Audit of SP AusNet Service Standards Performance Reporting

PERFORMANCE RESULTS FOR 2007

- Final Report
- 4 April 2008

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Sinclair Knight Merz
ABN 37 001 024 095
369 Ann Street, Brisbane 4000
PO Box 246
Spring Hill QLD 4004 Australia
Tel: +61 7 3244 7100
Fax: +61 7 3244 7301
Web: www.skmconsulting.com

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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 2007 performance report of SP AusNet (transmission) based on the service standards defined in the AER Revenue Cap decision 2003-2008[1], and in accordance with the general provisions of the service standards guidelines of November 2003.

The audit concentrated on a review of the performance results submitted by SP AusNet, in particular:

- the adequacy and accuracy of the recording system used to measure performance and a review of any changes since previous audits;
- the accuracy of the calculations of the final performance; and
- the force majeure events and other exclusions to ensure compliance with the Decision and AER service standards guidelines.

As the auditor, SKM met with SP AusNet staff in Melbourne on Monday 11 February 2008, to review the accuracy and integrity of the system established by SP AusNet for retrieving data from the MAXIMO maintenance system for reporting under the AER service standards. In addition, the supporting information for specific events was reviewed to examine any particular issues associated with the claim for exclusion.

As a result of audit activities undertaken, Sinclair Knight Merz has formed an opinion that:

- the performance reporting by SP AusNet was free from material errors and in accordance with the requirements of the AER service standards guidelines;
- SP AusNet has correctly applied the AER performance incentive model that contain the S-factor equations and coefficients defined in the revenue cap decision to calculate the S-factors;
- the recording system used by SP AusNet to capture the relevant details for outages is considered to be accurate and reliable;
- the report submitted by SP AusNet, using the spreadsheet template provided by AER, included details of all exclusions, including events that would not be considered to be within the scope of the Service Standards Compliance Scheme, such as outages relating to connection and non-regulated assets;

[1] AER, *Victorian Transmission Network Revenue Caps 2003-2008: Decision*, 11 December 2002

- the categorisation of assets within the MAXIMO maintenance system was found to be appropriate and consistent with the categorisation under the AER service standards for critical and non-critical assets;
- the audit of the interface programs between MAXIMO and the performance reporting files found the transfer of data to be accurate and complete;
- the application of exclusions was generally in accordance with historical calculation of performance, which SKM audited and agreed that it formed the basis of the performance targets for the current regulatory period; and
- the exclusion of VENCorp augmentation and third party events from the performance measures is a different treatment compared to other TNSPs under the AER Service Standards Scheme. These exclusions have previously been accepted by the ACCC and AER in order to maintain consistency with the targets which were based on historical reporting practices.

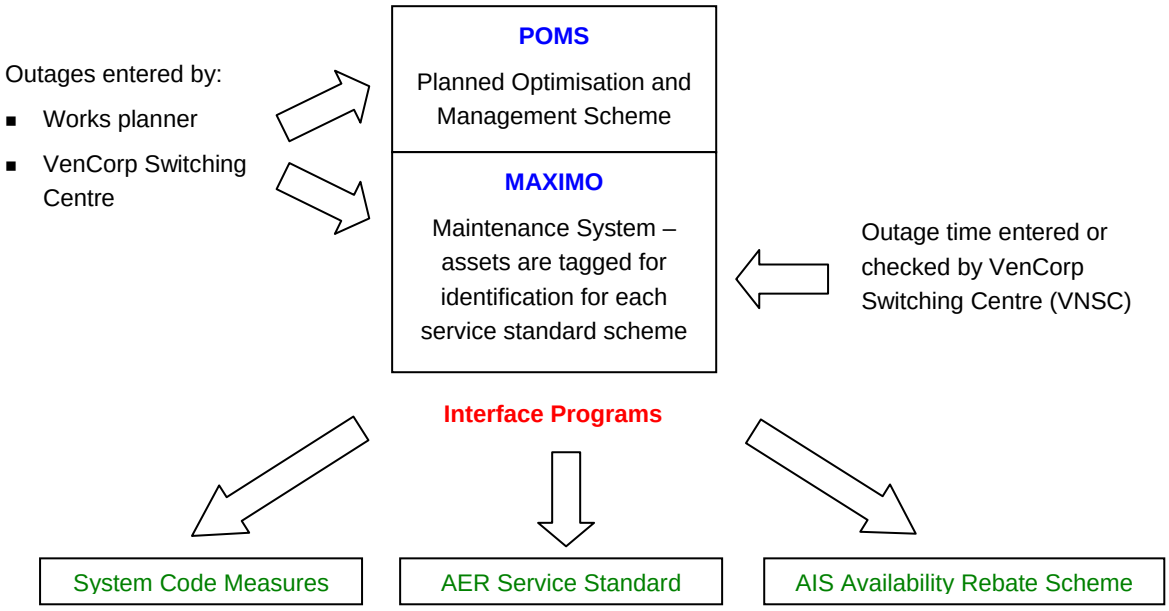
SKM recommends:

