

Minutes

MEETING: Power System Operations Working Group – Meeting 3
DATE: Monday, 11 February 2019
TIME: 1:00 – 5:00pm
LOCATION: AEMO Perth Boardroom – Level 45, Central Park, 152 St Georges Terrace, Perth
TELECONFERENCE DETAILS: Webex details on meeting invite.

ATTENDEES:

NAME	COMPANY / DEPARTMENT
Aditi Varma	PUO
Andrew Stevens	Energy Made Clean
Anlee Khuu	Jackson McDonald
Christopher Wilson	AEMO
Claire Richards - Webex	ENEL
Clayton James	AEMO
Daniel Kurz	BlueWaters
David Bones	GHD
Dean Frost	Western Power
Glen Carruthers	Western Power
Greg Ruthven	AEMO
Huuson Nguyen	Western Power
Jas Bhandal	AEMO
Jenny Laidlaw	RCP
Kirk Reeve	Alinta Energy
Leon Kwek	AEMO
Marc Hettler	Perth Energy
Matthew Fairclough	AEMO
Mena Gilchrist	PUO
Natalia Kostecki	AEMO
Noel Schubert	-
Oscar Carlberg	Synergy
Patrick Peake	Perth Energy
Rebecca White	PUO
Sabina Roshan - Webex	Western Power
Scott Davis	Energy Council
Steve Gould	Eureka Electricity
Wendy Ng	ERM Power
Kaye Anderson	AEMO
Sara O'Connor	ERA
Shane Cremin	Summit Southern Cross Power

APOLOGIES:

NAME	COMPANY / DEPARTMENT
Aden Barker	PUO
Ben Bristow	Western Power
Douglas Thomson	Western Power
Genevieve Simpson	Western Power
Judy Hunter	Western Power
Liz Aitken	Perth Energy
Luke O'Callaghan	Lavan
Neil Chivers	Western Power
Mark Riley	AGL
Paul Hynch	PUO
Stephen Eliot	ERA

1. Confirmation of minutes of previous meeting.

Minutes of previous meeting accepted.

Actions from previous meeting:

Origin	Action	Responsible	Status
16/11/18	Update FOS discussion paper with revised definitions, and request publication on the RCP website, under PSO Working Group		
16/11/18	Members to send any questions to PSO mailbox	All	Closed
16/11/18	Circulate additional Constraints information to members		
16/11/18	Update design outcome wording for AEMO powers		

2. Constraints framework update (AEMO & Western Power)

AEMO has been engaging with Western Power since November 2018 to explore constraints framework and modelling options, hope to use the information presented to help identify those aspects that need to be captured for incorporation into the rules.

National Electricity Rules (NER) do not tightly define constraint variables such as thermal/stability limits, and do not stipulate AEMO due diligence process within the rule themselves.

PSOWG should consider whether there is benefit in WEM aligning with NEM approach or being more specific when considering recommendations in the consultation paper when released.

Modelling variables affecting thermal and stability limits were outlined.

Question: (Daniel Kurz): Due diligence and scenarios - how much conservatism is built into this?

- An operational margin is built into the thermal limit; should be implemented in accordance with a published guideline
- There are multiple sources of error that an operating margin needs to account for: measurement errors, 5-min variance, modelling imperfections (e.g. MW rather than MVA)
- Leon introduced Rebecca White from the PUO who will be working with AEMO and WP on the constraints' framework. Approach to setting margins will be an important focus of PUO rule making (Rebecca from PUO) – would seek consultation and advice on what level this should be set at.

Question: (Patrick Peake): Is due diligence a complete replication or an audit?

- (Clayton James) Not intended to be a complete replication of the Network Operator's work, more of a confirmation process to check that it will function correctly and accounts for appropriate conditions (an initial pass prior to turning on). There is also a subsequent monitoring process that AEMO runs to confirm ongoing validity and effectiveness.
- The level of checking is case by case, depending on complexity of the scenario the constraint is capturing, level of evidence provided, whether this is a new constraint, etc.

Question: (Wendy Ng): Who would monitor the operation of constraints? Is this a different team to the people that perform the initial due diligence?

