

# **PROGRESS REPORT – IMPLEMENTATION OF RECOMMENDATIONS FROM INDEPENDENT INVESTIGATION OF ALICE SPRINGS SYSTEM BLACK INCIDENT ON 13 OCTOBER 2019**

Published in accordance with section 6(1)(h) of the *Utilities Commission Act 2000*

*27 February 2020*

## Table of Contents

Table of Contents .....	1
PURPOSE OF THE REPORT .....	2
COMMISSION OVERVIEW .....	3
SUMMARY OF RECOMMENDATIONS AND PROGRESS .....	4
DETAIL OF RECOMMENDATIONS AND PROGRESS .....	9
MAJOR INCIDENT REPORTS – RECOMMENDATIONS AND PROGRESS .....	31
SUBSEQUENT ACTIONS AND IMPLEMENTATION PROGRESS .....	32

## PURPOSE OF THE REPORT

On 15 October 2019, the Treasurer (Regulatory Minister) requested the Utilities Commission (the Commission) to conduct an independent investigation into the Alice Springs System Black incident that occurred on 13 October 2019 (independent investigation) and report the findings and advice of the Commission to the Minister.

Following the Commission's report to the Minister, which provided its findings and made 15 associated recommendations, on 9 December 2019, the *Northern Territory Government Response to the Independent Investigation of the Alice Springs System Black Incident on 13 October 2019* (Government response) was published.

The Government response to the independent investigation accepted 14 of the Commission's recommendations in whole and one in-principle.

Consistent with that published in the Government response, on 8 December 2019, the Treasurer wrote to the Commission requesting, pursuant to section 6(1)(h) of the *Utilities Commission Act 2000* (UC Act) that the Commission compile and publish a report on the implementation of the recommendations of the independent review and other major incident reports.

The Treasurer requested that the first report on progress be published by the end of February 2020, with further reports every six months for a period of two years.

This Progress Report is the first report to be published in accordance with the Treasurer's request.

## COMMISSION OVERVIEW

There are 15 recommendations made by the Commission in its independent investigation, with 14 accepted in whole by the Territory Government and one in-principle. Within these recommendations, there are a total of 33 actions to be progressed and reported by the Power and Water Corporation (PWC) and Territory Generation (TGen), and one by the Commission in accordance with the Government response.

Of the 33 recommended actions for PWC and TGen to implement (which are set out in the next two chapters of this report with a summary and details of progress), the Government response<sup>1</sup> required one to be implemented immediately, seven by 31 December 2019, 14 by 31 January 2020, one each by the end of March, April and May 2020, and eight by 30 June 2020.

Based on the updates provided to the Commission by PWC and TGen, the Commission can confirm it received evidence that PWC's immediate action in relation to updating the Public Utilities Group (PUG) procedure is complete. Further, of the 22 actions to be implemented by PWC and TGen by 31 January 2020,<sup>2</sup> 11<sup>3</sup> are considered complete and 11 are partially complete or underway.

While not all recommended actions have been fully implemented by PWC and TGen by the deadlines set in the Government response, the Commission considers that in general the delays are justified, noting a number require further technical considerations, testing and/or consultation by PWC and TGen and/or clarification from the Commission.

This Progress Report does not include an update on the progress of implementing the recommendations of other major incident reports, as PWC is still refining its major incident recommendation tracking spreadsheet and undertaking data cleansing. Consequently, the Commission has included discussion on PWC's progress in working through the significant number of major incident reports and associated recommendations since January 2015, based on discussions and a summary report provided by PWC.

The Commission will continue to monitor and report all outstanding and ongoing actions, and any subsequent actions as a result of implementing any recommendations, with the next Progress Report due to be published by the Commission by the end of August 2020.

---

<sup>1</sup> Includes approved extensions of time from the Minister following Government's response.

<sup>2</sup> Includes actions due by 31 December 2019.

<sup>3</sup> Includes the 'Initial complete' action for recommendations 7f in relation to the regular rehearsal of system black procedures and 13a in relation to PWC System Control preparing a major incident tracking spreadsheet.

## SUMMARY OF RECOMMENDATIONS AND PROGRESS

The Government response provided that the recommendations of the independent investigation be implemented within four timeframes as set out below:

- immediately, for those recommendations that can and should be implemented immediately
- 31 December 2019, for recommendations identified by the review as a high priority and for which the Government is particularly concerned that they be implemented swiftly
- 31 January 2020, for all other recommendations identified in the independent investigation to be of a high priority
- 30 June 2020, for all other recommendations identified in the independent investigation to be of a medium priority or are more complex to implement.

Table 1 below provides a summary of the recommendations to be implemented, the party or parties responsible to action the recommendation, the due date and the progress status for each action as at 31 January 2020, as determined by the Commission based on a review of information reported by PWC and TGen.

