

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*

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PURPOSE OF THE REPORT

On 15 October 2019, the Treasurer 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 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 thereafter for a period of two years.

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

COMMISSION OVERVIEW

There were 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 recommended actions to be progressed and reported on 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 response¹ required one to be implemented immediately, seven by 31 December 2019, 11 by 31 January 2020, one each by the end of April and May 2020, 10 by 30 June 2020, one by 31 August 2020 and one by December 2020.

Based on the updates provided to the Commission by PWC and TGen, the Commission can confirm it received evidence that 15 recommended actions are complete or the initial task is complete (noting some recommended actions are on-going), and 18 recommended actions are either 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 or approved extensions, the Commission note the implementation of a number of recommended actions may have been impacted by the response to and restrictions imposed by coronavirus (COVID-19). However, while the completion of recommended actions remain outstanding, the Alice Springs power system is potentially exposed to a higher risk of a major system incident and or an extended restoration time from such an incident.

The Commission notes that PWC and TGen have implemented changes and completed significant work in relation to a number of recommended actions, however the recommended action as worded in the Government response has not been met, and therefore the recommended action is assessed by the Commission to be underway or partially complete.

This Progress Report also includes an update on the progress of implementing the recommendations of other major incident reports since January 2015. While the Commission is concerned by the significant number and age of outstanding recommendations, and the potential risk to the Territory's regulated power systems as a result, through discussions with PWC System Control and observations by the Commission, it is satisfied that progress is being made, and increased priority and resources appear to be allocated to address the issue.

The Commission will continue to monitor and report all outstanding and ongoing recommended 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 February 2021.

¹ Includes approved extensions of time from the Minister following the Government's response.

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.

PWC and TGen have requested extensions to the initial timeframes for a number of recommendations from the Minister for Renewables, Energy and Essential Services. Where these extensions have been requested, and whether the extension was approved or not approved, is explicitly stated in this report.

Table 1 below provides a summary of the recommendations to be implemented, the party or parties responsible to action the recommendation, the due date (including any approved extension) and the progress status for each action as at 17 August 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 30 June 2020 ²	Underway
2	Jointly report to the Utilities Commission for advice to Government:	System Control and TGen	30 June 2020	Partially complete

² 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. A further extension was requested on 22 April 2020, and approved by the Minister on 26 May 2020. On 1 July 2020, PWC requested a further extension to 31 October 2020, however on 23 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	Responsible	Due date	Status
	a) on a plan to implement improved solar forecasting			
	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:	System Control	31 Dec 2019	Complete
	a) prepare a complete plan for who may be in the control room during a major system event			
	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 revised to 31 Aug 2020 ³	Underway
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	Partially complete
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 revised to 30 June 2020 ⁴	Underway

³ On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020. On 1 July 2020, PWC requested a further extension to 31 October 2020, however on 23 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

⁴ On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020.

ID	Recommendation	Responsible	Due date	Status
	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. ⁵	PWC and TGen	31 Jan 2020	Partially complete
7	Other procedural recommendations include:	System Control	31 Dec 2019	Complete
	a) a System Control Black System Restart Procedure is to be prepared			
	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, potentially based on the Engineers Australia Continuing Professional Development model.	PWC and TGen	30 June 2020 revised to Dec 2020 for PWC ⁶	Underway
8	Make engineering changes to avoid the Jenbacher units becoming overloaded during power system events:	TGen	31 Jan 2020 ⁷	Partially complete

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

⁶ On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020.