- SP AusNet's calculation of its S factor be accepted as free from material errors, subject to the AER's acceptance of the exclusions recommended by SKM; and
- The S-factors for SP AusNet under the AER service standards scheme for 2007 be **0.062485% of the Annual Revenue for the 2007 calendar year**.

2. Recording System

An overview of the SP AusNet outage management systems is shown in Figure 1.

- **Figure 1 Outage Management Systems**



The POMS module became fully operational in November / December 2003, and is a planned / unplanned maintenance support package which is intended to ensure that maintenance is arranged to meet the goals of the service standards schemes.

For each planned or unplanned outage, a Works Order is initiated through POMS, detailing the known details of any fault and the nature of work required. A mandatory field has been added to the Works Order so that the reason for the outage is coded (refer section 4.3). This field offers a drop down selection of coding options from which the planner makes a selection. The coding for Works Orders is reviewed daily by the Works Planning Manager to ensure it is appropriate.

In the MAXIMO maintenance system, each system element has been tagged with identification codes to identify how it is categorised under each of the S-factor measures to facilitate reliable data processing. The outage details from POMS are combined with the asset tags to provide a single source of data for reporting to the different performance schemes and statistics as required by the Victorian System Code and Network Agreement with VenCorp.

2.1 Outage Details

For each system outage, there is a System Outage Request form accompanied by a Switching Log and Permits form. The switching times are recorded by the VNSC controller and transferred to the relevant Works Order in MAXIMO.

2.2 Categorisation and Exclusions

Dependent upon the outage reason code applied to the Works Order, the event may be excluded from consideration under the service standards scheme. Maintenance staff through the POMS system enters the categorisation for an outage at the time of signing off the Works Order. The coding of the event is mandatory, and Works Orders cannot be closed without this information being supplied. The Works Planning Manager and other senior staff review the coding to ensure that the reason for each event has been correctly categorised.

2.3 Processing of Outage Data

SP AusNet has developed an interface program that extracts relevant data from MAXIMO into an Excel spreadsheet for processing performance result information under the AER service standards scheme. This interface program was developed during 2003/04, and since then there have been several improvements and modifications made to the program, though no substantial changes since the system was last audited. All the data used for the 2007 service standards performance report was extracted using this interface program.

MAXIMO is the single source of data for reporting performance to the AER service standards scheme. The Excel file for the AER service standards results extracts data from MAXIMO into a spreadsheet, and then processes the data to filter only those events that have not been excluded for one reason or another. Within the Excel file, there is a spreadsheet where peak, intermediate and off-peak times are determined, dependent upon the time of year. The information is summarised on a separate spreadsheet where the times in peak / intermediate / off-peak periods are calculated for each event, together with the contribution of each event towards the results of measures 1 and 3.

2.4 Calculation of Performance Measure Results

The performance measure results are calculated using the AER performance incentive model that contains S-factor equations defined in the Decision. The results are collated into a graph (refer Appendix A) illustrating the S-factors proposed by SP AusNet and that recommended by SKM.

2.5 Recent Enhancements to Recording System

The MAXIMO and AER Reporting systems are being developed and enhanced over time.

SP AusNet advised that there are planning meetings to be held during 2008 which will discuss potential improvements to the reporting systems used by the TNSP. These improvements will continue to ensure the integrity and accuracy of the data used in all of the statutory and regulatory reporting done by SP AusNet.

3. System Audit Findings

During 2007, there were 1,803 events[2] that were reported under the AER service standards scheme.