The next chapter of this report provides more detail on the status of each of the recommendations as advised by PWC and TGen, including in relation to actions with future due dates, and associated Commission comments.

Table 1: Summary of recommendations and status

ID	Recommendation	Responsible	Due date	Status
1	Modify the System Control operator screens at Hudson Creek control centre to improve their operational awareness:	System Control	31 Jan 2020	Complete
	a) add alarms that rapidly bring to their System Control operator's attention that a generator has come out of automatic generator control (AGC) control			
	b) track spinning reserve and regulating reserve separately so that it can be seen when the two are not equal.	System Control	31 Jan 2020 revised to 31 Mar 2020 <sup>4</sup>	Underway
2	Jointly report to the Utilities Commission for advice to Government:	System Control and TGen	30 June 2020	Underway
	a) on a plan to implement improved solar forecasting			

<sup>4</sup> On 30 January 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 20 February 2020.

ID	Recommendation	Responsible	Due date	Status
	b) for the solar forecasting data to be held by the party responsible for maintaining spinning reserve.	System Control and TGen	30 June 2020	Underway
3	Review and amend communication protocols to clarify how System Control is to operate during a system black event: a) prepare a complete plan for who may be in the control room during a major system event	System Control	31 Dec 2019	Partially complete
	b) modify the operating protocols such that the formal primary path for communication during major system events be directly between System Control and the power stations.	System Control and TGen	31 Dec 2019	Underway
4	Review and report to the Commission for advice to Government on whether the AGC system is fit for purpose, and if it is still determined to be necessary, how its function and reliability are to be improved.	System Control	30 June 2020	Not started
5	Complete a study outlining options to simplify the starting and loading procedures to reduce the risk of generators tripping due to reverse power during restoration. The outcomes of the study are to be provided to the Commission for advice to Government.	TGen	30 June 2020	Underway
6	a) Report to the Commission for advice to Government on the ramifications of TGen being responsible for determining which machines to place into service to meet the spinning reserve requirement and System Control's other system security requirements	System Control and TGen	31 Dec 2019	Complete
	b) Agree and submit to the Utilities Commission for advice to Government consistent operating protocols in relation to dispatch and load following	System Control and TGen	31 Jan 2020	Underway
	c) Provide advice on the likely cost implications of implementing measures to avoid spinning reserve falling below 8 MW during the day for even for brief period, and recommended solution for implementation to the Utilities Commission for advice to Government. <sup>5</sup>	PWC and TGen	31 Jan 2020	Partially complete
7	Other procedural recommendations include: a) a System Control Black System Restart Procedure is to be prepared	System Control	31 Dec 2019	Complete

<sup>5</sup> This Government response recommendation is related to recommendation 6d in the Commission's independent investigation report, which Government supported in-principle

ID	Recommendation	Responsible	Due date	Status
	b) PWC amend the Public Utilities Group (PUG) procedure to require that the PUG be convened within 90 minutes of system black for any future event	PWC	Immediately	Complete
	c) Owen Springs Power Station (OSPS) to be responsible for energising the 66 kV busbars	PWC and TGen	30 June 2020	Complete
	d) a formal set of black start procedures to be updated, harmonised, printed and stored prominently at all control room and power station sites	PWC and TGen	31 Dec 2019	Complete
	e) the OSPS operator is to be provided a higher level of autonomy to implement the Station's black start procedure	TGen	31 Jan 2020	Complete
	f) various system black procedures should be rehearsed at regular intervals, both individually and in coordination	PWC and TGen	31 Jan 2020	Initial complete Ongoing
	g) all technical staff should have a simple training record based on the Engineers Australia Continuing Professional Development model.	PWC and TGen	30 June 2020	Underway
8	Make engineering changes to avoid the Jenbacher units becoming overloaded during power system events: <ul style="list-style-type: none"> <li>• modify OSPS control system so that AGC raise signals are not passed to Jenbacher machines that are operating above their de-rate limit</li> <li>• do not add a further power control loop outside of an existing power control loop</li> <li>• consider designing the outer control loop so that it automatically suspends its own operation, when the system frequency is a small margin below the UFLS stage 3 setpoint.</li> </ul>	TGen	31 Jan 2020	Partially complete
9	Make further control changes and investigations of the performance of the Jenbacher units: <p>a) investigate and address issues in relation to the need for Dia.ne control system reboot after a unit trip</p>	TGen	31 Jan 2020  revised to 31 May 2020 <sup>6</sup>	Underway
	b) remove all power factor limiters and replace them with limiters that reflect likely mechanisms of damage to the machines	TGen	31 Jan 2020	Complete

<sup>6</sup> On 28 January 2020 TGen requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 14 February 2020.