⁷ On 2 June 2020 TGen requested an extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	Responsible	Due date	Status
	<ul style="list-style-type: none"> modify OSPS control system so that AGC raise signals are not passed to Jenbacher machines that are operating above their de-rate limit do not add a further power control loop outside of an existing power control loop 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 set point. 			
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>	TGen	31 Jan 2020 revised to 31 May 2020 ⁸	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
	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 ⁹	Underway

⁸On 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. On 2 June 2020 TGen requested an additional extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

⁹On 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. On 2 June 2020 TGen requested an additional extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	Responsible	Due date	Status
10	a) Make engineering changes to avoid the battery energy storage system (BESS) becoming overloaded during power system events	TGen	31 Jan 2020 ¹⁰	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 ¹¹	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	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 revised to 30 Jun 2020 ¹²	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 ¹³	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	Complete

¹⁰On 2 June 2020 TGen requested an extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

¹¹On 2 June 2020 TGen requested an extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

¹²On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020. On 1 July 2020, PWC requested a further extension to 31 October 2020, however on 23 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

¹³On 2 June 2020, TGen requested an extension of time to 31 December 2020 for elements of recommendation 12 that it is responsible for, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	Responsible	Due date	Status
	b) Complete all outstanding major incident reports and incorporate all recommendations into the tracking document.	System Control	30 June 2020	Complete Ongoing
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	Partially complete
	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 revised to 30 Jun 2020 ¹⁴	Underway

¹⁴On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020.

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	<p>Modify the System Control operator screens at Hudson Creek control centre to improve their operational awareness:</p> <p>a) add alarms that rapidly bring to their System Control operator's attention that a generator has come out of AGC control</p>	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
	<p>b) track spinning reserve and regulating reserve separately so that it can be seen when the two are not equal.</p>	On 17 August 2020, PWC advised that real time spinning reserve tracking is now implemented and is displayed on screen in the Control Room. The SCADA team have completed the calculations, display design and tests for tracking regulating reserve separately, and is currently being loaded into production. The impact of COVID-19 on resources and competing priorities made delivery by the end of June 2020 not possible and PWC requested an extension from the Minister to 31 October 2020.	n.a.	31 Jan 2020 revised to 30 June 2020 ¹⁵	<p>Underway (noting TGen is required to implement the same action (recommendation 11c), at its ROC)</p> <p>In February 2020, the Commission, with its technical advisor from Entura, provided clarification directly to TGen and PWC in relation to this recommendation.</p>

¹⁵On 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. A further extension was requested on 22 April 2020, and approved by the Minister on 26 May 2020. On 1 July 2020, PWC requested a further extension to 31 October 2020, however on 23 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
2	<p>Jointly report to the Utilities Commission for advice to Government:</p> <p>a) on a plan to implement improved solar forecasting</p>	<p>On 17 August 2020, PWC advised that it initially (in 2019) investigated the feasibility of developing a solar forecasting tool and sharing it with TGen, however it was identified that due to licensing and ICT issues, the data cannot be readily transferred to TGen. PWC is implementing solar forecasting, including of behind the meter solar, and is working with the providers to improve the accuracy of the forecasts. Further, PWC has advised it is separately progressing with further system improvements and is developing a web based 5 minute updated net system load forecast, which will be available for all market participants, including TGen by January 2021.</p>	<p>On 30 June 2020, TGen advised following an initial approach in which it was understood solar forecasting could be shared by PWC, in May 2020, PWC suggested that TGen should procure its own solar forecasting data to support dispatch decision making due to the technical and contractual limitations. Accordingly, TGen advised it will procure its own solar forecasting in July 2020 and implement it into its control rooms over August and September 2020.</p>	30 June 2020	<p>Partially complete</p> <p>The Commission notes while the recommendation is to report on a plan to implement improved solar forecasting, both PWC and TGen have gone further in procuring a solution. Through discussions with PWC, the Commission understands PWC has a comprehensive solution to implementing solar forecasting into its operations.</p> <p>The Commission will monitor and report on this recommendation until the improved solar forecasting has been implemented, consistent with PWC and TGen's responses.</p>
	<p>b) for the solar forecasting data to be held by the party responsible for maintaining spinning reserve.</p>	<p>PWC's update for recommendation 2b is consistent with that provided for recommendation 2a.</p>	<p>TGen's update for recommendation 2b is consistent with that provided for recommendation 2a.</p>	30 June 2020	<p>Underway</p> <p>The Commission does not consider this recommendation complete until the improved solar forecasting, as discussed above in relation to recommendation 2a, is</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
					implemented and held by the party responsible for maintaining spinning reserve.
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>	<p>PWC submitted the Control Room Major Incident Protocols (System Black) procedure to the Commission on 3 January 2020, which specifies, among other things, who should have access to the control room during a major event. The Commission reviewed the document and recommended it be updated to increase clarity.</p> <p>Following Commission feedback, PWC updated the procedure, with the latest version dated 2 February 2020.</p>	n.a.	31 Dec 2019	Complete
	<p>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>	<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</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</p>	31 Dec 2019	<p>Underway</p> <p>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</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
		<p>specifies, among other things, the primary path for communication during major events.</p> <p>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.</p> <p>Through discussions with PWC, the Commission has been advised that the radio system has been implemented.</p>	<p>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>it clear that the formal primary path for communication during major system events be directly between System Control and the power stations.</p> <p>Following the Commission's February 2020 Progress Report, the Commission has not seen evidence that TGen has updated its ROC Principles of Operation document.</p>
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.	On 17 August 2020, PWC advised a consultant has been engaged and is progressing with the AGC system review to determine if it is fit for purpose. A draft report is expected at the end of August 2020.	n.a.	30 June 2020 revised to 31 Aug 2020 ¹⁶	Underway

