MINUTES | Control Room Operations Working Group | CROWG | Meeting No.3

DATE: Thursday, 31 March 2022

TIME: 09.00am – 12.00pm (AEST/QLD time – please note daylight savings)

LOCATION: MS Teams Meeting – Refer to the meeting invitation for details

ATTENDEES:

NAME	INITIALS	COMPANY
Mario Rositano (Chair)	MR	AEMO
Alexis Bowman	AB	AEMO
Adrian Holder	AH	Energy Australia
Alan Jenkinson	AJ	AGL Loy Yang
Ali Walsh	AW	SA Power Networks
Allison Starkey	AST	Energy Australia
Aren Sears	AS	SA Power Networks
Bashar Derbas	BD	AEMO
Brent Glover	BG	AEMO
Brett Harrington	BH	Energy Australia
Brian Nelson	BN	AEMO
Callan Masters	CM	AEMO
Christopher Migocki	CM	AusGrid
Clydie Cox	CC	AGL
Colin Sharp	CS	TasNetworks
Colin Taylor	CT	ElectraNet
Craig Mcmanus	CMC	Energy Australia
Daniel Lavis	DL	AEMO
Darcy O'Bree	DO	Energy Australia
Darren Spoor	DS	AEMO
David Gray	DG	Energy QLD
David Molla	DM	Energy Australia
Dean Jackson		
Doug Deans	DD	ElectraNet
Duane Brooks	DBR	ElectraNet
Dylan Reynolds	DR	AGL
Ed Sellwood	ES	PowerLink
Gary Paterson	GP	AGL
Gayle McAllister	GMC	Energy Australia
Graeme Bowey	GB	AustNet Services
Grant Matheson	GM	AGL
James Ley	JL	Energy Australia
James Sherrin	JS	Hydro Tasmania
Jason Causer	JC	Endeavour Energy

NAME	INITIALS	COMPANY
Jennifer Cordina	JCO	Energy Australia
Jeremy Sheather	JSH	Energy Australia
Jonathan Carroll	JCA	Origin Energy
Ken Harper	KH	AEMO
Kerri Slatter	KS	AGL
Kevin Barnard	KB	ElectraNet
Leanne Maurice	LM	PowerLink
Malcolm McNicol	MM	AEMO
Marc Farnsworth	MF	Energy Australia
Mark Pollock	MPO	AEMO
Martin Cavanagh	MC	AusNet Services
Michael Kellond	MK	Energy Australia
Mike Griffiths	MG	Origin Energy
Neil Grigg	NG	Energy Australia
Paul Clark	PC	AGL
Paul Crowder	PCR	Energy Australia
Paul Elliott	PE	AEMO
Paul McNamara	PMC	AGL
Peter Moretti	PM	Energy Australia
Peter Sanderson	PS	AEMO
Phil Gay	PG	AusNet Services
Raj Ippiliappiah	RI	AEMO
Rod Joyce	RJ	Endeavour Energy
Rodney Willis	RW	Energy Australia
Samuel Oosterholt	SO	SA Power Networks
Shane Corney	SC	Energy Australia
Simon Bolt	SB	Delta Electricity
Simon Bolt		
Stephan Laucht	SL	AGL
Stuart Cariss	SCA	AGL
Tim Gray	TG	ElectraNet
Tony Stanczak	TST	Delta Electricity
Vedran Kovac	VK	Hydro Tasmania
Vijay Kumar	VKU	Energy Australia

GUESTS:

NAME	INITIALS	COMPANY
Rajesh Arora	RA	Aecom
Adam Budzynski	ABU	AGL
Derek Dymond	DD	BayWa r.e. Australia
Shouvik Mukherjee	SM	BayWa r.e. Australia
Jose Fortes	JF	CWP Renewables
Jo Hume	JH	Fulcrum3D

NAME	INITIALS	COMPANY
Tony Saker	TS	Goldwind
Paul Vickers	PVI	HARD Software
Stephanie Easton	SE	Iberdrola Australia
Hal Jorgensen	HJ	Neoen
Sam Gard	SG	Res-group
Peter Veljkovic	PV	RWE Renewables Australia

APOLOGIES:

NAME	INITIALS	COMPANY
Caroline Ferres	CF	AEMO
Lenard Bayne	LB	AEMO
Rob Krueger	RK	APA
Nathan Everitt	NE	BayWa r.e. Australia
Adrian Pang	AP	CWP Renewables *(Moved to VIOTAS – Market Ops Lead – Feb 2022)*
Henry Rich	HR	Delta Electricity
Russell Gordon	RG	Energy QLD
Harley Mackenzie	HM	HARD software
Robert Chapman	RC	Origin Energy
Brett Wills	BW	Origin Energy
Ellise Janetzki	EJ	Overwatch Energy
James Tetlow	JT	Overwatch Energy
Jonathon Dyson	JD	Overwatch Energy
James Fuller	JFU	Overwatch Energy *(Moved to AGL – Energy Trader – Feb 2022)*
Duncan Griffin	DGR	PowerWater
Michael Edmonds	ME	SA Power Networks
Ron Logan	RL	Shell Energy
Michael Paine	MP	Snowy Hydro
Brad Perry	BP	Stanwell
Darrell Backford	DB	Terrritory Generation
Bradley Shipp	BS	TransGrid *(Retired)*

1. Welcome and Introduction

1.1. Roll Call completed via MS Teams - MR

- Participant Welcome
- Apologies accepted from various members who were unable to attend

1.2. Purpose and Objectives of Meeting - MR

- Continue discussions on topics raised during previous meetings
- Provide updates on status of work
- Forum to share ideas, experiences and matters relating to working in a control room.

1.3. Introduction of New Members and Guests - MR

- From AEMO
- Guest Members for the meeting include:
  - Josh Shepherd and Bensil Paul from BayWa r.e. representing Nathan Everitt
  - Samuel Oosterholt from SA Power Networks, representing Ali Walsh
  - Jonathan Carroll – Operations Manager, Main Plant - Origin Energy, representing Robert Chapman

2. Minutes / Actions

2.1. Review of previous Minutes

- Minutes of November meeting accepted by

2.2. Updates to Actions Register

- Open and closed Action Items reviewed and status updated.

2.3. Survey Feedback

- Need to collate

3. Rotating Chairing Duties

3.1. Rotating the CROWG Chairing Role

- MR has chaired the CROWG meetings since inception in June 2019.
- Discussion around envisaged model for chairing future CROWG meetings:
  - The role would be rotated through AEMO and TNSP representatives.
  - This would enhance development of the group, maintain currency and provide multiple facilitation approaches.
  - Inform the evolving nature of the group as a sustainable, collaborative 'Industry' forum.
  - As per the CROWG TOR, AEMO will continue to provide Chair and Secretariat duties, however facilitating future meetings can be lead by nominated TNSPs.

3.1.1. Member Discussions and Questions

- ES - PowerLink – Agree and happy to take on the facilitation role. Happy to have the ongoing support of the Chair and AEMO for the Secretariat role.
- CS - TasNetworks – Agree to take on the role.
- TransGrid – Will take it on notice – Brad Ship has retired and they are looking for a new representative, so will get back to you.
- DD - ElectraNet – Will have to discuss with Duane Brooks – to have continuity they need to have the participant run it. Happy to support that direction. TransGrid recognise the effort that goes on behind the scenes
- DB - ElectraNet– In agreement with DD and happy to support the rotating role.

3.2. Potential Changes to the TOR

- Changes to the document
  - Are members happy with the TOR?
  - Use of "guest membership" for "Intermittent Generators"?
  - Should Intermittent Generators be included under the banner of "generators"?
  - Generator Summary Pages look very different to 5-10 years ago.
  - Opinions and comments sought from intermittent Generators?
  - Are Intermittent Generators happy to continue participating as guest members of the CROWG, while we have relevant topics on the Agenda?
  - Should this arrangement change? It is not certain that it can be changed, however opinions from Intermittent Generators and other members are sought:
- Intermittent Generators are part of a guest membership arrangement.
- MG – Origin - Big changes in the future relating to generation answers that question.

- ABU - AGL – There will be more participants in the future.
- SE - Iberdrola – Seconds that the distinction between the types of generators is no longer required in this context. It depends on the type of participation that you want the generators to have for this forum.

ACTION: MR – Draft an adjustment to the CROWG TOR. Seek member review and feedback. Submit endorsed update to the PSSWG – Darren Spoor.

3.3. Other

- Items to consider for inclusion in future CROWG meetings:
  - Guest Speaker – Expert in Control Related Field (Situational Awareness, Information Visualisation, Shift Work, etc,) due to huge workloads this is often not a focus so it would be good to engage an external expert.
  - CROWG Contacts list –
    - A better format is required to enable members to utilise/access the experience/talent on hand.
    - Better maintenance of currency and accuracy.
    - It is currently quite fluid and great for members to be able to easily contact each other.
  - Activity – Short video followed by group discussion. An agenda idea that is different to current agenda items and allows the group to discuss control room related topics –
    - Members were asked to suggest ideas.