As part of previous audits, SKM has conducted random sampling of control room records to ensure events are captured and appropriately categorised. SKM reviewed the data entry forms used by system operators to report outages and planned works, and noted that, through the use of drop lists, operators are provided with relevant outage categorisation options from which to choose. An audit of a sample of these data entry forms found that the categorisation options available were appropriate; that events, reasons, and switching times were found to have been correctly recorded, and that the MAXIMO data had been accurately transferred to the Excel file and correctly processed.

To review the data system, and to ensure any errors identified during the previous audit had been corrected, SKM examined an extract of raw data from the MAXIMO system and checked that events data had been accurately filtered and processed within the reporting system. In particular, SKM identified during discussions with SP AusNet that there are equipment items categorised within MAXIMO which are excluded from the reporting altogether.[3]

SKM appreciated the full co-operation and assistance provided by SP AusNet with this close examination of the datasets, and provided full extracts of the works order table and data entry forms from MAXIMO.

SKM examined a selection of 25 random data entries across different asset types, and checked the following details for each entry:

- the record from the raw MAXIMO extract appropriately categorised the asset detailed in the works order:
- the algorithm used in transferring data from the raw MAXIMO list to the detailed list of outages used in performance reporting was accurate, and included all asset types that should be counted; and

[2] These "events" were works orders extracted from the MAXIMO system into the reporting system, relating to outages or switching on equipment that affected the transmission system during 2007. As shown in Table 2, these works orders included connection and non-regulated assets.

[3] The reporting system extracts a subset of all MAXIMO works orders for the year, based on whether each asset is categorised within MAXIMO as being subject to the service standards compliance scheme (ie it only extracts those items of equipment shown as subject to the service standards compliance scheme), and also the status of the works order (it must be started or complete).

- that the Excel model used by SP AusNet accurately calculated the outage time for each works order and that the calculated time was correctly allocated to the appropriate performance parameter.

In each instance, SKM was satisfied that the works orders information had been correctly recorded and processed. The categorisation of assets was found to be appropriate, and the data entry arrangements providing sufficient support to the system operators to allow for appropriate categorisation of events. SKM noted that SP AusNet has a number of internal checks that review the categorisation of each works order/event to ensure that this categorisation is in line with the requirements of the AER Service Standards Compliance Scheme.

The functionality of the Excel file and the associated Visual Basic code has been subjected to exhaustive testing by both internal SP AusNet staff and contractors. In 2003, SKM reviewed the operation of some of the Visual Basic modules, and was satisfied that they appeared to function correctly. The arithmetic functions on the Excel spreadsheets were checked and found to have been correctly applied.

In summary, SKM is satisfied that the recording and data processing systems that have been put in place by SP AusNet appear to accurately log and calculate performance.

4. Exclusions

The Decision established a set of provisions for certain defined events to be excluded from calculated outage figures. These provisions are provided in section 4.1.

4.1 Exclusions defined under the Decision

The exclusions defined under the Decision are as follows:

Measure 1 Transmission Circuit Availability	1.1 Exclude unregulated transmission assets. 1.2 Exclude connection assets 1.3 Exclude from 'circuit unavailability' any outages shown to be caused by a fault or other event on a '3rd party system' e.g. intertrip signal, generator outage, customer installation (TNSP to provide list) 1.4 Force majeure events
Measure 2 Loss of Supply Event Frequency Index	2.1 Exclude unregulated transmission assets (e.g. some connection assets) 2.2 Exclude any outages shown to be caused by a fault or other event on a 'third party system' e.g. intertrip signal, generator outage, customer installation 2.3 Planned outages 2.4 Force Majeure events
Measure 3 Average Outage Duration	3.1 Planned outages 3.2 Excludes momentary interruptions (< 1 minute) 3.3 Force majeure events
Measure 4 Hours of Binding Constraints (Intra-regional)	4.1 Exclusions Hours of binding constraints at or near (>95 percent) the capacity determined by the constraint equation describing all transmission elements in service 4.2 Excludes connection assets 4.3 Hours of binding constraints where non-credible generation contingencies coincide with previously notified planned outages 4.4 Force majeure events
Measure 5 Hours of Binding Constraints (Inter-regional)	5.1 Exclusions Hours of binding constraints at or near (>95 percent) the capacity determined by the constraint equation describing all transmission elements in service 5.2 Hours of binding constraints where non-credible generation contingencies coincide with previously notified planned outages 5.3 Any event which was clearly as a consequence of action or inaction of another TNSP 5.3 Force majeure events

4.2 Exclusions proposed by SP AusNet during revenue cap application

Attachment G of the 2003-2008 Decision contains a list of specified exclusions proposed by SP AusNet. These exclusions are those that have applied to SP AusNet, and underpin the historical data used in establishing targets under the AER service standards scheme.