ID	Recommendation	Responsible	Due date	Status
	c) review and adjust the under frequency settings to ensure that they are no more sensitive than is necessary to protect the machines from damage	TGen	31 Jan 2020	Complete
	d) determine and address the source of an apparent inability of the Jenbacher machines to respond to sudden application of load exceeding 10% of their rating.	TGen	31 Jan 2020  revised to 30 April 2020 <sup>7</sup>	Underway
10	a) Make engineering changes to avoid the battery energy storage system (BESS) becoming overloaded during power system events	TGen	31 Jan 2020	Partially complete
	b) In relation to the inrush current of the BESS, undertake studies to determine how the BESS should be used during a system black event.	TGen	31 Jan 2020	Partially complete
11	Address issues adversely affecting system security. In particular: a) investigate and implement modifications to stop the Man units (or any other unit) coming out of AGC control without an operator command or unforeseeable fault condition	TGen	31 Jan 2020	Partially complete
	b) add alarms that rapidly bring to the Remote Operations Centre (ROC) operator's attention that a generator has come out of AGC control	TGen	31 Jan 2020	Complete
	c) Track spinning reserve and regulating reserve separately.	TGen	31 Jan 2020	Underway
12	Undertake the recommended review into the under frequency load shedding scheme (UFLS) and provide the review report to the Commission for advice to Government.	PWC	30 June 2020	Underway
13	a) Prepare a spreadsheet tracking the recommendations from the independent investigation and the recommendations of any completed major incident reports since January 2015. The tracking spreadsheet is to be provided to the Commission and its adequacy assessed by the Commission	System Control	31 Dec 2019	Initial complete
	b) Complete all outstanding major incident reports and incorporate all	System Control	30 June 2020	Underway

<sup>7</sup> On 28 January 2020 TGen requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 14 February 2020.



ID	Recommendation	Responsible	Due date	Status
	recommendations into the tracking document.			
14	Publish a report on the implementation of recommendations of the independent review and other major incident reports every six months for a period of two years.	Utilities Commission	29 Feb 2020	Initial complete
15	a) In collaboration with relevant stakeholders, is to update communications protocols, response plans and procedures for the protection of vulnerable customers in the event of electricity supply interruptions	PWC	31 Dec 2019	Underway
	b) Liaise with the Department of Health and provide the portfolio Minister, Treasurer, Minister for Health and Utilities Commission with advice on jointly agreed responsibilities for advising vulnerable customers, including those requiring life support equipment in their homes, on emergency action and remedial plans in the event of any unplanned electricity supply interruptions.	PWC	31 Jan 2020	Underway

## **DETAIL OF RECOMMENDATIONS AND PROGRESS**

Table 2 below provides a detailed summary on the status of each of the recommendations in Government's response as advised by PWC and TGen, including in relation to actions with future due dates. Further, Table 2 includes the Commission's associated comments in relation to progress as necessary.

Table 2: Detail of implementation progress

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
1	Modify the System Control operator screens at Hudson Creek control centre to improve their operational awareness: a) add alarms that rapidly bring to their System Control operator's attention that a generator has come out of AGC control	In its 7 February 2020 report to the Commission, PWC advised that alarm systems have been updated and implemented as per recommendation.	N/A	31 Jan 2020	Complete
	b) track spinning reserve and regulating reserve separately so that it can be seen when the two are not equal.	On 30 January 2020, PWC advised the underlying issue has been addressed and that it is working, in consultation with TGen, to define (separate) spinning and regulating reserve.	N/A	31 Jan 2020 revised to 31 Mar 2020 <sup>8</sup>	Underway, noting TGen is required to implement the same action (recommendation 11c), at its ROC.  The Commission, with its technical advisor from Entura, will provide clarification directly to TGen and PWC in relation to this recommendation, and will monitor and report on the progress of this recommendation.
2	Jointly report to the Utilities Commission for advice to Government:	In its 7 February 2020 report to the Commission,	In its 7 February 2020 report to the Commission,	30 June 2020	Underway

<sup>8</sup> On 30 January 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 20 February 2020.

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
	a) on a plan to implement improved solar forecasting	PWC stated it is well underway and on track.	TGen stated it is underway and on track.		
	b) for the solar forecasting data to be held by the party responsible for maintaining spinning reserve.	In its 7 February 2020 report to the Commission, PWC stated it is well underway and on track.	In its 7 February 2020 report to the Commission, TGen stated it is well underway and on track.	30 June 2020	Underway
3	<p>Review and amend communication protocols to clarify how System Control is to operate during a system black event:</p> <p>a) prepare a complete plan for who may be in the control room during a major system event</p>	PWC submitted Control Room Major Incident Protocols (System Black) to the Commission on 3 January 2020, which specifies, among other things, who should have access to the control room during a major event.	N/A	31 Dec 2019	Partially complete. The Commission reviewed the document and recommended it be updated to increase clarity. PWC advised the Commission that the document will be revised and that it will provide an updated version. The Commission will track and report until satisfied with the content.
	b) modify the operating protocols such that the formal primary path for communication during major system events be directly between System Control and the power stations.	<p>PWC submitted Alice Springs System Black Restart Procedure dated 27 December 2019 that sets out the communication protocol as per the recommendation.</p> <p>PWC submitted Control Room Major Incident Protocols (System Black) to the Commission on 3 January 2020, which specifies, among other things, the primary path for communication during major events.</p>	<p>TGen submitted Generation Black Start Procedures for the Alice Springs Power System (TGen Black Start Procedures) dated 30 December 2019 that sets out the communication protocol as per the recommendation.</p> <p>TGen advised on 19 February 2020 that it plans to have the updated ROC Principles of Operation document by end of March 2020.</p>	31 Dec 2019	Underway While the Commission is comfortable that PWC and TGen's black start procedures have been modified in accordance with the recommendation, this action is not considered complete until other associated protocols and procedures are also updated to make it clear that the formal primary path for communication during major system events be