4. Electricity Terminology and Phraseology

4.1. System Restart Document Update

- The document was used during recent Victorian System Restart training.
- Document requires minor updates, which will be completed and the updated document distributed to members.

ACTION: Complete minor amendments for the System Restart document and distribute updated document to members.

- There are lists of Industry Forums and Working Groups on the AEMO website, however the CROWG update has not been published as yet and is currently missing.
- The System Restart document may be published in the same location as the Industry Forums and Working Group lists on the website.

4.2. Emergency and Time Critical Document Update

- Due to the mini-workshop held last meeting, the document has progressed.
- Thanks given to all that have contributed with updated.
- Updates are currently being collated and transposed into a format similar to the System Restart document.
- An update to the document will be distributed with the meeting minutes.
- To enable finalisation of the document, members should review the spreadsheet and advise by email, if there are any terms or definitions that should be added or updated.
- A meeting of the EITP Sub-Group will be scheduled to finalise the document.
- The final document will be submitted to the PSSWG for approval.

ACTION: MR to ensure update to Emergency and Time Critical document is distributed with meeting minutes.

5. Intermittent Generator Related

5.1. Constraints Binding Update – Ken Harper / Ben Blake / Ros Gillet / Brian Nelson

- AEMO has commenced requesting TNSPs to nominate a single cap on each wind farm, which can be implemented as a local limit by each participant. It also needs to capture outages as well.
- Brian Nelson outlined the status and progress

- Problem of the semi dispatched cap being released. For example, if cloud forms over a farm and then as soon as the dispatch instruction is given, the clouds dissipate and the farm suddenly becomes sunny and returns to working as normal.
- That is beyond the scope of NEMDE and the Central Dispatch process to manage.
- It has been decided to manage the local limits on the farms themselves.
- The AEMO Congestion Management Team have commenced asking TNSPs for their upper limits. They can then apply these local (SCADA) limits that get taken into account and are implemented by the farms.
- This will be more effective in stopping solar farms taking off, simply because the dispatch instruction disappears.
- Another option being considered is to send notices to participants to advise they are well off target. The problem with this option is under the current rules, they are permitted to go well off target if it gets really sunny or windy. Their renewable resource allows them to move up.
- As it is not able to be managed by the Central Dispatch process, if it can be managed by the connections process, which is a more reliable and effective way of doing it.

5.1.1. Member Discussion and Questions

- SE – Iberdrola – As discussed at the last meeting, the problem is when a semi-scheduled generator is unconstrained in a constrained dispatch process, it potentially turned up another generator. The concept of 'Is there an upper limit on all the generators that make up a constraint, that can be set and forget?' Generators compensate to some degree each other. What is the thinking initially from internal AEMO teams as to where those limits are going to be. There will be technical questions around whether definition updates or control system updates to implement the local limit as expected. From a dispatch point of view, is there a megawatt upperlimit that does hold that each individual generator would each generator within these constraints?
  - BN – AEMO – No there is not. The Context of this is individual wind farms and Solar farms that were in the position where they were going to exceed the local limit on their Plans, AEMO has been working with TNSPs to work out what the maximum is at that particular time. If there are more complicated constraints sitting in the middle of a power system, this process will not really help with that. AEMO do not have a solution for that at the moment and it is a good point to raise.
- SE – Iberdrola - Knowing that NEMDE cannot plan for the unexpected and this sounds like it is something unexpected that happens, relative to NEMDE's view of the world, however when the forecast output of the generator is not expected to be an issue for that constraint and the constraint no longer binds, then essentially there is no semi-dispatched cap provided. Could the semi-dispatched cap still apply if the constraint is close enough to binding? That would enforce the expectation on that generator.
  - BN – AEMO – Not under the rules. There has been a lot of thinking around this and a possible option to explore is 'head room' for participants. During internal discussions and some participant discussions, it was initially concluded that it is a very complicated thing to get to work and as there would be supplementary caps , it would be problematic trying to get it understood. The feedback received so far is that the sort of scenario where there is a constraint, with lots of generators involved and everyone is captured by it, there has not been a lot of those types of things creating problems. At the moment, it is not a problem that Brian has been asked to solve and he will deal with the one unit one constraint problem first and then this issue can be looked at. A solution is not apparent at the moment.
- ABU – AGL – It comes down to knowing and understanding your plant from a control room operator perspective, so if you are exposed to a semi-dispatched cap it is critically important about having precise and concise communications to those locations. NEMDE only looks at the next five minutes. It is not looking at the next ten to fifteen minutes. Make sure if there is an SDC applied, you should how your plant is going to perform coming out of it.
  - BN – AEMO – Agreed. The whole SD concept did not consider these.
- SE – Iberdrola – There is not clear space in the rules for generators to implement an upper limit that is not communicated through the Central Dispatch process, goes against the rule change that was made in 2021. Once TNSP and DNSP limits are excluded, that might work, but how that gets implemented, tidied up and communicated back to the market is critical for the market to function efficiently.

