Audit of ElectraNet Service Standards Performance Reporting

PERFORMANCE RESULTS FOR 2005

- Final Report
- 24 March 2006

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1. Executive Summary

Sinclair Knight Merz (SKM) was engaged by the Australian Energy Regulator (AER) to conduct an audit of the performance report of ElectraNet for 2005 under the AER Performance Incentive (PI) Scheme.

The audit reviewed the performance results submitted by ElectraNet, in particular:

- the adequacy and accuracy of the recording system used to measure performance;
- the accuracy of the calculations of the final performance; and
- the force majeure and other exclusions to accord with the service standards guidelines.

SKM met with ElectraNet staff in Adelaide on Wednesday 15 February 2006, to review their data systems and procedures for gathering and processing outage information. The integrity of the system established by ElectraNet for retrieving data from the Events Database for reporting under both internally and the AER PI Scheme was audited. As a result of audit activities undertaken, Sinclair Knight Merz has formed an opinion that:

- the performance reporting by ElectraNet was free from material errors and was in accordance with the requirements of the AER service standards guidelines;
- ElectraNet correctly applied the PI Scheme formulas and coefficients to calculate the performance incentive amount using the equations contained in the revenue cap decision[1], although there was a rounding-off error in the performance result for one measure;
- the recording system used by ElectraNet to capture outage data is accurate and reliable;
- the categorisation of assets was consistent with the historical categorisation; and
- the application of exclusions was in accordance with historical calculation of performance.

SKM recommends that:

- ElectraNet's calculation of its S-factor be accepted as free from material errors, although there was a minor rounding off error in the Circuit Availability measure result;
- the exclusion of parts of the Vic – SA Separation of 14 March 2005 is reasonable in light of the NEMMCO investigation findings;
- the inclusion of major capital works capped to 14 days is consistent with the transmission line availability calculations applied in previous reviews; and

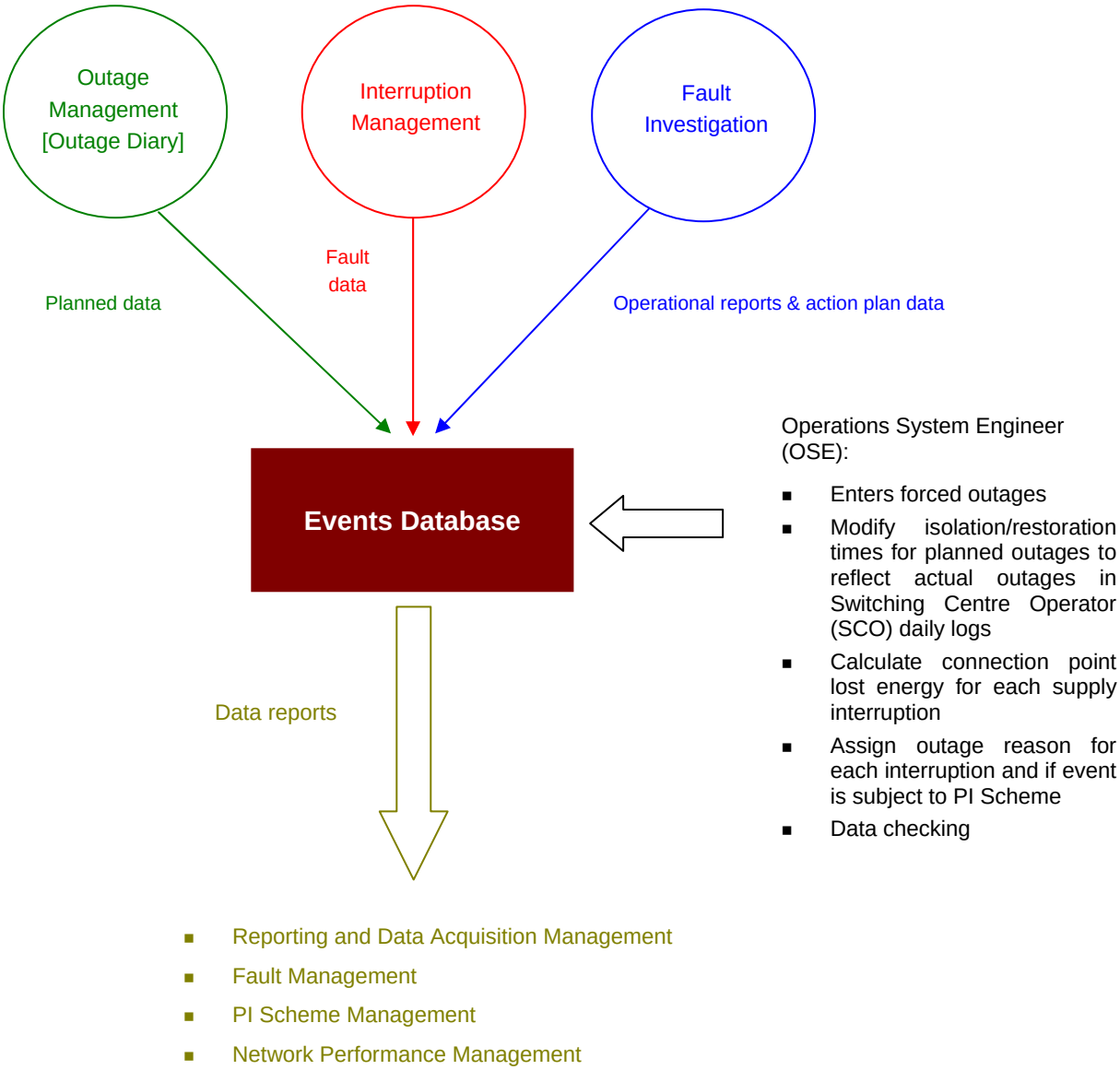
- based on the acceptance of the proposed exclusions being consistent with standard performance measures in the AER ElectraNet determination, the bonus recommended under the AER PI Scheme for 2005 is **0.721482% of the agreed Annual Revenue for 2005.**

[1] The original revenue cap decision contained errors in the table in Appendix 6. The formulas contained in Appendix 7 are the correct figures, and the ACCC has written to ElectraNet SA with a corrected Appendix 6 table. The correct figures have been used by ElectraNet SA to calculate its performance incentive.

