

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*

23 February 2023

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	11

PURPOSE OF THE REPORT

On 15 October 2019, the Treasurer at the time requested the Utilities Commission (the Commission) conduct an independent investigation into the 13 October 2019 Alice Springs System Black incident (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's 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 at the time wrote to the Commission requesting, in accordance with 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 investigation and other major incident reports.

The Treasurer at the time 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.

Subsequently, on 24 March 2021, the former Minister for Essential Services requested the Commission continue to publish six-monthly reports until all outstanding Alice Springs system black actions are complete.

This is the Commission's seventh progress report.

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 were 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 summarised in the next chapter of this report), 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 has received evidence that 32 recommended actions are complete or the initial task is complete (noting some recommended actions are ongoing). There continues to be one outstanding recommended action, which is assessed as underway.

The one outstanding recommended action relates to a review by PWC of the under frequency load shedding (UFLS) scheme (12). The Commission understands the action cannot be completed to optimise UFLS settings until various modelling activities, associated with the development of an overall model of the Alice Springs power system, have been completed.

The Commission has previously acknowledged these modelling activities were likely being hampered to some extent by an industry-wide shortage of engineering modelling resources. Notwithstanding, the Commission notes it has been over three years since the Alice Springs system black. This appears to be a significantly long period of time in which to complete these activities, particularly given the Commission raised modelling-related concerns prior to the Alice Springs system black.

For now, the Commission continues to be satisfied that there appears to be sufficient momentum and incentive in progressing the various modelling activities, which are a prerequisite for completing recommendation 12. The Commission still considers the work to optimise the UFLS settings is necessary and should be completed prudently and as soon as reasonably possible.

As with previous progress reports, a further update on progress implementing the recommendations of other major reportable incidents since January 2015 is also included in this report. In short, PWC System Control has continued to actively track, implement and close out recommendations across the Darwin-Katherine, Alice Springs and Tennant Creek power systems. Pleasingly, the Commission understands that when a recommendation is not related to a compliance issue, PWC System Control now actively seeks to negotiate with the system participant/s to encourage action. The Commission is aware of examples where this negotiation has been successful, resulting in improvements and reducing potential risk to the power system.

As requested by the former Minister for Essential Services, and given the importance of ensuring all Alice Springs system black actions are completed, the Commission will continue to publish six-monthly reports until the final outstanding action is complete.

¹ Includes approved extensions of time from the former 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 requested extensions to the initial timeframes for a number of recommendations from the former Minister for Renewables, Energy and Essential Services. Where these extensions were requested, and whether the extensions were approved or not approved for previously completed recommendations can be found in the February 2022 progress report².

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 close of business on 10 February 2023, 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 the one outstanding recommendation as advised by PWC and TGen, and associated Commission comments.

A more detailed summary on the status of previously completed recommendations (and subsequent actions) can be found in the February 2022 progress report².

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	Complete
2	Jointly report to the Utilities Commission for advice to Government:	System Control and TGen	30 June 2020	Complete
	a) on a plan to implement improved solar forecasting			

² <https://utilicom.nt.gov.au/publications/reports-and-reviews/progress-report-on-the-implementation-of-recommendations-from-independent-investigation-of-alice-springs-system-black-incident-on-13-october-2023>

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	Complete
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	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	Complete
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	Complete
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	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	Complete
	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. ³	PWC and TGen	31 Jan 2020	Complete
7	Other procedural recommendations include: a) a System Control Black System Restart Procedure is to be prepared	System Control	31 Dec 2019	Complete
	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

³ 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
	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, to address views expressed in interviews that training for operational staff is limited.	PWC and TGen	30 June 2020 revised to Dec 2020 for PWC	Complete
8	Make engineering changes to avoid the Jenbacher units becoming overloaded during power system events: <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. 	TGen	31 Jan 2020	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	Complete
	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	Complete

ID	Recommendation	Responsible	Due date	Status
10	a) Make engineering changes to ensure the battery energy storage system (BESS) does not become overloaded during power system events	TGen	31 Jan 2020	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	Complete
11	Address issues adversely affecting system security. In particular:	TGen	31 Jan 2020	Complete
	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			
	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	Complete
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 ⁴	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
	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 and six further complete
15	a) In collaboration with relevant stakeholders, is to update communications protocols, response plans and procedures for the protection	PWC	31 Dec 2019	Complete

⁴ On 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 former Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's August 2020 progress report. Subsequently, the Minister did not 'approve' or 'not approve' the requested extension.

ID	Recommendation	Responsible	Due date	Status
	of vulnerable customers in the event of electricity supply interruptions			
	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	Complete

DETAIL OF RECOMMENDATIONS AND PROGRESS

The Commission provided a table in previous progress reports, which included a detailed summary on the status of each of the recommendations in the Government's response, as advised by PWC and TGen, and the Commission's associated comments in relation to progress as necessary. Consistent with the August 2022 progress report, as there is only one outstanding recommendation, the Commission has decided to remove the table and focus on that recommendation (12, in relation to a review of the UFLS in Alice Springs).