These exclusions[4] are:

"All exclusion clauses for the three measures should have the following standard clauses:

- *Any outage caused by a fault, outage request or other event on a 3rd party system connected to the TNSP's Network.*
- *Any outage requested by a 3rd party for construction or demolition activities on land over which the TNSP has an easement .*
- *In relation to a loss of a double circuit tower, exclude the outage of one circuit following the restoration into service of the other circuit.*
- *An outage which is requested by VENCorp or a 3rd party to enable VENCorp or a 3rd party to augment the High Voltage Grid, or conduct tests on the High Voltage Grid, either itself or through a contractor.*
- *An outage which occurs within a period during which a Connected does not require the Supply of electricity directly or indirectly from the High Voltage Grid, where that Outage does not affect the Supply of electricity to any other person.*
- *An outage requested by NEMMCO except where the reason for that request is an act or omission of SP AusNet.*
- *A full or partial failure of the Brunswick Terminal Station to Richmond Terminal Station 220 kV Cable system that is caused by damage to a part of the cable which is:*
    - *located on, under or overland that is not an SP AusNet site; and*
    - *which is inflicted by a person other than SP AusNet."*

SKM reviewed the outage code applied by SP AusNet for the excluded events claimed in 2007 and formed an opinion that they are in general conformance with the exclusions defined under the Decision. There appeared to be no fundamental difference between the exclusions adopted by SP AusNet and the exclusions defined under the Decision, with the exception of the exclusion claimed

[4] ACCC, *Victorian transmission network revenue caps 2003-2008: Decision*, 11 December 2002, pp 157

under the augmentation works funded by VENCorp and carried out by SP AusNet or its agents (see outage reasons[5] in Table 2).

The treatment of this exclusion is explained in section 4.4 in more details. It was agreed in previous years that although this exclusion is not in accordance with the service standards performance scheme guidelines, it is consistent with the basis on which historical results were collected, and hence should be granted as an exclusion in order to provide consistency with the targets.

Exclusions claimed as third party events are reviewed in section 4.5.

4.3 Categorisation of 2007 events

Table 1 summarises the overall results by included and excluded events, including the consideration of out of service assets.

Table 1 Summary of total hours for included and excluded events

Categorisation	Total Hours		Peak Hours		Intermediate Hours		Off-peak Hours	
All Included Events	31,416	57%	1,749	44%	5,426	65%	24,241	57%
All Excluded Events	23,328	43%	2,227	56%	2,926	35%	18,175	43%
Total	54,743	100%	3,975	100%	8,352	100%	42,416	100%

In compliance with the requirements of the AER Guidelines and Decision, SP AusNet submitted a complete list of all excluded events in 2007, including those events considered to fall outside the scope of the current scheme ie. connection assets and non-regulated assets. The inclusion of these "out-of-scope" exclusions has the potential to distort the perception of the actual number of exclusions SP AusNet is applying for.

Considering only those exclusions that fall within the scope of the current scheme the total number of excluded events are 861 and represents 18,238 outage hours, of which 15,262 (84%) are included, and 2,977 (16%) are excluded.

There were no out-of-service assets in 2007 that were excluded.

Each event is categorised on the Work Order to summarise the reason for the outage. These categories are shown in Table 2 together with an exclusion designation. Categories that are marked with an "**x**" are excluded from the calculation of the performance measure data results because they

[5] SP AusNet outage code for this exclusion is VEN_AUG or SPI_CAPEX

are in general conformance with the exclusions defined under the Decision, except those specifically discussed in this report.

These results are taken from SP AusNet's internal reporting system spreadsheet. SKM notes that SP AusNet has reported all excluded events in the spreadsheet report provided to AER, including connection and non-regulated assets. The performance report provided for "no exclusions" does not include any outage related to the connection or non-regulated assets, but does include all Third Party, "special case"[6] and Force Majeure events.

