on the SCR

(Short Circuit Ratio) at the point of connection, the Procedure is unclear regarding the SCR that would require provision of these models.

- **Existing Network Participants**
When there are system strength issues, guidance is needed on how to manage generators, load facilities and other plant equipment such as Variable Speed Drives (VSD) that have previously provided adequate Root Mean Square (RMS) models and other relevant information during the connection process. Is there a provision for them to be exempt from EMT model submission if the system had adequate system strength at the time of the connection application?
- **Future connections on the NWS**
If a new connection impacts system strength issues, it is important to clarify how those new connections will be managed relative to existing facilities.
- **System strength impact assessment and response time**
It is vital to have a clear timeframe for an Access Seeker or a participant to respond to situations when there are system strength issues. We suggest the Procedure specify indicative timelines for the completion of any system strength assessment by the NSP and the ISO.
- **Clarity in the extent of modelling required when a change is made to a generation facility**
It is unclear on the extent of modifications that can necessitate updating the modelling requirements. The Procedure needs to specify the extent of modelling required in these circumstances.

A possible approach

The Procedure should provide a clear indication of what qualifies as a low SCR at the point of connection and the technologies that might trigger the need for an EMT model.

The Procedure should clearly define an exemption process for existing generators that are already connected to the system and have a high SCR at the point of connection. Updating the impact assessment process with indicative time frame would assist all stakeholders to work efficiently and effectively.

4 Model validation process

Section 5.2.3 discusses the development of Schedule of Tests for performance verification and model validation process.

Issue

Though this Procedure identifies the key stakeholders and the need for performance verification and model validation, it does not provide clarity on the timeframes and sequence of stakeholder involvement in the development of the schedule of tests.

The Technical Rules have two sets of test requirements: Compulsory tests and Special Tests. The Special Tests are requested at the discretion of the NSP and the ISO. There is no guidance on how these Special Tests are requested and the objectives of the Special Tests.

Section 5.3.1.b discusses the risk caused by the Schedule of Tests on the power system security and stability to other network users. This section does not make consideration for the risks imposed on the facility under test.

It is unclear:

- The process and timeframe to be followed to define Schedule of Tests to be undertaken,
- What is the role of the NSP, the ISO and the Access Seeker during these tests, and
- Number of iterations, possible tests and schedule.

A possible approach

It is recommended that consideration be given to:

- Defining the scope of the Schedule of Tests on a balanced risk-based approach to the network, its users and the Access Seeker's facility.
- Defining a streamlined process with indicative timeframes, roles, and responsibilities for developing, reviewing, and approving the test plan.

- Clarifying the Intent and qualifying requirements for special tests.
- The risks imposed on the facility under test.

The performance verification and model validation process should consider the Access Seekers risk during development of the Schedule of Tests and In conducting the tests, with the aim of ensuring benefit gained are proportionate to the risk incurred in undertaking the proposed tests.

5 Exemption Process

The Procedure is structured to include a Chapter on "8: Special Circumstance", but it does not provide detailed information. It is assumed that Special Circumstances considers Exemptions noted in the Rules.

Issue

Subchapter 3.1 and 3.4 of the Rules note that the ISO is responsible for administering the exemption regime and maintaining an exemption register. The Procedure does not address the handling of any exemptions related to non-compliance of the Rules. It also does not allow for any negotiations on modelling complex equipment especially in cases where a model can only be developed by the equipment's original equipment manufacturer (OEM).

A possible approach

The Procedure should cascade from the Rules and discuss:

- (a) Grounds on which an exemption can be granted.
- (b) How negotiations to modelling requirements will be handled.
- (c) How to apply for exemption.
- (d) ISO and NSPs steps following receiving an exemption application.
- (e) Indicative timeframes associated with the above steps.
- (f) The Procedure should also extend to discuss its applicability regarding the Connection Point Compliance (CPC) applications and how Compliance Monitoring Plans can be used to replace or supersede requirements imposed in the Power System Modelling Procedure.

6 Hierarchy of various documents

ISO to advise the hierarchy of this Procedure over the Horizon Power's power system modelling guidelines.