2. Recording System

An overview of the ElectraNet transmission performance data management process is shown in Figure 2-1.

- **Figure 2-1 Transmission Performance Data Management Process**



2.1 Events Database

The Events Database was developed in-house using Oracle. Data entry is currently based on a series of manual inputs, although the system is being developed and more direct data input methods would be employed in the future.

Operators in the Switching Operation Centre maintain an electronic log using a database system, which the Operations System Engineer (OSE) subsequently uses to review events and cross check the start and finish times for outages entered by the operators with the SCADA records.

Certain defined events, such as forced outages, automatically generate preliminary advice via SMS and a confirmation email from the operator in the Switching Operation Centre to a defined list of staff, advising of the details of the incident.

Planned work is recorded in the Outage Diary, which is entered into the Events Database. The OSE reviews each planned outage against the daily logs and SCADA records to modify the isolation and/or restoration times to reflect actual times. Each planned outage is part of the System Switching Program and carries a SSP number for easy identification. The operators log the actual start and finish times for this work, and it is these times that are used in calculating performance results.

In late January 2006, ElectraNet introduced a custom system to tighten the control of and accountability for planned outages. The Switching Writer and Outage Booking System (SWOBS) allows any person either internal to ElectraNet or a third party to enter the requirements for an outage, including the proposed time and the particular pieces of plant (selected from equipment lists) to be effected. Based on these requests, ElectraNet schedule the outages and make the results available to third parties with external viewing access rights. Once an outage has been planned, an authorised person[2] will develop the initial switching sheet, which will be subsequently checked and amended as required. A complete history and audit trail of the switching sheet is maintained within SWOBS. There have been a number of minor operational problems identified, and accepting that the system is still in the transition phase, the initial response to the introduction of SWOBS has been positive. The intention is to eventually replace the Outage Diary with SWOBS, and potentially link directly with the NEMMCO outage scheduler.

All relevant events from the logs, interruption reports, and the Outage Diary are entered into the Events Database. Fault investigation reports are used in some cases to establish the cause of outages, and to assign the appropriate classification (eg included/excluded).

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[2] Clause 4.10.3(d) of the National Electricity Rules states registered market participants registered by NEMMCO as network service providers " *...must ensure that transmission network operations performed on their behalf are undertaken by authorised persons ...*".

For each outage, the Operation System Engineer calculates the unserved energy using actual load data from revenue metering, reviews the cause for the outage and codes the event for calculation of performance under the PI Scheme. This coding is checked by others as part of the operational report for each event, and modified if the original categorisation is deemed inappropriate. It was noted that the original coding is not overwritten, but updated, so that there is a history maintained for this coding phase.

2.2 Categorisation and Exclusions

The reasons for each event are considered at the time events are entered into the Events Database, and excluded events are "tagged" in the database.

2.3 Processing of Outage Data

ElectraNet have developed database queries and reports that extract relevant data from the Events Database for further analysis in a spreadsheet for PI Scheme analysis and reporting.

The Events Database acts as a single information source for PI Scheme reporting, with all relevant events exported to spreadsheets for summation and analysis. There is a separate sheet for each performance indicator, listing total events for that indicator. A cover sheet summarises the results for each performance indicator, and calculates the S-factors and revenue bonus/penalty.

2.4 Calculation of Performance Measure Results

The performance measure results are calculated using the S-factor equations defined in the South Australian Transmission Network Revenue Cap decision (2002). The AER has previously written to ElectraNet clarifying the discrepancies between Appendices 6 and 7 of the original decision document, and confirming that the equations in Appendix 7 prevail over the figures in Appendix 6. ElectraNet have applied the equations and coefficients from Appendix 7.

2.5 System Audit Findings

Following the extensive testing of the recording system in previous reviews which found no errors in the processing of event data, SKM conducted additional sample testing of the Events Database in 2006 to ensure correlation with spreadsheet reports. The tests confirmed that each of the events had been correctly transferred, with the date, time and other details intact. SKM was satisfied the reasons and classification for each event was reasonable and in accordance with historical reporting protocols.

3. Exclusions

The AER service standard guidelines noted that the PI Scheme adopted standard definitions for performance measures to ensure that TNSPs have similar incentives, whilst recognising that these definitions needed to be flexible. It was highlighted that the definitions should align with appropriate information that the TNSP has been collecting historically to ensure that performance is measured consistently over time to preserve the incentive to improve. The audit identified the events that have been excluded in the past.

3.1 Excluded Events

For each of the performance measures applicable to ElectraNet, there are different exclusions specified for each. These exclusions are shown in Table 1 for each of the performance indicators.

Shaded areas represent exclusions applied by ElectraNet in line with historical practice that are not explicitly listed in the AER PI Scheme (as per the South Australian Transmission Network Revenue Cap decision (2002)).