- (Clayton James) Don't know yet who would do this for WA, the team has not yet been established. This could be one new team covering both, it could be some expanded functions for an existing team (e.g. SM Operational Planning), or could be shared function with NEM.

Question: (Noel Schubert): Transformers have multiple rating limits – short term, normal, overload, etc. These can affect the life of the transformer. What would be used?

- We would likely defer to Western Power to determine the most appropriate rating to use for their assets.
- (Huuson Nguyen) Continuous ratings to be used for continuous ops, abnormal ratings to be used in contingency situations (and system emergency).

Action: PSOWG to provide feedback on level of technical detail preferred in the working group presentations.

Questions: When determining constraint equations are all scenarios equal? How are scenarios weighted? Relating to the reliability/validity of historical data and forecasts, how often do these change?

- Only look at credible scenarios to determine safe limits, and then use the outputs of this to develop a statistical representation of all scenarios and their

safe limits. Limit equations then based on 95% confidence level – exists 5% of the time. Use both historical data and comparison data.

Question (Andrew Stevens): Is there an assumption that a set amount (e.g. 35%) of generation must remain synchronous?

- (Huuson Nguyen) Different generation profiles tested against model.
- (Clayton James) This framework can implement a minimum inertia type of constraint. Currently there are no specific constraints that define a minimum level of inertia for the SWIS, however potential future needs are discussed in the Ancillary Service framework update in further detail.

Questions: Would model be released to market participants?

- (Huuson Nguyen) Participants can request access to copy of network model from Western Power subject to confidentiality agreements.
- (Clayton James) AEMO also has access to this model and could potentially do something in this area, the NEM approach is to provide access to the model for registered participants only. Note that there are various models used for various purposes, and this particular model that is used to support constraint development is the Western Power DigSilent model (encrypted).
- (David Bones) Note that the NEM approach has proven restrictive in the past, in particular when providing access to government bodies, prospective participants that are looking to become registered, and to research bodies (such as universities). Load data in the models has previously been considered “commercially sensitive” by some commercial loads, which has been a barrier in the past around making the model public.
- (Greg Ruthven) AEMO has recently been looking at modifying the rules in this area in the NEM to enable data access for project developers.
- (Clayton James) This is something that will need to be considered further by the PSOWG in developing final recommendations for the PUO.

Questions: (Oscar Carlberg) Does the model have constraints in it?

- (Clayton James) Not specifically, the model has equipment limits in it and the constraints that are developed using the model are then published via the constraints’ library.

Question: (Wendy Ng) Are generator coefficients in constraint equations modelled per generator?

- (Clayton James) Participants can request access to copy of network model from Western Power subject to confidentiality agreements.

Questions: (Patrick Peake): Does Western Power have enough generator data, or will more performance testing be needed?

- (Huuson Nguyen) Western Power has complete data set, but some based on very old tests. Would be good if market participants could provide their continuous performance monitoring program to update variables. Would like to validate, especially for those generators that haven't been tested in some time.
- Post-event, data recorders throughout Western Power grid allows for assessment/review.
- (Mena Gilchrist) PUO hopes to bring something to working group around April on roles and responsibilities relating to generator performance standards.
- (Clayton James) In addition to validated modelling data being essential for ensuring the power system can be managed security, worth noting that greater confidence in the model = reduced conservatism; lower confidence = more conservatism.

Question: (Dean Frost) Do constraint equations leverage against run-back schemes? What are the benefits to the market to continue with run-back scheme? Could run-back schemes be considered a type of ancillary service?

- (Clayton James) Constraint Equations do leverage existing runback schemes, existing schemes can offer a benefit as they are typically designed to operate “post-contingent” rather than constraint equations which operate “pre-contingent”, so allows generators to export for longer while still maintaining security. Hence constraint equations must be carefully built to consider the scheme in place.
- (Huuson Nguyen) Existing runback schemes intended to be retained. Western Power identified that they have limited room to introduce additional run-back schemes – these are much more complex to introduce than when initially implemented as they tend to operate over multiple generators.
- (Clayton James) This poses a risk to system security and reliability in terms of ensuring appropriate coordination of the schemes, correctly modelling their effects, and just simply the overall quantity of MW being run back for any given contingency.