Table 2 Breakdown of results by Outage Reasons

Outage Code	Reason	Exclusion	No of Events	Hours
3RD PARTY	Outage due to actions of third party	x	24	232
APDALCOA	Work by Alcoa or work by SPI PowerNet during outage initiated by Alcoa	x	18	94
BUSHFIRE	Outage requested during bushfire for safety of fire fighters	x	7	53
CONSCON	Element stranded by system design by outage of another element due to capital works by SP AusNet	-	0	0
CONSMAIN	Element stranded by system design by outage of another element due to maintenance works by SP AusNet	-	0	0
CONSTR	Redundant code for outage due to SP AusNet asset maintenance	-	0	0
DB_AUG	Augmentation works funded by distribution company and carried out by SPI PowerNet or its agents	x	7	188
DBPROX	Outage due to work by, or requested by, distribution company in proximity	x	4	31
ELECTRAN	Work during outage initiated by ElectraNet SA	x	0	0
EXCAPX	Excluded shunt reactor outage	x	0	0
EXCLUDE	Excluded from AIS and AER service standards	x	0	0
EXMAINT	Excluded shunt reactor outage	x	0	0
FAULT	Fault on SPI PowerNet network - not caused by distribution company	-	75	519
FORCED	Forced outage on SPI PowerNet network	-	25	126
FORCMAJ	Force majeure event	x	0	0
GEN_AUG	Augmentation works funded by generation company and carried out by SPI PowerNet or its agents	x	2	18
GENCO	Outage requested by generator to carry out own works	x	1	2
HVCUST	Work by SPI PowerNet during HV customer plant shutdown	x	0	0
INTERCON	Interconnector constrained by SP AusNet or its agents	x	0	0
LANDOWN	Outage due to private landowners to work in proximity to lines over their land	x	0	0

[6] In the 2007 performance report, SP AusNet has categorised some of the maintenance activities on the transmission lines to Yallourn Power Station as "special events", as these the categorisation of this exclusion did not fit into any of the exclusion definitions included in the service standards guidelines. For the purposes of Table 2, these particular events have been counted as SPIMAINT events.

Outage Code	Reason	Exclusion	No of Events	Hours
RECOVER	Outage where AIS rebate is recoverable from third party	x	0	0
SNOWY	Outage requested by Snowy Mountains Control Room	x	0	0
SPICAPX	Outage due to SPI PowerNet capital works	-	297	10,801
SPIMAINT	Outage due to SPI PowerNet operational maintenance	-	306	4,545
STHHYDRO	Work during outage initiated by Southern Hydro on their assets	x	1	8
SW_NEM	Switching of network requested / directed by NEMMCO	x	10	59
SW_VEN	Switching for VENCorp load shedding – power restrictions	x	0	0
TPPROX	Outage due to work by third party in proximity	x	0	0
TRANSGRD	Outage requested by TransGrid for work on their assets	x	0	0
VEN_AUG	Augmentation works funded by VENCorp and carried out by SPI PowerNet	x	83	1,562
VICROADS	Outage due to actions of / requested by Vic Roads	x	1	1
	Unregulated and Connection Assets*	x	942	36,505
Total			**1,803**	**54,743**

* These events were not included in SP AusNet's internal ACCC reporting system spreadsheet, but have been identified from the events in the exclusions report provided to AER.

4.4 Outage Code VEN_AUG

This outage code was applied to outages resulting from augmentation works funded by VENCorp and carried out by either SP AusNet or its agents.

In Victoria, the transmission planning role is split from the transmission asset ownership role. SP AusNet's functions are that of transmission asset owner and asset manager, whilst the responsibilities for planning of the network to meet customer demand requirements and service reliability criteria are allocated between VENCorp, an independent Victorian Government corporation, and connected customers (including electricity distribution companies).

During the establishment of the AER service standards scheme, SP AusNet provided historical performance data for circuit availability for the period 1995 to 2000, noting that it was the equivalent data previously provided to the Victorian regulator, the then Office of the Regulator-General, Victoria (the forerunner to the now Essential Services Commission). This regulatory reporting was conducted in accordance with the Victorian Electricity System Code, which, amongst other issues, spelt out the different responsibilities of VENCorp and what were referred to as "transmitters" (in this case, SP AusNet) together with detailing the performance measures to be reported.