Issue

- Timeframes for simulation

Clause 4.4.4 (a) of the Procedure states that "The model must include all functional controllers and ancillary equipment that materially affect the performance of the equipment over the typical timeframes of a dynamic simulation (up to several minutes), and accurately represent the performance for all possible conditions where the equipment would be in operation."

The Horizon Power Guidelines 3.3.2 (IBR-10) states models to include controllers and other equipment which affects the response over 30 seconds of simulation time.

It is not clear whether models should be developed to meet the 30 second requirement or the up to several minutes requirement.

- Unbalanced System conditions

Clause 4.4.4 (g) of the Procedure states that "The dynamic model must be suitable for RMS studies at the project specific short circuit levels at the point of connection and should accurately represent the equipment response during and after a system event. This includes active and reactive current injection during a system fault or system frequency excursion. This performance must be achieved under a balanced and unbalanced system condition."

This is identical to Horizon Power Guidelines A-8 and A-9 except for the requirement to accurately represent the equipment response for active and reactive current injections under unbalanced system conditions – Horizon Power Guideline A-9 says it is "highly desirable" (but not a strict requirement) for the model to achieve this level of accuracy.

The response of Inverter-based loads (LCI drives) and future battery energy storage systems (BESS) and solar farms to unbalanced faults can be a cause for concern. This is because some OEM Power Factory models may not be configured to provide an accurate RMS response during unbalanced faults, which is covered in the Power System Computer Aided Design (PSCAD) EMT model.

A possible approach

The ISO to provide hierarchy of this Procedure over other documents and consider updating this procedure to avoid any ambiguity. The ISO shall also consider the cost and schedule implications of these requirements on the Access Seeker and balance it in achieving Power system safety and security.

7 Update of model

Clause 3.2.1(i) of the Procedure requires the NSP to update their network wide model prior to sharing with the ISO each year. Clause 118(2) of the Rules requires the controller to notify the NSP of any material change to a generation facility or consumer facility.

Issue

The Procedure does not address situation whether generators must submit the model for annual review if there are no changes. Additionally, the definition of material changes and the Process to communicate upgrades or replacements are not discussed in this procedure. It is to note that Rule 118.5 states that the power system modelling procedure may specify thresholds, requirements, and procedures for reporting to the ISO.

Section 4.4.43(g) of the Procedure notes that the DigSILENT Power Factory model must match the version currently used by ISO. It is possible that the version used by ISO, NSP and the Access Seeker might be different, resulting in additional cost and time to the Access Seeker to ensure their model integrate with the NWIS model.

A possible approach

The Procedure should be updated to specify thresholds, requirements, and procedures for reporting to ISO as noted in clause 118.5 of the Rule. Additionally, the Procedure should provide examples of the 'material' changes for several types of generation to make it clearer when models need to be updated.

ISO should provide guidance on what DigSILENT Power Factory version the models are to be submitted, how frequently DigSILENT Power Factory Versions are expected to change and how participants are expected to update their models.

8 Simplified Process

Issue

There are several processes that is required to be followed by the Access Seeker, ISO and NSP.

A possible approach

To address the complexity, a unified end-to-end flowchart should be developed and included in the Procedure. This flowchart should combine the standard Power System Modelling stages with CPC Modelling requirements, and clearly outline the process for new proponents to connect to the NWIS (Northwest Interconnected System). Time constraints and expectations across the Access Seeker, NSP & ISO should also be included in the flowchart. Currently, a flowchart exists for CPC Application under the Interim Access and Connection Procedure, but one does not exist for Power System Modelling stages.

By providing a clear and unified flowchart, Access Seeker will have a better understanding of the scope of the project, leading to better resource planning and cost certainty.

9 Conclusion

In summary, Woodside has provided feedback on the Interim Power System Modelling Procedure, highlighting the need for clarification on various aspects of the Procedure. These include providing clearer guidance on the requirement for EMT models, how to manage generators and load facilities in cases of system strength issues, and the model validation process.

Woodside also recommends the need for a defined exemption process and a unified end-to-end flow chart for better understanding of the project scope. Overall, Woodside supports the development of the Procedure but suggests amendments to further clarify requirements and processes.

Should you wish to discuss the matters raised in this submission, please do not hesitate to contact me.

Yours sincerely



Menno Weustink
VP New Energy Australia Pacific