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
		On 11 February 2020, PWC advised that the Control Room Major Incident Protocols (System Black) document is being updated shortly, following commissioning of the radio system.	TGen advised on 19 February 2020 that it is in the process of updating its ROC Alice Springs Power System General Operations Guide, with work anticipated to be completed by the end of April 2020.		directly between System Control and the power stations.
4	Review and report to the Commission for advice to Government on whether the AGC system is fit for purpose, and if it is still determined to be necessary, how its function and reliability are to be improved.	In its 7 February 2020 report to the Commission, PWC advised that an external consultant is to be engaged.	N/A	30 June 2020	Not started
5	Complete a study outlining options to simplify the starting and loading procedures to reduce the risk of generators tripping due to reverse power during restoration. The outcomes of the study are to be provided to the Commission for advice to Government.	N/A	In its 7 February 2020 report to the Commission, TGen stated it has commenced a review of options, and associated benefits and disbenefits, in accordance with the recommendation, and that through a workshop with with System Control, has identified further options for consideration. Further, TGen advised that it has engaged a technical consultant to undertake an independent review of TGen's internal draft report and provide additional assistance as necessary.	30 June 2020	Underway

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
6	a) Report to the Commission for advice to Government on the ramifications of TGen being responsible for determining which machines to place into service to meet the spinning reserve requirement and System Control's other system security requirements	PWC wrote to the Commission on 3 January 2020 advising that PWC and TGen agree that the current operating state is to remain in place until further clarification is provided (presumably by Government). The high level ramifications for the current state and two other options were provided.	TGen wrote to the Minister on 24 December 2019, with a copy provided to the Commission, advising that TGen and PWC agree that TGen be responsible for selecting, and starting and stopping, its generation plant in accordance with System Control's Secure System Guidelines and Risk Notices, and that System Control is to be responsible for monitoring and compliance. TGen provided a dot point list of the benefits of this approach, which is the current operating mode, but states formalisation is needed.	31 Dec 2019	<p>Complete</p> <p>Through discussions with PWC and TGen in relation to the discrepancies in their reports, it appears that both PWC and TGen agree that the 'current approach' should continue whereby TGen be responsible for selecting, and starting and stopping, its generation plant in accordance with System Control's Secure System Guidelines and Risk Notices, and that System Control is to be responsible for monitoring and compliance, at least until there is a direction from Government that would require a change, such as the introduction of a wholesale electricity market and associated processes.</p> <p>The Commission has reviewed the high level ramifications listed by PWC and TGen and consider it reasonable that the 'current approach' continues (ie there is currently no good</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
					<p>reason to change the current approach if it is working for PWC and TGen), subject to ensuring associated codes, operational procedures and agreements are in place and aligned with this.</p> <p>However, the Commission notes that the key benefits reported by TGen do not appear to contemplate the ramifications of the 'current' approach if a further (private) large scale generator connects to the Alice Springs grid, noting PWC's advice that TGen already lacks visibility of the Uterne solar photovoltaic (PV) power station (Uterne). While a solution to address this lack of visibility is likely to be relatively straight forward, noting Uterne has been operating on the Alice Springs grid since July 2015, it will be complicated if further (private) large scale generators decide to connect to the Alice Springs grid. For</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
					<p>example, for TGen to maintain the spinning reserve through the dispatch of its machines, it would need to be able to monitor not only Uterne, but also the output of any other large scale generators to determine dispatch. This may require additional powers and/or obligations for TGen to access other generators' data and new or upgraded systems, which may impact the cost of generation in Alice Springs, noting TGen would likely expect to be paid for providing these services in Alice Springs. Accordingly, if a new large scale generator intended to connect to the Alice Springs grid, the 'current approach' should be reviewed by PWC and TGen in consultation with Government prior to connection.</p>
	<p>b) Agree and submit to the Utilities Commission for advice to Government consistent operating protocols in relation to dispatch and load following</p>	<p>On 31 January 2020, PWC provided its current operating protocol. PWC's report to the Commission on 7 February 2020 stated there remains</p>	<p>On 31 January 2020, TGen submitted a Draft Operation Practices for Alice Springs document which it states is agreed with PWC.</p>	<p>31 Jan 2020</p>	<p>Underway Once TGen has finalised its updated ROC Principles of Operation document and its ROC Alice Springs Power</p>



ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
		<p>some ambiguity on a consolidated and final set of operating protocols, with will be resolved by end- February 2020.</p>	<p>TGen advised on 19 February 2020 that it plans to have the updated ROC Principles of Operation document by end of March 2020.</p> <p>TGen advised on 19 February 2020 that it is in the process of updating its ROC Alice Springs Power System General Operations Guide, with work anticipated to be completed by the end of April 2020.</p>		<p>System General Operations Guide, the Commission will review and compare these with TGen's Operation Practices for Alice Springs document and PWC's operating protocol to ensure consistency.</p>
	<p>c) Provide advice on the likely cost implications of implementing measures to avoid spinning reserve falling below 8 MW during the day for even for brief period, and recommended solution for implementation to the Utilities Commission for advice to Government.</p> <p>(Note: this Government response recommendation is related to recommendation 6d in the Commission's independent investigation report, which Government supported in-principle)</p>	<p>On 30 January 2020, PWC requested the Commission, with its technical advisor, clarify, review and discuss this recommendation.</p>	<p>In its 7 February 2020 report to the Commission, TGen provided a short fiscal and technical review report which summarises indicative cost increases when increasing spinning reserve from 8 MW to 10 MW. No data was provided to the Commission to enable verification of the findings, noting the Commission does not consider this necessary at this time given the need to clarify with PWC and TGen the intent of this recommendation, prior to TGen revisiting its review and associated assumptions if necessary</p>	<p>31 Jan 2020</p>	<p>Partially complete</p> <p>To assist PWC and TGen in implementing this recommendation, the Commission, with its technical advisor from Entura, will provide clarification in relation to the intent of the recommendation. The Commission will continue to monitor and report on progress.</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
			<p>and/or undertaking detailed modelling.</p> <p>TGen has included a requirement to avoid spinning reserve falling below 8 MW during the day for even for brief period in draft operating documents for the Alice Springs system and states it has designed alarms to prompt generation controllers to start additional generator/s at trigger points.</p> <p>TGen requested the Commission provide clarity on a number of matters in relation to this recommendation and advised it is aware that PWC has sought clarification on the intent of this recommendation.</p>		
7	<p>Other procedural recommendations include:</p> <p>a) a System Control Black System Restart Procedure is to be prepared</p>	<p>PWC submitted System Control Alice Springs System Black Restart Procedure dated 27 December 2019.</p>	N/A	31 Dec 2019	Complete
	<p>b) PWC amend the PUG procedure to require that the PUG be convened within 90 minutes of system black for any future event</p>	<p>PWC submitted an extract from the Emergency Operation Plan and Standard Operating Procedure on 3 January 2020 that sets out System Black Specific responsibility for PUG Leader to hold a</p>	N/A	Immediately	Complete

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
		meeting within 90 minutes as per the recommendation.			
	c) OSPS to be responsible for energising the 66 kV busbars	In its 7 February 2020 report to the Commission, PWC requested the Commission, with its technical advisor, provide clarification on this recommendation.	In its 7 February 2020 report to the Commission, TGen stated that it does not agree with this recommendation and that this has been reflected in its TGen Black Start Procedures.	30 June 2020	<p>Complete</p> <p>The Commission notes that Government's Response appears to have incorrectly copied or interpreted the UC's recommendation which was that the split of responsibilities should be at the <u>station</u> 66 kV busbars, not all 66 kV busbars.</p> <p>The Commission has reviewed TGen's Black Start Procedures and PWC's Alice Springs System Black Restart Procedure and notes it appears the intent of the recommendation has been achieved, which is that TGen is allowed to start its machines and achieve stable operation, at its own discretion, according to its own procedures and with a minimum need to communicate with any external party including PWC (other than for coordination/confirmation purposes).</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
					While the Commission considers the status of this action complete, it notes PWC's request for clarification on the recommendation. Accordingly, the Commission, with its technical advisor from Entura, will provide clarification on this recommendation, as requested, directly to PWC (and to TGen for information).
	d) a formal set of black start procedures to be updated, harmonised, printed and stored prominently at all control room and power station sites	Email of 30 December 2019 provided as evidence stating these procedures have been placed/updated in the relevant document portal and hard copies placed in the control room, with operators notified.	A number of emails dated 30 December 2019 were provided as evidence stating hard copies of these procedures have been placed at Owen Springs and Ron Goodin power station control rooms and the ROC and communicated to staff.	31 Dec 2019	Complete
	e) the OSPS operator is to be provided a higher level of autonomy to implement the station's black start procedure	N/A	TGen Black Start Procedures dated 30 December 2019 submitted, which state control will be handed back to local station level to manage station black events as per the recommendation.	31 Jan 2020	Complete
	f) various system black procedures should be rehearsed at regular intervals, both individually and in coordination	In its 7 February 2020 report to the Commission,	TGen advised the first drill (desktop exercise) was	31 Jan 2020	Initial complete Ongoing