- BN – AEMO are trying to solve this as a network connections problem, rather than a dispatch problem. However, it will not take long before these become dispatch problems, with multiple generators in the one constraint.

- DD - BayWa r.e. – It was mentioned about cloud going over solar farms, is there also an issue with wind gusts at wind farms? There are a number of renewables that use self-forecasting e.g. sky cameras, for exactly this situation. Have you seen this arrangement assist with overcoming this issue when sites are connected to it?
  - BN – AEMO – Yes, it is a manifestation of multiple things that renewable resource is included to do some variable things that cannot always be expected to be controlled. These sorts of practical impacts have not been considered in the design. AEMO's experience is that participants self-forecasts are often better than AEMO forecasting, as they are more focussed on their local environment, rather than a national focus. A 'Watch and Act' arrangement at the moment, with more focus in the future. This is a solution for a particular problem at the moment and will not solve everything.

5.2. Other Business

- PC – Loyang – Security in comms – Loyang has a list of numbers programmed into their phones that identify Loyang to AEMO and same in return. A comms protocols update was also received a few months ago. How do operators believe who is making the contact, as anyone could get these numbers and direct operators to do something as a hoax. Depending on the consequence of the action, is there work in that space that should happen, even down the track?
  - MR – AEMO - Personally experienced issues with prank calls, fishing for CR information. They have been trained in the signs of what is going on. If we receive a call from a TNSP or generator that there is a fire or a plot line has come off, how does an operator know it is genuine.
- CM - AusGrid – Agreed. Practices could be implemented to call back if it is suspicious, but if a call is received, urgently asking for a reduction in load, if there is someway to use technology to verify the call, it would save time there as well.
  - MR – AEMO - being confident of who is talking at the other end of the line is a common theme and would assist during emergencies.
- SB - Delta – If the direction is to participants, it would be coupled with a market notice, but there is not the same solution for the reverse?
  - MR – AEMO - If there is no market notice or we need to get the ball rolling before the notice goes out or the constraint is issued, we cannot get the notice or constraint out instantaneously. The person on the other end of the phone needs to be confident that it is AEMO calling to issue the direction and carry out the request.
- JS – Hydro Tasmania – Not being able to see the caller ID and not recognising it, operators have to rely on verbal – Hydro Tasmania have dabbled with pass phrases before but that can have issues. Technology would be a better way to deal with the problem and is a well overdue potential solution..

ACTION: MR to raise the security in comms issue with PSSWG / Darren Spoor to see how we can progress this forward..

6. Presentations

6.1. This item will be revisited at the next meeting, as there were no presentations delivered.

7. Summer Readiness and Related – Bashar Derbas

7.1. Update from members

- Bashar Derbas provided an update and summer recap, including AEMO system events over the last summer, NEM Weather Outlook, predictions from the BOM and Future Challenges.

7.1.1. Member Discussion and Questions

- ABU – AGL experienced 4-5 days in a row at Silverton at 36 degrees plus, which did impact the wind turbines. It is more of a cumulative, day after day, followed by a rapid drop in temperature, that causes problems.

- MR – AEMO – Are there any comments around the older assets in place, in regards to their protection systems?
- PG – AusNet – Most issues experienced by AusNet are with the newer digital protection schemes. The older analog schemes tend to be more robust.
- CM - AusGrid – Something that is seen increasingly on AusGrid's network, is oil pressure monitoring on the fluid filled 132kV cables. Recently there have been reduced resources to be able to respond in a short amount of time, to low oil pressure alarms, on whether it is telemetery, or if it is a real oil leak. so the cables are being de-energised. Generally, it is a telemetery issue and thre cables can be returned to service, however as this is something that is increasingly happening on the network, it is becoming more of an issue.
- DD – ElectraNet – The shoulder seasons are becoming the hardest to organise planned outages, due to increased DPV. Outages have to be done in summer and winter, as they are the only times available when the load is high enough. That may drive short term planning issues, as we are unable to plan in the middle of summer when there are really hot days.
- ABU – AGL – With the outage assessment becoming more complicated, the TNSPs are to be congratulated, particularly PLQ and TransGrid. With some of AGL's assets certain information for inverters connected for semi-scheduled plant in those regions was lacking. Now it is clear and concise in the outage notifications about what is expected from the sites. Makes it easy for AGL to make the necessary arrangements. Getting this information with the PCN's that really helps. Similarly, AGL has a good relationship with TNSPs and DNSPs we are connected to and are very active when something needs clarity.
- MR – AEMO – It is hoped that this senitiment is echoed across the TNSPs, DNSPs and Intermittents.