¹⁶On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020. On 1 July 2020, PWC requested a further extension to 31 October 2020, however on 23 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
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.	<p>On 30 June 2020, TGen advised it had received a consultant (Ekistica) report that considers the items raised in Recommendation 5. Further, TGen has considered the contents of the report, and notes that there are no urgent actions whilst progress is underway on the installation of the load bank at the Owen Springs power station.</p> <p>TGen provided a copy of the consultant report for the consideration and comment by the Commission.</p>	30 June 2020	<p>Partially complete</p> <p>On 8 August 2020, the Commission provided feedback to TGen in relation to its consultant report. The Commission's overarching feedback relates to the report using an assumed stabilising load value in the absence of a tested and validated value. The Commission notes that the consultant acknowledges the need for a tested and validated value multiple times throughout the report. Accordingly, the Commission consider further work and a follow-up report is necessary to enable this recommendation to be considered complete.</p>
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	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</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
			<p>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.</p>		<p>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 (i.e. there is currently no good 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</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
					<p>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 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</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
					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.
	b) Agree and submit to the Utilities Commission for advice to Government consistent operating protocols in relation to dispatch and load following	On 31 January 2020, PWC provided its current operating protocol. PWC's report to the Commission on 7 February 2020 stated there remains some ambiguity on a consolidated and final set of operating protocols, with will be resolved by end February 2020. On 17 August 2020, PWC advised agreement has been reached that TGen is responsible for dispatch, load following and spinning	On 31 January 2020, TGen submitted a Draft Operation Practices for Alice Springs document which it states is agreed with PWC. TGen advised on 19 February 2020 that it plans to have the updated ROC Principles of Operation document by end of March 2020. TGen advised on 19 February 2020 that it is in the process of updating its ROC Alice Springs	31 Jan 2020 revised to 30 June 2020 ¹⁷	Underway Once TGen has finalised its updated ROC Principles of Operation document and its ROC Alice Springs Power 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.

¹⁷On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020.