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
		PWC advised a desktop exercise was undertaken in January 2020 and that System Control will determine the appropriate time to complete a 'real time' exercise based on system risks.	held on 20 January 2020, and provided a copy of the signed attendance sheet, agenda and minutes, including recommendations to update the TGen Black Start Procedures to make improvements.		When questioned, TGen indicated it intends to update its Black Start Procedures and submit to System Control for approval in late-February 2020, following investigation of the more technical recommendations and consultation with stakeholders.  The Commission will track and report further black start exercises and inclusion of exercise recommendations in future TGen Black Start Procedures.
	g) all technical staff should have a simple training record based on the Engineers Australia Continuing Professional Development model.	In its 7 February 2020 report to the Commission, PWC stated this action is in progress.	In its 7 February 2020 report to the Commission, TGen stated it has commenced a review of its training framework for technical staff and is on track.	30 June 2020	Underway
8	Make engineering changes to avoid the Jenbacher units becoming overloaded during power system events:	N/A	In its letter of 31 January 2020 to the Commission, TGen stated it has implemented a modification that ensures AGC raise signals that would trigger the Jenbacher units to operate above their de-rate limits are not passed onto the machines	31 Jan 2020	Partially complete  The Commission, with its technical advisor from Entura, will provide clarification directly to TGen in relation to this recommendation, and monitor and report on the

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
	<ul style="list-style-type: none"> <li>• modify OSPS control system so that AGC raise signals are not passed to Jenbacher machines that are operating above their de-rate limit</li> <li>• do not add a further power control loop outside of an existing power control loop</li> <li>• consider designing the outer control loop so that it automatically suspends its own operation, when the system frequency is a small margin below the UFLS stage 3 setpoint.</li> </ul>		<p>In relation to the second part of the recommendation, TGen has asked for advice from the UC's technical advisor. In relation to the third part, TGen's response indicates confusion on the Commission's intent.</p> <p>In its 7 February 2020 report to the Commission, TGen states it is considering options with PWC and is drafting an associated report that will be provided to the UC when work is complete.</p>		progress of this recommendation.
9	<p>Make further control changes and investigations of the performance of the Jenbacher units:</p> <p>a) investigate and address issues in relation to the need for Dia.ne control system reboot after a unit trip</p>	N/A	<p>In correspondence of 28 January 2020, TGen stated it has commenced investigation, with its contractor and the manufacturer of the Jenbacher units.</p> <p>TGen requested approval from the Minister for additional time to undertake the investigation</p>	<p>31 Jan 2020</p> <p>revised to 31 May 2020<sup>9</sup></p>	Underway

<sup>9</sup> On 28 January 2020 TGen requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 14 February 2020.

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
			and risk assessment prior to implementation of any change. This was approved by the Minister.		
	b) remove all power factor limiters and replace them with limiters that reflect likely mechanisms of damage to the machines	N/A	In its 7 February 2020 report to the Commission, TGen stated the action is complete, tested and verified. TGen provided a copy of the Generation Outage/Testing Request submitted, to and processed by, System Control on 1 November 2019 as evidence.	31 Jan 2020	Complete
	c) review and adjust the under frequency settings to ensure that they are no more sensitive than is necessary to protect the machines from damage	N/A	TGen provided as evidence on 7 February 2020 a summary of its review which concluded that no adjustment is necessary.	31 Jan 2020	Complete
	d) determine and address the source of an apparent inability of the Jenbacher machines to respond to sudden application of load exceeding 10% of their rating.	N/A	In correspondence of 28 January 2020, TGen stated the issues encountered during the restoration following the Alice Springs System Black	31 Jan 2020 revised to 30 April 2020 <sup>10</sup>	Underway

<sup>10</sup> On 28 January 2020 TGen requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 14 February 2020.