Table 1 Exclusions for ElectraNet performance indicators

Circuit Availability	Loss of Supply Event Frequency Index	Average Outage Duration
Unregulated transmission assets;	Unregulated transmission assets	Unregulated transmission assets
3rd party initiated events (TNSPs, generators, customers, NEMMCO)	3rd party initiated events (TNSPs, generators, customers, NEMMCO)	3rd party initiated events (TNSPs, generators, customers, NEMMCO, faults causing correct operation of ElectraNet protection)
Extended outages for major line rebuilding involving substantial multi structure replacements, restringing and reinsulation	Planned outages	Planned outages
	Successful reclose within one (1) minute	Momentary interruptions (<1 minute)
Force majeure	Force majeure	Force majeure
Voltage control [3] where circuit is available for immediate restoration	Outages resulting from an interconnector outage are capped to thirty (30) minutes	Outages resulting from an interconnector outage are capped to thirty (30) minutes
Opening of only one end of a transmission line ie. where the transmission line remains energised and available	SA Water pumping station supply outages (refer section 3.2)	

[3] Circuit switched out to provide actual or contingency voltage control.

3.2 SA Water

Interruptions involving SA Water pumping stations are included in Average Outage Duration performance calculations but excluded from the Loss of Supply Event Frequency Index. This is due to two main considerations:

- These interruptions were excluded from historical data used in setting performance targets under the AER PI Scheme, as pumping station loads are highly irregular, which makes any accurate estimation of load profiles and therefore projected energy lost very unreliable; and
- SA Water pumping stations are classified as Category 1 loads under the South Australia Transmission Code, and were historically interruptible by ElectraNet and therefore excluded from any calculations of lost system minutes.

The Transmission Code defines a Category 1 load as

"A transmission entity shall not contract for an amount of agreed maximum demand greater than 100% of installed line capacity. A transmission entity shall have no obligation to provide N-1 line capacity [4] beyond that necessary to maintain power system performance and quality of supply standards under the National Electricity Code. A transmission entity shall use its best endeavours to restore the contracted line capacity within 2 days of an interruption."[5]

[4] N-1 means the ability of the transmission system to continue to supply loads connected to the system in the event of a "worst case" outage of any single element (line, transformer, busbar, circuit breaker…)

[5] Essential Services Commission of South Australia, *Electricity Transmission Code*, 1 July 2003, section 2.2.2

3.3 Audit Findings

During 2005, there were 267 events recorded for transmission line circuit outages, and 80 customer interruption events[6]. The number of exclusions, and primary cause for exclusion, are shown in Table 2 and Table 3.

Table 2 Transmission line circuit availability outages

Outage type	No. of events	Hours	Notes
Included events	256	4,043.77	Includes Mannum-Mobilong and LeFevre project work each capped to 14 days[7]
Excluded events	5	29.49	Third party customer requests
	2	34.80	Protection work on unregulated assets
	1	99.27	Voltage control work at Olympic Dam
	1	31.32	Maintenance on non ElectraNet asset
	1	13.12	Murraylink Berri substation maintenance*
	1	1.08	Wind farm project work
Subtotal	*11*	*209.08*	
Total	**267**	**4,252.85**	

* Note that ElectraNet recorded this event as a 13.117 hour event at Monash – Murraylink Berri substation on 13 October 2005, and was excluded as a third party customer request. An audit of the Murraylink outages confirms that a scheduled outage for annual maintenance on 13 October 2005 was included in the Murraylink Transmission Company regulated performance measure, totalling 13 hours 23 minutes. There was a minor discrepancy in the start times recorded by the two TNSPs, allowing for the time difference between South Australia and Victoria.

Consistent with previous reviews relating to major capital works, ElectraNet have included the extended transmission line outages resulting from the following projects:

- Mannum – Mobilong 132 kV transmission line rebuild; and
- Le Fevre substation extension.

The time associated with each of these extended outages has been capped to 14 days in aggregate in calculating the 2005 transmission circuit availability figure.

[6] A single customer interruption event may affect a number of separate connection points.

[7] The uncapped result for inclusions in 2005 was 5,119.82 hours.

Table 3 Customer interruption events

Outage type	No. of events	Minutes	System minutes[8]	Notes
Included events	43	2,168	0.597	
Excluded events	20	0	0.000	Trips caused by generators
	5	81	0.892	Vic – SA power system incident
	5	162	0.528	Trips caused by ETSA Utilities protection
	4	1,279	1.733	Eyre Peninsula outage
	1	110	0.000	Trips caused by SA Water protection
	1	39	0.334	Eyre Peninsula bushfire
Subtotal	*37*	*1,671*	*3.487*	
Total	**80**	**3,839**	**4.084**	

Table 4 summarises the overall results by included and excluded events.

Table 4 Summary of inclusions and exclusions

Category	Total no. of events		Total Duration	
	Included	Excluded	Included	Excluded
Transmission line circuit outages	256 (96%)	11 (4%)	4,044 (95%)	209 (5%)
Customer interruption events	43 (54%)	37 (46%)	2,168 (56%)	1,671 (44%)

[8] System Minutes are calculated for each individual connection point affected by an event. It is calculated as *System Minutes = Average Load Lost (MW) * Outage Duration (minutes) / System Maximum Demand*

3.4 Excluded Events

Three events nominated as exclusions by ElectraNet were considered and investigated by SKM:

- Vic - SA power system incident of 14 March 2005;
- Eyre Peninsula outage of 29 August 2005; and
- Mt Barker - Mobilong line trip of 30 August 2005.

3.4.1 Vic - SA power system incident

On Monday 14 March 2005, the 275kV transmission line between Playford and Davenport tripped, automatically reclosed and as the fault had cleared, remained in service. As a result of this momentary trip, generating units at Northern Power Station in South Australia off loaded, the AC interconnection between Victoria and South Australia tripped, and automatic under frequency load shedding of 578MW occurred in South Australia. In addition, three generating units at Ladbroke Grove and Pelican Point Power Stations tripped out of service, shedding 231MW.