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
		<p>reserve as outlined in its operating protocol. Following a review of the operating protocols and agreement on content, a final updated version was issued on 27 May 2020.</p>	<p>Power System General Operations Guide, with work anticipated to be completed by the end of April 2020.</p> <p>On 30 June 2020, TGen advised that following PWC's updated Operating Protocol for Alice Springs in May 2020, it has reviewed this document and is undertaking final consultation on its reciprocal operating practices and provided a number of documents for review by the Commission.</p>		<p>Following the Commission's February 2020 Progress Report, the Commission has not seen evidence that TGen has updated its ROC Principles of Operation.</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</p>	<p>31 Jan 2020</p>	<p>Partially complete</p> <p>In February 2020, to assist PWC and TGen in implementing this recommendation, the Commission, with its technical advisor from Entura, provided 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 associated assumptions if necessary 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> <p>In August 2020, TGen advised it is in the process of completing a review which includes consideration of various scenarios of spinning reserve, with a final version due to be completed by the week of 17 August 2020.</p>		

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
7	Other procedural recommendations include: a) a System Control Black System Restart Procedure is to be prepared	PWC submitted System Control Alice Springs System Black Restart Procedure dated 27 December 2019.	n.a.	31 Dec 2019	Complete
	b) PWC amend the PUG procedure to require that the PUG be convened within 90 minutes of system black for any future event	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 meeting within 90 minutes as per the recommendation.	n.a.	Immediately	Complete
	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	Complete 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. 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

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
					<p>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> <p>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).</p>
	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	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	31 Dec 2019	Complete

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
		placed in the control room, with operators notified.	power station control rooms and the ROC and communicated to staff.		
	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	<p>In its 7 February 2020 report to the Commission, 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.</p> <p>In August 2020, PWC advised it is waiting for the load bank installation and commissioning at the Owen Springs power station in order to conduct a system black restart practical exercise.</p>	TGen advised the first drill (desktop exercise) was 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.	31 Jan 2020	<p>Initial complete</p> <p>Ongoing</p> <p>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.</p> <p>The Commission will track and report further black start exercises, and separately under the Subsequent actions and implementation progress section of this report, the inclusion of exercise recommendations in</p>

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
					future TGen Black Start Procedures.
	g) all technical staff should have a simple training record, potentially based on the Engineers Australia Continuing Professional Development model.	On 17 August 2020, PWC advised it has budgeted to establish a technical training framework in 2020-21 and has recruited a dedicated team to ensure training is developed in line with industry best practice. The review of training modules is in progress and an auditable training records system will be established.	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. On 30 June 2020, TGen advised its Learning and Development has reviewed training planning, documentation and process in the context of a continual professional development framework. It attached a series of documents that outline TGen's approach for consideration by the Commission. The Commission notes that the series of documents predate the Alice Springs system back incident.	30 June 2020 revised to Dec 2020 for PWC ¹⁸	Underway The Commission consider it has not received sufficient evidence from TGen that all technical staff have a simple training record, consistent with the recommendation.
8	Make engineering changes to avoid the Jenbacher units becoming overloaded during power system events:	This action is not for PWC, however PWC provided comment in its report to the	In its letter of 31 January 2020 to the Commission, TGen stated it has implemented a modification	31 Jan 2020 ¹⁹	Partially complete In February 2020, the Commission, with its technical advisor from

¹⁸On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020.

¹⁹On 2 June 2020 TGen requested an extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