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
			<p>on 13 October 2019 are subject to an ongoing investigation, and it is evaluating options to enable testing of the Jenbacher units without risk to the stability of the grid.</p> <p>TGen requested approval from the Minister for additional time to undertake this work, which was approved.</p>		



ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
10	a) Make engineering changes to avoid the BESS becoming overloaded during power system events	<p>This action is not for PWC, however PWC provided comment in its report to the Commission on this recommendation.</p> <p>In its 7 February 2020 report to the Commission, PWC states that TGen and System Control are working together to formulate a testing regime that demonstrates that the updated settings of the BESS limiters operate correctly.</p>	<p>In correspondence on 31 January 2020, TGen stated this action was completed on 15 October 2019. An extract from a TGen report into the BESS was provided as evidence in its 7 February 2020 report to the Commission.</p>	31 Jan 2020	<p>Partially complete</p> <p>The Commission will monitor and report on this recommendation until it is agreed by PWC and TGen as complete, including testing.</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
	b) In relation to the inrush current of the BESS, undertake studies to determine how the BESS should be used during a system black event.	N/A	In correspondence of 31 January 2020, TGen stated the inrush current of the BESS has been determined and data shared with System Control, which will be considered in the assessment of any future black start modelling. On 19 February 2020, TGen advised studies to determine how the BESS should be used during a system black event will be undertaken as part of addressing recommendation 5, which is due on 30 June 2020. TGen expects to have a draft report by the end of March 2020.	31 Jan 2020	Partially complete The Commission will consider this complete once TGen has completed its studies, noting the studies are being undertaken as part of addressing recommendation 5.
11	Address issues adversely affecting system security. In particular: a) investigate and implement modifications to stop the Man units (or any other unit) coming out of AGC control without an operator command or unforeseeable fault condition	This action is not for PWC, however PWC provided comment in its report to the Commission on this recommendation. In its 7 February 2020 report to the Commission, PWC states preliminary checks have been completed and the issue appears to be rectified. Final confirmation will be provided after AGC testing is complete.	In correspondence of 31 January 2020, TGen states the issue was investigated and an update has been implemented to rectify the issue. TGen states final testing of the solution is being planned with System Control.	31 Jan 2020	Partially complete The Commission will monitor and report on this recommendation until it is confirmed that testing is complete.

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
	b) add alarms that rapidly bring to the ROC operator's attention that a generator has come out of AGC control	N/A	TGen advised that it implemented the recommended alarms on 24 October 2019 and provided evidence of implementation.	31 Jan 2020	Complete
	c) Track spinning reserve and regulating reserve separately.	N/A	<p>In correspondence of 31 January 2020, TGen stated it has implemented separate measures for regulating reserve and spinning reserve in its control, which will require further refining when associated definitions are provided by System Control.</p> <p>TGen states that it is working with PWC on a consistent definition of spinning reserve and regulating reserve. However, TGen has also requested that the Commission confirm the definition of 'contingency reserve', 'regulating reserve' and 'spinning reserve' in relation to recommendation 6.</p>	31 Jan 2020	<p>Underway, noting PWC is required to implement the same action (recommendation 1b), but at System Control, and that PWC requested the Minister approve an extension to 31 March 2020.</p> <p>The Commission, with its technical advisor from Entura, will provide clarification directly to TGen and PWC in relation to this recommendation, and will monitor and report on the progress of this recommendation.</p>
12	Undertake the recommended review into the UFLS scheme and provide the review report to the Commission for advice to Government.	In its 7 February 2020 report to the Commission, PWC states studies have commenced and are on track.	N/A	30 June 2020	Underway

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
13	<p>a) Prepare a spreadsheet tracking the recommendations from the independent investigation and the recommendations of any completed major incident reports since January 2015. The tracking spreadsheet is to be provided to the Commission and its adequacy assessed by the Commission</p>	<p>System Control provided its first draft of a tracking spreadsheet on 3 January 2020, which included a significant number of outstanding recommendations dating back to January 2015, noting there are some duplicates and/or redundant recommendations. PWC stated a detailed review of the outstanding recommendations would be undertaken and that it has put in place immediate governance and monitoring structures to ensure all outstanding recommendations are progressed.</p> <p>PWC has advised that identification, allocation and tracking of all outstanding recommendations will be completed by 30 June 2020.</p>		31 Dec 2019	<p>Initial complete</p> <p>The Commission notes PWC put significant effort into capturing all recommendations into one tracking spreadsheet by the due date.</p> <p>While the Commission and PWC agree that further work is needed to review the outstanding recommendations and improve the design and usability of the tracking spreadsheet, Commission staff have met with System Control and note System Control's commitment to ensure recommendations are not closed out without evidence that the associated issue has been addressed and to significantly improve the usefulness of the spreadsheet, to enable meaningful data analysis to identify trends and priorities.</p> <p>The Commission will continue to monitor and report until satisfied with the content and design of the tracking spreadsheet, and monitor and report in</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
					relation to progress in implementing recommendations within the tracking spreadsheet.
	b) Complete all outstanding major incident reports and incorporate all recommendations into the tracking document.	System Control met its commitment to submit to the Commission all outstanding major incident reports older than six months old by 31 December 2019.  On 10 February 2020, System Control advised Commission staff that work is underway on eight of the 10 current outstanding incident reports.	N/A	30 June 2020	Underway  The Commission notes that two of the outstanding major incident reports are now over six months old (in relation to incidents on 9 and 13 July 2019).
14	Publish a report on the implementation of recommendations of the independent review and other major incident reports every six months for a period of two years, with the first report by the end of February 2020.	N/A	N/A	29 Feb 2020	Initial complete  This Progress Report is the first report published as requested.
15	a) In collaboration with relevant stakeholders, is to update communications protocols, response plans and procedures for the protection of vulnerable customers in the event of electricity supply interruptions	PWC submitted an extract from the Emergency Operation Plan and Standard Operating Procedure on 3 January 2020 that sets out System Black Specific responsibility for the PUG Leader to hold a meeting within 90 minutes as per recommendation 7b.	N/A	31 Dec 2019	Underway  The Commission will continue to monitor and report on this recommendation until complete, including through engagement with DoH and Jacana Energy as appropriate.