The transmission line fault occurred near the Northern Power Station, and caused a reduction in the power supplied by Northern Power Station during the fault, after which the power station returned to previous output levels. NRG Flinders (operator of Northern Power Station) advised that this quick change in output level resulted from the operation of the Overspeed Protection Circuit (OPC)[9] system. This reduction caused the load on the Vic – SA interconnector to increase rapidly beyond its design limit, and it was automatically tripped. Following the separation of the Victorian and South Australian grids, the frequency on the South Australian transmission network fell rapidly from 50Hz to a momentary minimum of 47.62Hz, and under frequency load shedding occurred to stabilise the network. This load shedding stabilised the frequency at approximately 49.70Hz, but it took some time for additional frequency control measures to correct the low frequency so as to allow for the reconnection of the Vic – SA interconnector.

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[9] This event is similar to another that occurred on 8 March 2004. On that occasion, a fire in the vicinity of Para substation resulted in the Para-Tailem Bend No 2 275kV line tripping, an unexpected off loading of Northern Power Station, severe overloading and tripping of the Vic-SA interconnector, and automatic load shedding in the Adelaide area. Following an investigation, NEMMCO concluded that the OPC settings at Northern Power Station were overly sensitive and made a number of recommendations including the recalibration of the OPC system, and a changing of auto recloser settings. Neither NEMMCO nor ESCOSA were prepared to definitively allocate responsibility for this outage to any particular party in this incident report. On that occasion, SKM accepted the portion of the event claimed for exclusion by ElectraNet from the 2004 performance calculation.

An update of the recommendations published by NEMMCO in July 2004 outlined the progress made by NRG Flinders in changing and recalibrating the OPC system, and of a market review of under frequency load shedding arrangements. NEMMCO withdrew its recommendations regarding changes to the auto reclosure delay time of 275kV circuit breakers and auto reclosure sequences following a review and acceptance of advice from ElectraNet.

NEMMCO reported that the outage for the interconnector between Victoria and South Australia was 22 minutes, with a number of generators and Murraylink being used to stabilise the frequency in South Australia prior to the reconnection of the two networks. Supply was interrupted at Mount Barker, Hahndorf, Balhannah and Meadows for 81 minutes due to the under frequency load shedding.

The NEMMCO investigation[10] found that the momentary trip on the Playford – Davenport transmission line was due to three separate insulator flashovers, causing phase to ground faults. The line protection operated successfully to clear the faults and automatically re-close the line. All faults were cleared within expected fault clearance times, and the automatic reclosing occurred in 500 milliseconds which was within design expectations. No definitive cause has been found for these flashovers.

In a report on a similar incident on 8 March 2004, NEMMCO originally suggested that an auto reclose time of 500 milliseconds had contributed to a power swing on the network, but this assessment was subsequently withdrawn following advice provided by ElectraNet. In this case, NEMMCO concluded that the " ... *auto re-close delay time was not a contributing factor in the incident of 14 March 2005, as the re-closing was successful, and the OPC protection at Northern Power Station had already substantially reduced the output of the generating units before the auto re-close took place.*"[11]

The NEMMCO report identified two contributory factors to the incident:

- Inappropriate operation of the OPC protection at Northern Power Station; and
- A software error at Pelican Point Power Station.

Both of these issues have subsequently been corrected to prevent a recurrence. In addition, NEMMCO recommended that the under frequency load shedding blocks in South Australia need to be reviewed. NEMMCO is currently undertaking a review of under frequency load shedding settings across the national grid, and will include any South Australia review findings into account.

SKM is satisfied that the NEMMCO investigation does not implicate ElectraNet in any way as contributing to this incident. The protection and auto re-close devices functioned correctly in clearing the momentary fault on the Playford – Davenport line, and the subsequent Vic – SA separation and under frequency load shedding resulted from third party trips. Therefore, SKM considers that this event satisfies the stated exclusions within the performance measures for total

[10] NEMMCO, *Power System Incident 14 March 2005: Final Report*, 26 August 2005

[11] pp 4, section 3

circuit availability and Loss of Supply Event Frequency Index (measures 1 and 2) as a third party trip, and should be excluded from the performance calculations.

ElectraNet included a transformer outage of 22 minutes at Dorrien that occurred during the period when additional generation was being dispatched to address the frequency stabilisation problems in South Australia. This transformer tripped due to the correct operation of protection against overcurrent. SKM is of the opinion that this outage has been appropriately included in the performance calculation.

SKM is of the view the reported outage at Mount Barker and surrounding districts in the Adelaide Hills should be excluded from the outage duration calculation (Measure 3). This outage was due to load shedding that was outside of the control of ElectraNet, and the outage was not due to a failure of any transmission network asset.

3.4.2 Eyre Peninsula Outage

On the evening of Monday 29 August 2005, a severe electrical storm passed across the Eyre Peninsula. Just before 10:00pm, a lightning strike on the 66kV distribution network between Rudall and Lock resulted in protection at Whyalla substation operating to clear the sustained fault on the distribution system. As a consequence, supply was lost to the Eyre Peninsula south of Whyalla, with most locations without power for approximately 6½ hours.

To minimise the outage to the Port Lincoln district, gas turbines were dispatched to provide supply. The total outage for Port Lincoln was approximately 1¼ hours.

ElectraNet has investigated the incident, and concluded that there was a deficiency with the protection scheme on the section of the distribution network struck by lightning. This resulted in protection at Whyalla substation acting to clear the sustained fault.

Given the severe weather conditions persisting and the incident occurred late at night, it was extremely difficult to accurately ascertain at that time the precise cause for the Whyalla circuit breaker tripping. The priority for ElectraNet was for the restoration of power to the Eyre Peninsula, which saw a number of temporary arrangements including the use of standby gas turbines and alternative switching to minimise the transmission outage.