8. Communications

8.1. Update on NEM Guideline on the Requirements for Operational Communication

- Bashar Derbas provided an update and summer recap, including AEMO system events over the last summer, NEM Weather Outlook, predictions from the BOM and Future Challenges.

- Scope of this Guideline will include the:
  - Use of mobile phones for control room contacts
  - Use of call-menu options to reach control room contacts
  - Language requirements for control room contacts
  - Reliability and quality of voice audio
  - Training Requirements (eg: acknowledgement of the agreed Phraseology)
  - Expected SLA's:
    - Answer within 30 seconds
    - Respond within 15 min

The group discussed the potential scope of a guideline to define industry best practice, with the following topics and recommendations:

- Use of mobile phones for control room contacts:
  - NEOEN noted that mobile phones provided a useful emergency contact in the control room. However, this specific mobile phone has access to multiple cell towers and is on a different network to the primary point of communications.
  - Ausgrid noted that personal issue mobile phones should not be primary contacts. Several problems have been experienced with the use of these as primary points of contact.
  - Ausnet stated that the use of mobiles as a backup can be acceptable, but not as the primary point of contact.
  - Powerlink further commented on issues with mobile phones when people are on leave.
  - Hydro Tasmania then referred to the loss of fibre on the 1st March 2022. In this case, the mobile network became heavily compromised.
  - The group discussed the use of 1300/1800, which are patched to mobile phones could be configured to work. However, these require caller ID's to be relayed in both directions to assist in authentication. The relaying of numbers must also be robust and correctly configured.
- Use of call-menu options to reach control room contacts

    - Consistent view from the group was ‘no’.
- Language requirements for control room contacts
    - Consistent view from the group was the requirement to be fluent in English.
- Reliability and quality of voice audio
    - Consistent view from the group was the audio channel should be intelligible.
- Training Requirements (eg: acknowledgement of the agreed Phraseology)
    - The group agreed that training on an agreed phraseology should form part of standard training for operator or controller positions.
- Expected SLA’s:
    - It was agreed that the objective should be to answer an incoming call within 30 seconds. At the very least, the call should be answered within no more than 5min.
    - The recipient of a call should initiate a response in the network within 15 min for any system security related requests, instructions or directions in accordance with Clause 4.2.6
- Annunciators
    - When used, the length and complexity of these calls should be minimised. As an example “This call is being recorded”.

Proposed Standard for Operational Communication in the NEM:

(for comment at the next CROWG meeting)

- Primary operational contacts should be established via direct connections through a PSTN.
- The use of mobiles as a primary contact may only be considered for participants that are not covered by the requirements of the system restart communications protocol and where there is a dedicated 1300/1800 number which automatically connects to a prioritised list of recipients. If so, caller IDs must be correctly relayed such that correct call-back details are maintained. This requirement also ensures that caller authentication can be maintained. The call connectivity must also be robust.
- Backup operational contacts should also be established via direct connections through a PSTN, but can include mobile phones if the phone is located in an area of reliable coverage to more than one carrier cell tower, and is on a different network to the primary number
- Call menu options are not appropriate for operational communication and points of operational contact should be established via a direct number to the relevant operator or controller.
- The operators or controllers in the NEM must be able to speak English.
- The physical voice communications channel must have low distortion and noise, such that the communication is intelligible.
- Operators/Controllers in the NEM must comply with the agreed phraseology list defined by the CROWG in 2021.
- The objective is to answer any incoming call within 30 seconds. At the very least, incoming calls must be answered within no more than 5 min. The recipient of a call should also initiate a response in the network within 15 mins for any system security related requests, instructions or directions, in accordance with Clause 4.2.6.
- Call system annunciators are commonly used to advise callers that the call is being recorded. When used, the length and complexity of these annunciator messages should be minimised. For example, the following annunciator message is deemed appropriate: “This call is being recorded”.