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
		<p>PWC states it has a verbal agreement that is on a best endeavours basis with the Department of Health (DoH) to advise DoH after a 90 minute unplanned outage when there is no known restoration time, subject to receiving contact details from DoH, and that it could review DoH's list of vulnerable customers (if provided) to ensure all clients are captured. As at 20 February 2020, it is understood no response had been received from DoH to confirm the approach is agreed.</p> <p>PWC provided a copy of its Draft Life Support Outage Notification Process on 3 January 2020, with an updated version provided on 11 February 2020. On 19 February 2020, PWC advised that it expects to finalise its Life Support Outage Notification Process and submit it to the Commission on 1 March 2020.</p>			
	b) Liaise with the Department of Health and provide the portfolio Minister, Treasurer, Minister for Health and Utilities Commission with advice on jointly agreed responsibilities for	On 7 February 2020, PWC advised that it has engaged with DoH, however this task has been delayed due to	N/A	31 Jan 2020	Underway The Commission will continue to monitor and report on this

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
	advising vulnerable customers, including those requiring life support equipment in their homes, on emergency action and remedial plans in the event of any unplanned electricity supply interruptions.	the emerging Coronavirus situation. As set out above at 15a, PWC states it has an interim arrangement in place based on a verbal agreement.			recommendation until complete, including through engagement with DoH appropriate.

## MAJOR INCIDENT REPORTS – RECOMMENDATIONS AND PROGRESS

As reported in the previous chapter, in relation to recommendation 13a, PWC provided its first draft of a tracking spreadsheet to the Commission on 3 January 2020. This first draft included a significant number of outstanding recommendations dating back to January 2015, including duplicates and redundant recommendations.

Over January and February 2020, the Commission notes that PWC System Control has been refining its major incident recommendation tracking spreadsheet to improve the relevance and usefulness of the document. Further PWC has advised the Commission that a detailed review of the outstanding recommendations is being undertaken and that it has put in place immediate governance and monitoring structures to ensure all outstanding recommendations are progressed.

Recent advice from PWC System Control indicates that good progress is being made, including the identification of duplicates, reconciliation of information and categorisation, with approximately 50 per cent of the recommendations categorised in the incident tracking spreadsheet so far.

Based on the information provided by PWC System Control on work completed to 7 February 2020, the majority of the recommendations categorised to date are in relation to asset management (34 per cent), protection (27 per cent) and procedures (20 per cent). PWC System Control states that these are then categorised back to the specific asset or action, to allow for targeted actioning of recommendations.

PWC System Control has advised the Commission that full closure of completed recommendations in the incident tracking spreadsheet is expected to commence in February and will be an ongoing process. The Commission agrees with PWC System Control that recommendations should only be closed when System Control is fully satisfied that the identified issue in relation to the major incident has been fully addressed by the relevant party, either by implementing the recommendation or an agreed alternative, and the matter is fully documented with relevant supporting material.



## SUBSEQUENT ACTIONS AND IMPLEMENTATION PROGRESS

The Commission intends to monitor and report the full end-to-end process of implementing recommendations from the Government response.

For example, where there is a Government accepted recommendation to consider an issue and a recommended solution, the obligation does not stop once a recommendation has been made. Once accepted, the recommendation becomes another action to be implemented and reported. This approach will ensure the original issues identified are fully addressed.

Table 3 below provides a list of subsequent actions for implementation and an update on progress.

Table 3: Subsequent actions and status of implementation

ID	Subsequent action	Responsible	Status
S1	The Commission, with its technical advisor will provide clarification directly to PWC and TGen in relation to Government response recommendations 1, 6, 7 and 8.	Utilities Commission	Complete Letter providing clarification sent to PWC and TGen with an embargoed copy of the Progress Report on 27 February 2020.
S2	Following the desktop exercise held in January 2020 in relation to Government response recommendation 7f, TGen to update its Black Start Procedures and submit to System Control for approval in late February 2020, following investigation of the more technical recommendations from the exercise.	TGen	Underway