<ul style="list-style-type: none"> • modify OSPS control system so that AGC raise signals are not passed to Jenbacher machines that are operating above their de-rate limit • do not add a further power control loop outside of an existing power control loop • 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 set point. 	<p>Commission on this recommendation.</p> <p>On 17 August 2020, PWC advised that TGen has implemented a temporary solution, as agreed with PWC, to rectify the issue resulting from the Jenbacher generators operating above their de-rated value. A permanent solution is yet to be implemented and PWC consider it to be critical for system security.</p>	<p>that ensures AGC raise signals that would trigger the Jenbacher units to operate above their de-rate limits are not passed onto the machines.</p> <p>In its 2 June 2020 letter to the Minister for Renewables, Energy and Essential Services, TGen advised the current outer control loop is effective in most situations, however when the Jenbacher units are operating in a de-rated state there remain limitations to their performance. It has been assessed that the current control would not be effective at the existing UFLS stage 3 settings as the UFLS operates at a system frequency that would result in the units, when de-rated due to high ambient temperatures, exceeding their de-rated output and increasing the potential for a unit trip. As such, further progress on this item is dependent on Jenbacher developing a permanent generator level resolution as well as the completion of UFLS setting review by PWC (recommendation 12.1).</p>	<p>Entura, provided clarification directly to TGen in relation to this recommendation. The Commission will continue to monitor and report on the progress of this recommendation until it is agreed by PWC and TGen as complete, including testing.</p>
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ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
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 (31 May 2020) to undertake the investigation and risk assessment prior to implementation of any change. This was approved by the Minister.</p> <p>In its 26 May 2020 progress report, TGen advised the Commission detailed investigation, analysis, and potentially design and implementation work is required by the supplier of the Jenbacher units. TGen has submitted a written request to the supplier. As the supplier is the only authorised Australian agent for the units, TGen is not able to get support from another source, and therefore the</p>	<p>31 Jan 2020</p> <p>revised to 31 May 2020²⁰</p>	Underway

²⁰On 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. On 2 June 2020 TGen requested an additional extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
			timing is dependent on the response time from the supplier.		
	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 on 13 October 2019 are subject to an ongoing investigation, and it is evaluating options to enable testing of the	31 Jan 2020 revised to 30 April 2020 ²¹	Underway The Commission understand the load bank to enable testing has arrived at the Owen Springs power station.

²¹On 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. On 2 June 2020 TGen requested an additional extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
			<p>Jenbacher units without risk to the stability of the grid.</p> <p>TGen requested approval from the Minister for additional time (30 April 2020) to undertake this work, which was approved.</p> <p>In correspondence to the Commission on 18 July 2020, it was indicated that the load bank required to test the Jenbacher response is anticipated to arrive at the Owen Springs power station by no later than 24 July 2020. Further arrangements to install and commission the load bank are on track, and test plans are being developed and will be submitted to System Control for approval as required in the normal processes.</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>On 17 August 2020, PWC advised that TGen has implemented the initial agreed changes to the BESS limiters as an interim solution. Further, PWC consider TGen is required to provide analysis on the initial mal-operation of the BESS and provide a report demonstrating that the BESS will operate correctly and the root cause has been resolved.</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> <p>In August 2020, TGen advised while the solution provided by TGen makes allowance for any overshoot of the 7 MW limiter and these changes will not be removed without prior change management with System Control, it is considering System Control suggested improvements and continuing to work with the supplier of the BESS, and other expert OEM consultants to identify the root cause of the overshoot and further improvement to the operation of the BESS.</p>	31 Jan 2020 ²²	<p>Partially complete</p> <p>The Commission acknowledge TGen has implemented an interim solution, however the Commission will continue to monitor and report on this recommendation until is it agreed by PWC and TGen as complete, including testing.</p>

²²On 2 June 2020 TGen requested an extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

	<p>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.</p>	<p>n.a.</p>	<p>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.</p> <p>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.</p> <p>The Commission have reviewed the report provided in relation to Recommendation 5 and do not consider it sufficiently covers how the BESS should be used during a system back event.</p> <p>On 30 June 2020, TGen advised that TGen and PWC will consider the benefit of upgrades to the capability of the BESS, including the possibility of</p>	<p>31 Jan 2020²³</p>	<p>Partially complete</p> <p>The Commission does not consider it has received evidence that sufficient studies have been completed in relation to how the BESS should be used during a system black event.</p>
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ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
			implementing a grid forming capability. Further, in August 2020 TGen advised following discussions between TGen and PWC, System Control confirmed that it will make the decision if, and when, the BESS would be used as part of system black recovery procedures.		
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 August 2020, PWC provided a report from a TGen consultant which provides evidence that the issue was identified and rectified. Further, PWC has provided confirmation that AGC testing was conducted in May 2020 and the issue was resolved.	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. In its 30 June 2020 progress report, TGen stated testing of the AGC system was completed in May, and TGen is waiting on advice on the outcomes from the testing.	31 Jan 2020	Complete
	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	31 Jan 2020	Complete