AEMO publishes a lot of information around constraint operation and performance in the NEM. These are available from: [Congestion Information Resource](#). These are used by participants (and prospective participants) in the NEM to support analysis on where best to build facilities and to support other commercial decisions (e.g. negotiating with a network operator to enhance network). Tools and systems have flexibility on the publishing of data: PSOWG to consider appropriate publication.

Recommendation: (Dean Frost) It would be good to hear more information on potential operational applications in future working groups, such as operation under outage conditions and what happens when a constraint is ineffective.

3. Primary Frequency Control Modelling (AEMO)

Presentation intended to provide a brief overview, with greater detail to be released in the near future through notes and paper.

Message: AEMO is able to manage frequency security currently in the power system.

- But currently reliant on characteristics/operation of Synergy portfolio; with open bidding and market, a new approach is needed.
- NEM approach to certifying Raise 6sec service (double the avg energy increase in first 6s) would not be sufficient for current WEM - need a better early response, potentially including a combination of both 2sec and 6sec response to maintain security and to avoid under frequency shedding.

Discussion to clarify meaning of primary/secondary controls.

Comment: (Glen Carruthers) The terms PFC/SFC originally came from the UK where they were used to describe the operation of traditional steam turbines where manual intervention was required to input more fuel into the boilers to maintain or increase response.

Question: (Jenny Laidlaw) In terms of the PFC response, is this intended to cover interruptible loads?

- (Clayton James) yes although the interruptible loads operate in a different way (by frequency sensing relays), they are designed to operate prior to reaching the frequency nadir, so would tend to fit the PFC timeframes. The intention of structuring the definitions will be to ensure that no particular technology is excluded from providing a response.

Question: (Andrew Stevens) In scenario discussed, can we model what droop response we should have received vs what we did?

- Leon Kwek confirmed that this was possible, and could be demonstrated in this presentation. He noted that Western Power has a very good fleet of high-speed recorders on the power system which provide valuable data to AEMO for monitoring security and validating power system models. In the example shown, droop accounts for a very small proportion of the overall response.
- Compliance in the future will be increasingly relevant.
- Need to understand what the power system needs and what is available.

Comment: (Clayton James) It is possible to see that this approach generally lends itself to being solvable via an optimisation mechanism.

4. Ancillary Services Modelling Update (GHD)

David Bones noted that analysis done was applicable to current FOS, but generally translates. Assumption made that this can be extended for any future changes in the FOS.

Based on previous information provided it was noted that both 2s and 6s response is required - in future, it may be beneficial to set the two independently, and differentiate the value of them.

Question: (Huuson Nguyen) Has GHD considered PV response in the model?

David Bones confirmed that this had been considered, but possibly more useful to build into discussions around operational margins

(David Bones) general comments on whether there is benefit in PFR and SFR being differentiated - contingent on whether there are low-cost providers of one but not the other, something that requires some further economic analysis

Comment: (Andrew Stevens) Thought should still be given as to whether a mandatory droop response should be paid, as it creates additional hardship on the participants' facilities and an increased compliance burden.

David Bones – potentially a modified compliance arrangement is appropriate to consider as well, given the overall benefit of mandatory droop to the power system

(David Bones) Note there is a typo on slide 22, this should read +/-0.025Hz. This will be corrected prior to distribution of slide packs.

Question: Is there benefit in knowing the load relief factors more specifically.

David Bones confirmed that this is something that can be refined over time but is difficult to assess without reviewing actual incidents. This is much more possible now given AEMO has access to Western Power fault recorder data.

Discussion around DSM vs Ancillary Services and lack of equity in costs of maintaining/meeting obligations. If there is no reward but significant compliance costs, this creates an issue.

Comment: (Patrick Peake) suggestion that DSM will once again receive common capacity price with generators, but not subject to such onerous obligations as droop control.

Jenny Laidlaw - inconsistent/grandfathered obligations for generators could also be viewed as inequitable.

Question: (Patrick Peake): can RoCoF limits be built into dispatch engine?

Clayton: Should be able to build into 5-min dispatch process.

(Huuson Nguyen) Western Power currently reviewing its UFLS design to operate at higher RoCoF. Noted that GIA connection process has considered system strength

5. Meeting Close: 5:00pm