Following a review of this incident, SKM is of the view that:

- Independent weather reports for the 29th and 30th of August 2005 detailed gale force winds and electrical storms in the Eyre Peninsula, Adelaide and surrounding districts. Unseasonally high temperatures in the Adelaide city area in the preceding days dropped to record monthly minimum temperatures on the morning of the 29th, as a cold front approached from the Great

Australian Bight. Heavy rain, lightning and very strong winds were recorded on the 29th, with a report of a lightning strike[12] affecting the Eyre Peninsula power grid.

- It was not immediately apparent whether the cause for the Whyalla protection operation was related to a fault on the transmission network or elsewhere. This triggered the need for ground level inspection of affected transmission lines to ensure public safety prior to attempting to re-energise the affected lines. The line inspection was hampered by the severe weather conditions.
- To minimise the outage at Port Lincoln, ElectraNet dispatched gas turbines to restore supply to Port Lincoln and surrounding areas.
- The transmission network between Whyalla and the next substation at Yadnarie was isolated, and line patrols conducted to try and ascertain the cause of the problem. The circuit breaker at Whyalla that cleared the fault failed to close when restoration from Whyalla was subsequently attempted.
- Some switching was done at Playford to effectively bypass the circuit breaker at Whyalla, and power was restored to the Eyre Peninsula.
- It is evident from the records of availability outage events provided during the audit that ElectraNet included the time taken to remove the bypass and repair the circuit breaker at Whyalla in September and October 2005.

From this review, SKM concluded that the initial cause of the outage event was a third party trip. The lightning strike on the distribution network should have been cleared by protection on the distribution network, but instead was cleared by the protection at Whyalla substation. The definitions for Circuit Availability (Measure 1) and Loss Of Supply Event Frequency (Measure 2) exclude " ... *any outage caused by a fault or other event on a 3rd party system.*"[13] As a result, SKM would recommend the exclusion of this event from the performance calculation for these measures.

The definition for Average Outage Duration (Measure 3) in the South Australia determination of 2002 does not explicitly exclude third party trips, although ElectraNet historical data for this measure has been based on the exclusion of third party outages. The Force Majeure definition for ElectraNet in the South Australia determination excludes " ... *third party and natural events for which the TNSP can not be reasonably expected to cater for.*"[14] Therefore, SKM is of the view that this event should be excluded from the outage duration, both to be fair and reasonable in

[12] www.hillsrain.com report for 29-08-05 to 31-08-05

[13] ACCC, *South Australia Transmission Network Revenue Cap: Decision*, 11 December 2002, Appendix 5, pp 116 and 117

[14] Appendix 5, pp 121

comparison with agreed targets based on historical data excluding third party trips, and as it satisfies the Force Majeure provision.

It is a historical reporting practice for ElectraNet to categorise an event depending upon the initiating cause. In this instance it is agreed that the failure of the protection scheme on the distribution network following the lightning strike was the progenitor of the event. However, SKM believes that in this particular incident, the outage was in part slightly extended due to the problems encountered in reclosing the circuit breaker at Whyalla. There is insufficient evidence available to determine the extent to which the circuit breaker problem contributed to the outage, and therefore SKM would recommend that the event be excluded from the performance results in accordance with accepted exclusions. However, SKM would suggest that consideration be given in future to splitting the recording of major incidents to allow for a more precise review.

3.4.3 Mt Barker - Mobilong line trip

At 12:45pm on Tuesday 30 August 2005, a line trip occurred on the 132kV transmission line between Mt Barker and Mobilong due to a failure of a shackle, which allowed a conductor to fall onto a lower crossarm. The resulting phase-to-earth fault caused circuit breakers at both Mt Barker and Mobilong to trip and lock out.

The fault occurred during severe weather conditions which hampered the repair work. Due to strong winds, ETSA Utilities were unable to make use of a crane to effect the necessary repairs until the following day. To enable safe access, it was necessary to de-energise the Cherry Gardens – Robertstown 275kV No. 1 line for approximately 2.35 hours.

In its submission, SKM noted that ElectraNet has included the Mt Barker – Mobilong line trip event in the calculation of transmission line availability, but inadvertently excluded the isolation of the Cherry Gardens – Robertstown line for safe access of the crane. This error was acknowledged by ElectraNet and corrected during the audit. The minor adjustment that resulted from this correction is shown within the SKM recommendations for S-factors in Table 5.

3.5 Recommendations

The audit identified that the categories used for designating exclusions are generally in accordance with the exclusions defined with the ElectraNet determination. The exception is system minutes[15] associated with SA Water outages which has been excluded in accordance with historical reporting protocols and previous reviews.

[15] System minutes are used in the calculation of the Loss of Supply Event Frequency indices.

4. Force Majeure

In the Service Standards Guidelines published by the AER[16], there are four (4) considerations listed for determining what force majeure events should be "excluded force majeure events". These are:

- Was the event unforeseeable and its impact extraordinary, uncontrollable and not manageable;
- Does the event occur frequently – if so, how did the impact of the particular event differ;
- Could the TNSP, in practice, have prevented the impact (not necessarily the event itself); and
- Could the TNSP have effectively reduced the impact of the event by adopting better practices?

4.1 Definition

The definition used by ElectraNet in the determination of performance under the AER PI Scheme reflects the definition outlined in the AER service standards guidelines and which was used historically in processing performance data (see Appendix B for details).

4.2 Eastern Eyre Peninsula bushfire

Between the 10th and 12th of January 2005, a major bushfire swept across the Eyre Peninsula, burning approximately 827 square kilometres, destroying 64 houses, and claimed 9 lives and injured a further 113 people.