²³On 2 June 2020 TGen requested an extension of time to 31 December 2020, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
			provided evidence of implementation.		
	c) Track spinning reserve and regulating reserve separately.	<p>Noting implementation of this recommendation is the responsibility of TGen, it is related and linked to recommendation 1b, which is the responsibility of PWC.</p> <p>Accordingly, PWC has provided relevant advice on 17 August 2020, which states this issue requires communication's protocols between PWC and TGen to be finalised. It is complex work and needs more time and budget to be implemented.</p>	On 22 April 2020, PWC's letter to the Minister in relation to an extension indicated additional SCADA points needed to be implemented and resourcing constraints.	31 Jan 2020 revised to 30 June 2020 ²⁴	<p>Underway (noting PWC is required to implement the same action (recommendation 1b), at its Hudson Creek control centre)</p> <p>In February 2020, the Commission, with its technical advisor from Entura, provided clarification directly to TGen and PWC in relation to this recommendation.</p>
12	Undertake the recommended review into the UFLS scheme and provide the review report to the Commission for advice to Government.	On 17 August 2020, PWC advised studies have commenced on the implementation of revised UFLS settings. However, further information and clarity is required from TGen on the Jenbacher	n.a.	30 June 2020 ²⁵	<p>Underway</p> <p>The Commission notes that TGen requires the load bank at the Owen Springs power station to be operational in order to test and validate the</p>

²⁴On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020. On 1 July 2020, PWC requested a further extension to 31 October 2020, however on 23 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

²⁵On 2 June 2020, TGen requested an extension of time to 31 December 2020 for elements of recommendation 12 that it is responsible for, however on 13 July 2020 the Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's second progress report, which is due to be published in late August 2020 (this report).

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
		<p>generators and BESS models to complete this task. PWC is unable to review the UFLS until updated models have been received from TGen.</p> <p>TGen has requested an extension to 31 December 2020 to allow time to perform testing and model validation of the generator facilities.</p>			model of its generator facilities.
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>PWC System Control provided an updated working version of its recommendation tracking spreadsheet to the Commission in July 2020, which the Commission considers meets the intent of the recommendation.</p>	n.a.	31 Dec 2019	<p>Complete</p> <p>The Commission notes that updating of the recommendation tracking spreadsheet is an ongoing task and that it has provided feedback in relation to the design and use of the spreadsheet, however considers this is part of a continual improvement process.</p>
	<p>b) Complete all outstanding major incident reports and incorporate all recommendations into the tracking document.</p>	<p>System Control met its commitment to submit to the Commission all outstanding major incident reports older than six months old by 31 December 2019.</p>	n.a.	30 June 2020	<p>Complete</p> <p>Ongoing</p>
14	<p>Publish a report on the implementation of recommendations of the independent review and other major incident reports every six months for a</p>	n.a.	n.a.	29 Feb 2020	Initial complete

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
	period of two years, with the first report by the end of February 2020.			The second Progress Report (this report) is due 31 Aug 2020.	This Progress Report is the second report published as requested.
15	<p>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</p> <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 advising vulnerable customers, including those requiring life support equipment in their homes, on emergency action and remedial plans in the</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 the PUG Leader to hold a meeting within 90 minutes as per recommendation 7b.</p> <p>On 14 August 2020, PWC provided a published Life Support Procedure and associated Life Support Unplanned Outage Notification Instruction, which includes the notification of life support customers and the Department of Health.</p> <p>On 22 April 2020, PWC advised this activity has been delayed due to the COVID-19 situation.</p> <p>On 1 July 2020, PWC advised the Department of</p>	<p>n.a.</p> <p>n.a.</p>	<p>31 Dec 2019</p> <p>31 Jan 2020 revised to 30 June 2020²⁶</p>	<p>Partially complete</p> <p>The Commission provided feedback in relation to the Life Support Unplanned Outage Notification Instruction for PWC's consideration. The Commission will continue to monitor and report on this recommendation until complete.</p> <p>Underway</p> <p>The Commission consider the Department of Health contact numbers provided by PWC an input to the</p>

²⁶On 22 April 2020, PWC requested an extension of time. This was approved by the Minister for Renewables, Energy and Essential Services on 26 May 2020.