9. Shift Work – Bashar Derbas

9.1. How to make shift-work more “appealing” – Round 2

- BD – AEMO – Delivered a presentation and led discussions around ‘How to make shiftwork more appealing. Including current challenges of location with most controllers being assigned to a specific location and not able to work remotely, fleixble hours and how this arrangement is often not possible with operators.

9.1.1. Member Discussion and Questions

- MR - AEMO – A challenge is to make the roles more appealing and consider staff retention. The role needs to be fulfilling.

- CM - AusGrid – During lockdown, AusGrid looked at some CR activites that could be completed offsite, from a COVID point of view. Tasks were limited to allocation and rostering for various upcoming work activities. Almost all other tasks needed to stay within the control room. Majority of AusGrid's support staff were able to work from home and this caused some friction.
- MG – Origin – Currently transitioning into a hybrid model of working from home and from the office.Day shifts are in the office, night shifts and weekend shifts will be done from home. It has worked really well. Provided UPS at home to combat blackouts – changed the mailover philosophy but has generally worked well and improved employee's lifestyles in having more flexibility. Great for a safety perspective – long drives at night are avoided.
- HJ - Neoen - are there any requirements as to where operators need to work due to travel commutes? In SA there are 'Journey to Work' requirements. Organisations are responsible for their employees from the time they leave home until the time they return.
    - MR – we know that IT services have to be within 20 minutes of the control room, but there is not a fatigue management control around the commute to and from work.
- JS - HydroTas – When operators are called at night to attend shut downs or plant failure, in most scenarios a fatigue calculator is used on their behalf prior to calling. There is a safety KPI stating that operators must take a cab to and from night shift. There is also bedding on the trading floor and we have moved from single man to two man night shifts.

ACTION: MR – Sanctioned Fatigue Management Breaks for Pilots – Mario will distribute information about this and other Fatigue Management information.

ACTION: PC – Loyang – To distribute Fatigue Management information to members.

- JS - HydroTas – Another issue is onboarding of new staff. If training could take place prior to commencing, or by someoneone other than an onshift operator, this would have a positive impact on Operators' fatigue.
- MR – AEMO – Dan Lavis and the RTO Training Team, in consultation with the NEMOC and industry representatives, have produced a National Training Framework for Power System Operators. The Framework is a suite of Professional Development non-accredited modules, that will fill in skills gaps and provide a baseline of knowledge for operators. The Framework could be used as a semi-curriculum, with learners undertaking their relevant stream's modules from start to finish, or it could be used on a pick-and-choose basis. NEMOC has endorsed progress and the next steps are to engage suitable RTOs to develop and deliver the 'Fundamentals' level of modules. This item will be tabled at the next CROWG, so that further detail can be provided to members.

ACTION: AB – AEMO – Arrange with Dan Lavis, RTO Training Manager, to present further details on the National Training Framework for Power System Operators, publishing the Final Industry Consultation Report, timelines and next steps.

9.2. Rosters – Round 2

9.2.1. Member Discussion and Questions

- PC – Loyang – At Loyang there is a large sample size of operators, with over 100 per station on shift. A lot of work has occurred in the Shift rotation area. Operators did night/night/day/day on the 12 hour shifts ultimately, after doing 8 hours. A lot of opposition to that. The arrangement was then changed to day/day/night/night and that was a lot better received.

10. Control Room Technology and Ergonomics (Bashar)

10.1. What are the latest upgrades, ideas, proposals, projects, etc.

10.2. What currently works and what issues have been experienced

11. COVID-19 (Bashar)

11.1. Update from members

12. Other Business

12.1. Feedback/survey

To inform future meetings, members are asked to complete and submit their feedback.

Mario,
Kevin Bernard from ElectraNet asked about the Macquarie Uni assessment tools that are used for controllers. Listening skills, situational awareness, human factors – have any other TNSPs utilised it and what is their feedback?
Bashar discussed the Monash University study which was similar, however this one is from Macquarie university. I then mentioned that the RTO Training team are working with Thomson Bridge (RTO) and Mark Higgins of Macquarie University to develop 'Human Factors' training for operators. This was more along the lines of what Kevin Bernard was discussing. Did we need to minute this question and do we need to discuss anything about it at the next meeting?

13. Next Meeting…

Meeting Forward Plan

Date	Host	Location
Tuesday, 19th July 2022	TBA	TBA

14. Meeting Close…

- Meeting closed at 1.08pm