The summer of 2004/05 had been a particularly hot and dry season, with less than half the normal rainfall, and extremely hot, dry and windy days. The fire began on Monday 10 January, caused, it is believed, by the hot exhaust system of a car driven through long grass near Wangery, 44 kilometres north west of Port Lincoln. The fire was contained that evening, but broke again and jumped containment lines the following morning.

The fire burnt rapidly to the east and southeast, driven by strong winds. Around 1:00pm, the Country Fire Service (CFS) was warning residents on the east coast of the Eyre Peninsula to take precautionary measures, and by 3:00pm, the fire had burnt itself out at the coastline. Due to a change in the winds, the fire front turned north, eventually reaching Koppio and Yallunda Flat. The fire was finally brought under control at noon on Wednesday 12th of January. It had taken 400 CFS personnel and 80 appliances and water-bombing aircraft to battle the blaze.

Eight of the victims died in attempting to outrun the fire in their motor vehicles. Many other reports suggested that the speed with which the fire advanced made it almost impossible to save property.

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[16] ACCC, *Statement of principles for the regulation of transmission revenues – Service standards guidelines*, 12 November 2003, Schedule 2

The earliest advice ElectraNet received regarding the advance of the fire on the 11th of January was a report at 11:18am from ETSA Utilities personnel on site at the Port Lincoln substation reporting dense smoke. Following confirmation from the CFS that the fire had broken through containment lines, the substation was evacuated approximately ½ hour later. At 12:33pm, the line protection on the Yadnarie – Port Lincoln 132kV transmission line operated and resulted in an outage of 8.7 hours. The Port Lincoln area was isolated from the transmission network, and gas turbines used to restore supply.

Approximately 20km of this transmission line was affected by the fire, and subsequent aerial and ground inspections found that 30 tower structures had been damaged, numerous sections had heavy carbon deposits on the conductors and insulators and line dampers had been melted. There was no apparent damage to the conductors.

A spokesman for the CFS described this event as a classic fire storm, and was quoted in the media as suggesting that " ... *there is no force known to man that can control a fire burning under those conditions*."

SKM is of the view that this fire was a catastrophic incident that can be categorised as an extreme event for which ElectraNet could not be reasonably expected to cater for, and therefore satisfies the Force Majeure requirements. There is conclusive evidence that the fire was pre-existing when the transmission line tripped and the outage was not caused as a result of a line failure.

SKM recommends that this event be excluded from the performance results as a Force Majeure event.

5. Assessment of S-factors

Table 6 shows the results of S-factor calculation proposed by ElectraNet and recommended by SKM following its audit of the ElectraNet service performance report.

SKM confirmed that the ElectraNet has used the S-factor equations contained in the revenue cap decision and correctly applied the formulas and coefficients to calculate the S-factors in their submission. However, SKM has calculated the recommended S-factor results, correcting the error discussed in section 3.4.3 for the incorrect categorisation of an event.

It should be noted that in their submission, ElectraNet correctly applied the S-factor equations, but the performance availability result for *Circuit Availability (total)* was rounded off from 99.572825% to 99.57% prior to the calculation of the S-factor for total circuit availability. This had the effect of changing the resulting S-factor from 0.322825% to 0.32%. The *SKM without exclusion*s value shown in

Table 6 shows the S-factor for measure 1 without the rounding-off, so that the minor effect of the exclusion error discussed in section 3.4.3 is apparent.

Table 5 Performance Results

No	Performance Measure	Target	ElectraNet without exclusions	ElectraNet with all proposed exclusions	SKM without exclusions	SKM assessment
1	Circuit Availability (total)	99.25%	99.57282%	99.57282%	99.57282%	99.57258%
2a	Loss of Supply Event Frequency Index > 0.2 mins	5	1	0	1	0
2b	Loss of Supply Event Frequency Index > 1.0 mins	2	0	0	0	0
3	Average Outage Duration (mins)	100	114.11	110.35	114.11	110.35

Table 6 Calculated S-factors

No	Performance Measure	ElectraNet without exclusions	ElectraNet with proposed exclusions	SKM without exclusions	SKM assessment
1	Circuit Availability (total)	0.320000%	0.320000%	0.322825%	0.322576%
2a	Loss of Supply Event Frequency Index > 0.2 mins	0.100000%	0.100000%	0.100000%	0.100000%
2b	Loss of Supply Event Frequency Index > 1.0 mins	0.300000%	0.300000%	0.300000%	0.300000%
3	Average Outage Duration (mins)	(0.012844%)	(0.001094%)	(0.012844%)	(0.001094%)
	TOTAL	**0.707156%**	**0.718906%**	**0.721731%**	**0.721482%**

The profiles for each of the applicable measures are shown in Appendix A to illustrate the performance in graphical terms.