A more detailed summary of information regarding completed recommendations (and subsequent actions) can be found in the February 2022 progress report⁵.

Recommendation 12

Undertake the recommended review into the UFLS scheme and provide the review report to the Commission for advice to Government.

Due date: 30 June 2020⁶

Responsible: PWC

Status: Underway

PWC previously advised the Commission (on 17 August 2020) that studies had commenced on the implementation of revised UFLS settings, however, this work was reliant on various power system modelling activities being completed first, such as the development and acceptance of models for TGen's Jenbacher generators and BESS. Subsequent updates from PWC over the last two and half years, including the most recent update on 8 February 2023, have continued to advise that PWC and TGen are progressing various modelling activities, which are a prerequisite for PWC's review of the UFLS scheme.

Relevantly, the Commission acknowledged in its 2020-21 Northern Territory Power System Performance Review (NTPSPR) that connection-related activities, including modelling activities, were likely being hampered by very low availability of experienced personnel due to the high level of activity in the power system planning, network connections and system operations space across Australia.

Notwithstanding, the Commission notes it has been over three years since the Alice Springs system black. This appears to be a significantly long period of time in which to complete these activities, particularly given the Commission raised concerns regarding PWC's modelling of system changes and associated operations as far back as the 2017-18 NTPSPR, which predates the Alice Springs system black.

Given PWC's updates regarding recommendation 12 have focused on TGen's outstanding modelling activities, the Commission again requested an update from TGen regarding the matter.

⁵ <https://utilicom.nt.gov.au/publications/reports-and-reviews/progress-report-on-the-implementation-of-recommendations-from-independent-investigation-of-alice-springs-system-black-incident-on-13-october-2023>

⁶ On 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 former Minister for Renewables, Energy and Essential Services deferred a decision on the extension until after the Commission's August 2020 progress report. Subsequently, the Minister did not 'approve' or 'not approve' the requested extension.

On 10 February 2023, TGen's update was received, which advised TGen's Jenbacher models have been developed and are going through a PWC due diligence process. Further, there continues to be weekly meetings with PWC and other relevant stakeholders regarding Alice Springs modelling activities.

Both PWC and TGen have indicated that progress has been made since the Commission's August 2022 progress report in terms of Alice Springs modelling activities, with the goal of developing an overall model of the Alice Springs power system. This will, among other benefits, allow PWC to complete the outstanding review to optimise the UFLS scheme.

For now, the Commission continues to be satisfied that there appears to be sufficient momentum and incentive in progressing the various modelling activities, which are a prerequisite for completing recommendation 12. Therefore, the Commission will continue to request updates from relevant licensees as required, and monitor progress.

The Commission notes PWC's previous advice that the current UFLS scheme is in service and has demonstrated performance through major system events. Notwithstanding, the Commission still considers the work to optimise the UFLS settings is necessary and should be completed prudently and as soon as reasonably possible.

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 considered met the intent of the recommendation.

PWC System Control has continued to refine its major incident recommendation tracking spreadsheet, with associated indicators for analysis and reporting of recommendations, which the Commission has reviewed and is satisfied with the adequacy.

Following PWC System Control's detailed review of outstanding recommendations in the period following the system black in Alice Springs, it has continued to actively track, implement and close out recommendations across the Darwin-Katherine, Alice Springs and Tennant Creek power systems. PWC System Control advised that it is prioritising more recent higher priority recommendations over older lower priority recommendations.

As stated in previous progress reports, it would be unrealistic to expect the number of incidents and associated recommendations to ever be zero, noting power system incidents happen in all power systems and unless a recommendation is in relation to a non-compliance with a code or other legislative obligation, the system participant is not obliged to implement PWC System Control's recommendation.

PWC System Control has advised that when a recommendation is not related to a compliance issue, it now actively seeks to negotiate with the system participant/s to encourage action. PWC System Control has previously provided examples where this negotiation has been successful, resulting in improvements and reducing potential risk to the power system.

Notwithstanding, the Commission understands there are (and will likely be in the future) some PWC System Control recommendations that system participants may not agree to action, such as recommended 'improvements' where a financial or other resource commitment is needed and the recommendation is not linked to a regulatory obligation. These will be more difficult to close out, and where PWC System Control considers the matter puts power system security and or reliability at risk, consideration should be given to strengthening obligations in the System Control Technical Code or other relevant legal instruments, subject to consideration of the costs and benefits and thorough stakeholder consultation.

The Commission will continue to monitor PWC System Control's progress and tracking of major reportable incident recommendations, and report and take action as appropriate.