ID	Recommendation	PWC/System Control	TGen	Due date	Status/UC Comment
	event of any unplanned electricity supply interruptions.	Health has provided the on-call contact number for Tennant Creek and Alice Springs Health Services.			<p>procedure and instruction mentioned above in relation to recommendation 15a and evidence of liaising with the Department of Health. However, the Commission has not seen evidence of PWC providing the relevant Ministers and Commission advice on jointly agreed responsibilities for advising vulnerable customers.</p> <p>The Commission will continue to monitor and report on this recommendation until complete, including through engagement with Department of Health, as appropriate.</p>

MAJOR INCIDENT REPORTS – RECOMMENDATIONS AND PROGRESS

Consistent with recommendation 13a, PWC System Control provided a version of its recommendation tracking spreadsheet to the Commission in July 2020, which the Commission considers meets the intent of the recommendation. The Commission notes that updating of the recommendation tracking spreadsheet is an ongoing task and that it has provided feedback in relation to the design and use of the spreadsheet, however considers this is part of a continual improvement process.

The Commission notes that PWC System Control has completed a significant amount of work to refine its major incident recommendation tracking spreadsheet to improve the relevance and usefulness of the document, and conducted a detailed review of the outstanding recommendations and introduced immediate governance and monitoring structures to ensure all outstanding recommendations are progressed.

PWC System Control have developed associated indicators for analysis and reporting of recommendations, which the Commission has reviewed and is satisfied with the adequacy.

PWC System Control has advised the Commission that full closure of completed recommendations in the incident tracking spreadsheet has commenced 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.

Based on data provided by PWC on 19 August 2020, since January 2015, 170 major incidents²⁷ have occurred, with 931 recommendations made following investigation of the incidents. Of these recommendations, 94 are completed or closed, 83 are obsolete, 186 are duplicates of existing recommendations, and 568 are outstanding. Of the 568 outstanding recommendations, 175 recommendations have been outstanding for greater than two years. Of the 931 total recommendations since January 2015, 237 relate to the Alice Springs power system, with 164 of these recommendations still outstanding, which includes 88 outstanding for greater than two years.

While the Commission is concerned by the significant number and age of outstanding recommendations, and the potential risk to the Territory's regulated power systems as a result, through discussions with PWC System Control and observations by the Commission, it is satisfied that progress is being made, and increased priority and resources appear to have been allocated to address the issue.

The Commission notes that not all recommendations have immediate and or a high risk to power system security, and may for example relate to administrative changes or installation of equipment for better analysis of incidents. Through discussions with PWC System Control, the Commission understands actions have often been taken immediately following incidents when identified and considered a high risk to system security, rather than waiting for the completion of a major incident report, which include the incident recommendations. As a result, a number of recommendations may be captured as outstanding as the formal administrative processes have not been completed to close out the recommendations.

²⁷ As defined by section 7.3 of the System Control Technical Code.

Accordingly, through this report and other relevant Commission reports, the Commission will continue to monitor PWC System Control's progress and tracking of major incident recommendations, and report and take action as appropriate.

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 In August 2020, TGen advised it has updated its Black Start procedure following the desktop exercise and undertaken extensive consultation with operators at its Remote Operations Centre, Owen Springs power station and Ron Goodin power station. The revised document is currently under final internal review, before submission to PWC System Control for consideration, feedback and approval.