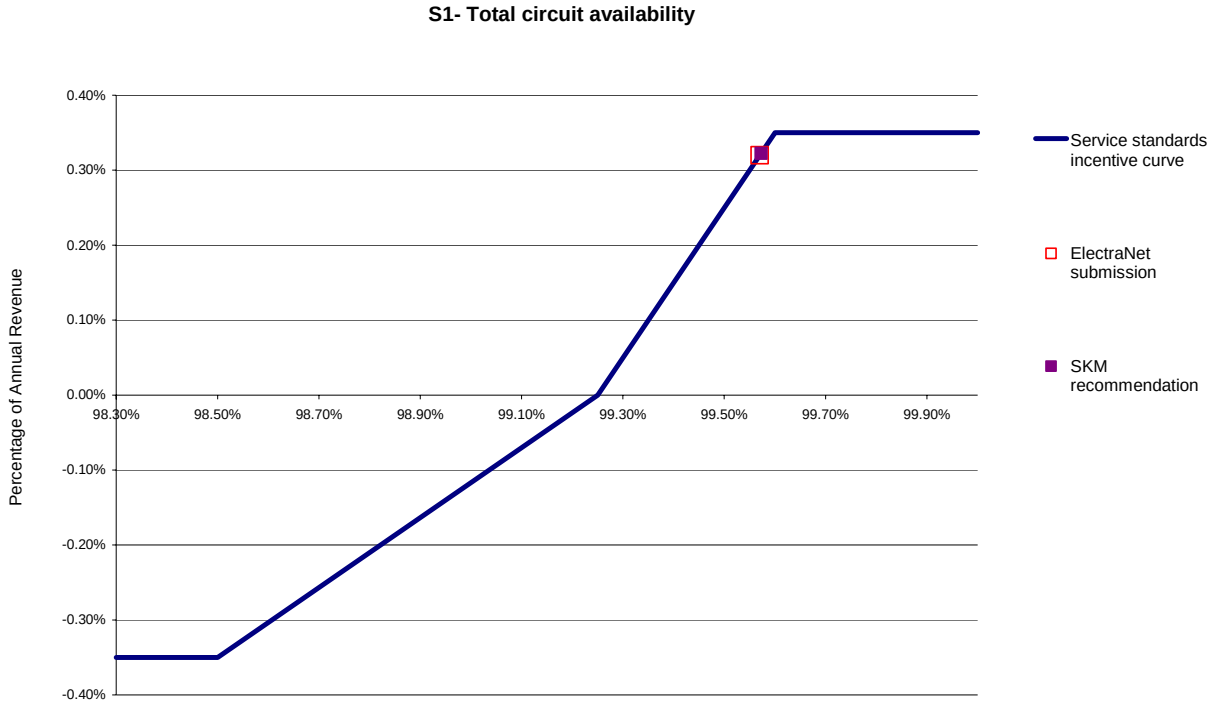
Based on these results, SKM recommends the bonus for ElectraNet should be **0.721482% of the agreed Annual Revenue for 2005**.

Appendix A Performance Measure Profiles

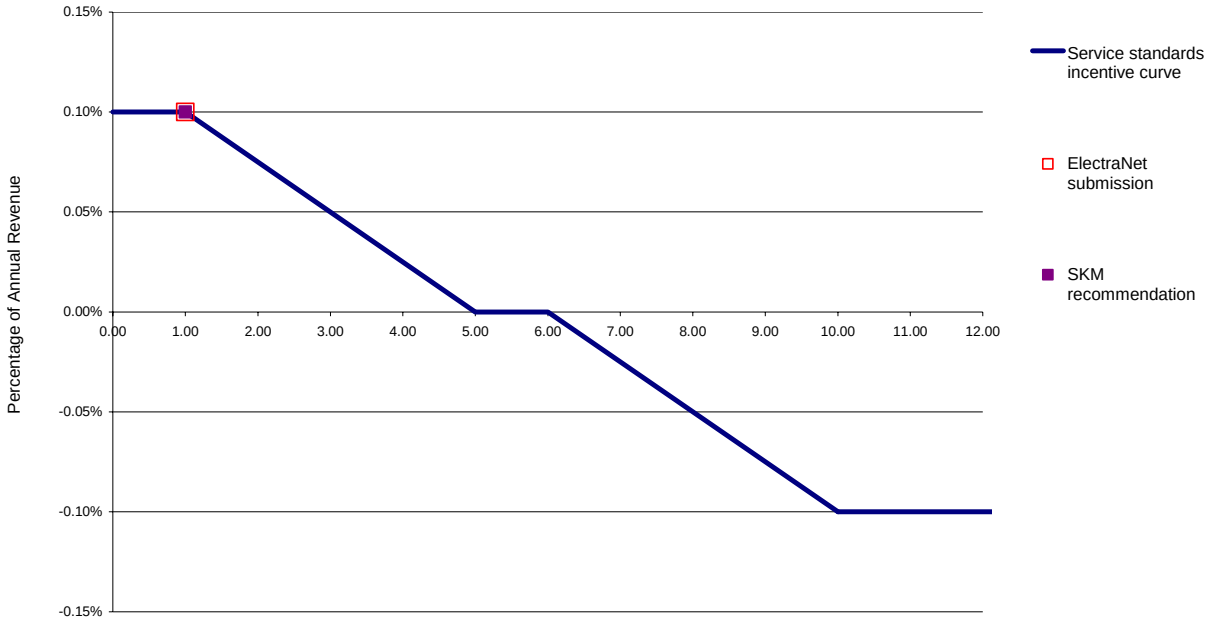
The Performance Measure profiles graphically illustrate the 2005 performance against the targets for Circuit Availability and Average Outage Duration.

The profiles shown are:

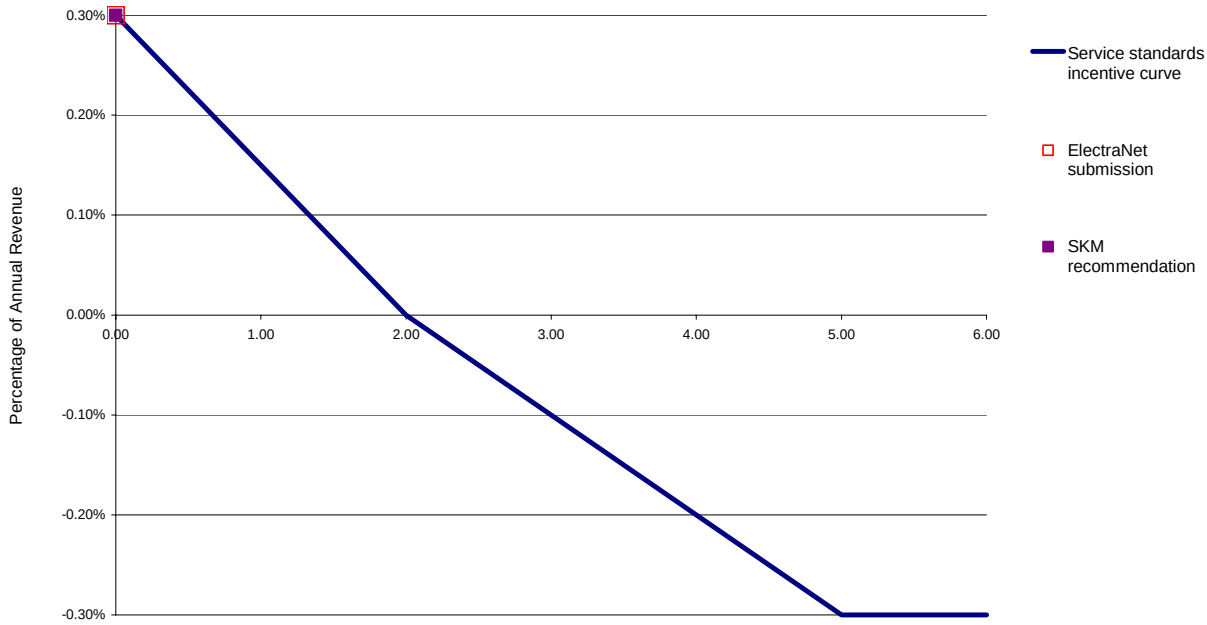
- Measure 1 Circuit Availability (total)
- Measure 2a Loss of Supply Event Frequency Index > 0.2 mins pa
- Measure 2b Loss of Supply Event Frequency Index > 1.0 mins pa
- Measure 3 Average Outage Duration

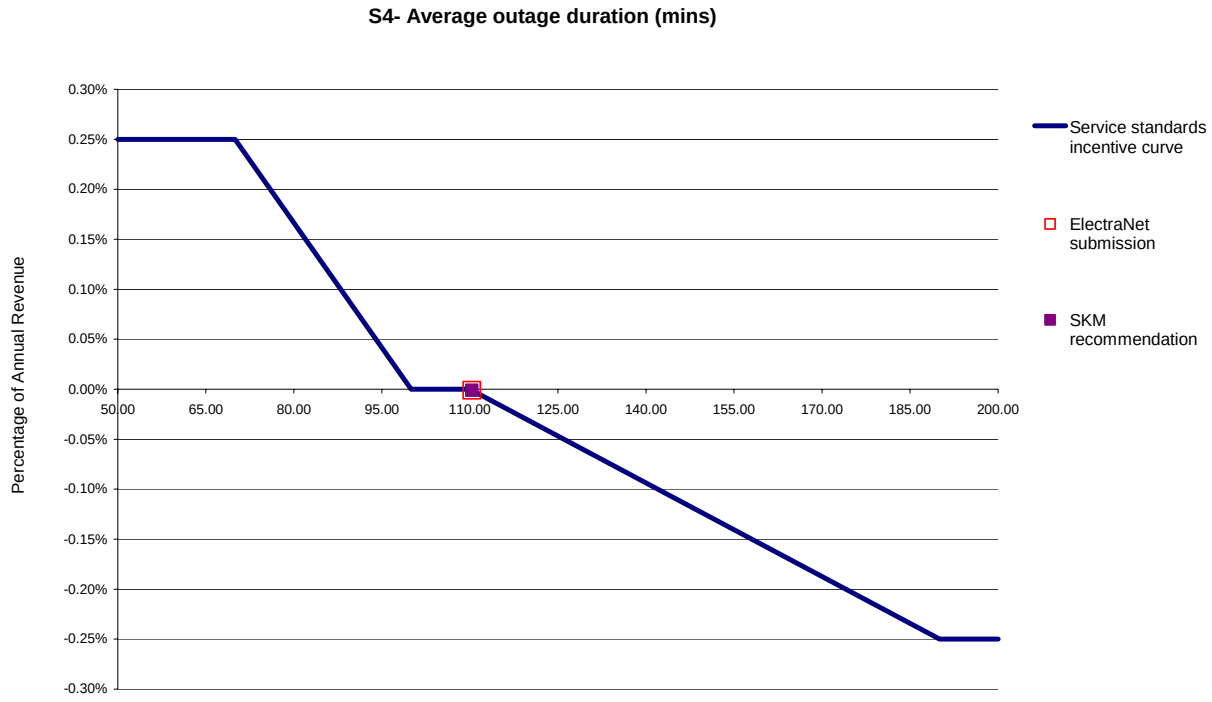


S2- Loss of supply frequency (>0.2 system minute)



S3- Loss of supply frequency (>1.0 system minute)




S4- Average outage duration (mins)
Percentage of Annual Revenue
0.30%
0.25%
0.20%
0.15%
0.10%
0.05%
0.00%
-0.05%
-0.10%
-0.15%
-0.20%
-0.25%
-0.30%
50.00
65.00
80.00
95.00
110.00
125.00
140.00
155.00
170.00
185.00
200.00
Service standards incentive curve
ElectraNet submission
SKM recommendation

Appendix B Definition of Force Majeure

The AER Revenue Cap decision does not contain a formal definition for force majeure.

On 6 February 2003 the AER wrote to ElectraNet clarifying discrepancies between the coefficients in Appendix 6 and Equations in Appendix 7 of the decision. At this time the AER included the following definition of force majeure:

"*… third party and natural events for which the TNSP can not be reasonably expected to cater for*"