SKM is of the view that the data provided as historical data for the purposes of the AER service standards scheme was the same data that SP AusNet had previously submitted to the Office of the

Regulator-General (ORG), VENCorp and Victorian distributors, and was based on the System Code measure for availability which excluded construction related outages.

4.4.1 Audit Findings

SKM has previously conducted an audit of the database records between 1995 and 2000, provided by the then SPI PowerNet to SKM, and confirmed that VENCorp augmentation works were excluded from the reported performance results.

In the ACCC Decision, the ACCC considered the SP AusNet proposed excluded third party events and concluded that "*... the Commission considers that in some cases SPI PowerNet* [now SP AusNet] *may be able to plan or influence the third party event and therefore not all third party events should be excluded. For example, where a third party requests access to SPI PowerNet's easements it should negotiate the best possible time for the third party access. However, such events will be excluded where they fall within the definition of force majeure. That is, where the third party event is, notwithstanding the observance of good industry practice, beyond the reasonable control of SPI PowerNet.*"[7]

4.4.2 Recommendation

SKM is of the view that whilst the network planning and operating roles are separated in Victoria, typically augmentation works undertaken by a transmission company on its own network such as occurs in all other States of the National Electricity Market would not be categorised as a third party event. SKM believes such work should be included in any circuit availability performance calculations.

However, as the agreed targets set in the ACCC Decision were based on historical data which was underpinned by the provisions of the Victorian System Code and the previous regulatory reporting regime to the ORG, SKM would recommend that the outage code VEN_AUG be excluded from the performance reporting of circuit availability for 2007 and for the remainder of the term of the current determination. This would ensure a fair and reasonable comparison between availability performance targets included in the Decision and the results currently calculated by SP AusNet.

SKM understands that the AER has accepted this approach, and has clarified the treatment of such exclusions in the 2nd draft version of the Service Target Performance Incentive Scheme published November 2007, and the final SP AusNet revenue cap determination for the next regulatory period 2008-2014.

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[7] Section 7.6, pp 103

4.5 Outage Code 3RD PARTY

In considering specific third party events proposed as exclusions, the ACCC considered that in such cases SP AusNet "*... may be able to plan or influence the third party event and therefore not all third party events should be excluded ... However, such events will be excluded where they fall within the definition of force majeure. That is, where the third party event is, notwithstanding the observance of good practice, beyond the reasonable control of SP AusNet.*" [8]

However, as the agreed targets set in the ACCC Decision were based on historical data which excluded these events, SKM would recommend that these events be excluded from the performance reporting for the remainder of the term of the current determination. This would ensure a fair and reasonable comparison between agreed performance targets and the historical results calculated by SP AusNet.

4.5.1 Project Z463: Eastlink Transmission Line Alterations

As part of the Eastlink roading project (Mitcham-Frankston freeway), it was necessary to raise the clearance of several transmission lines. The transmission lines concerned are considered vital for reliable supply to certain key Melbourne load centres, and included two of the three 220kV circuits supplying Richmond Terminal Station, both of the lines supplying Malvern Terminal Station and both lines supplying Springvale Terminal Station. These are all double circuit lines, so that at no time could both of the circuits be out of service simultaneously. As a result, for system security reasons, there were considerable constraints as to when the work could be undertaken.

The project involved extensive discussions with the customer (Eastlink), with the work occurring within the Eastlink construction site.

Within the provisions of the Mitcham-Frankston Freeway Act, SP AusNet were obligated to offer the services necessary in accordance with the provisions of clause 5 of the SP AusNet transmission licence. Within the Transmission Licence, there is a broad obligation to alter transmission lines when requested to do so by any party who has good cause and is prepared to underwrite the costs.

4.5.2 Project Z569: Deer Park GTS-KTS Line Alterations

VicRoads proposed the construction of the Deer Park Bypass road between the Western Highway and Western Ring Road, passing under the Keilor-Geelong 220kV overhead lines and requiring the replacement of two transmission towers and the addition of two mid-span towers to increase clearance heights. The road crosses a railway line where it under-crosses the transmission lines, so

[8] ACCC, *Victorian transmission network revenue caps 2003-2008: Decision*, 11 December 2002, pp 103

the line clearance between two transmission towers needed to be significantly raised, whilst two other spans needed adjustment.

VicRoads made their original request to SP AusNet in December 2005, with what was considered an unrealistic completion date of May 2006. SP AusNet indicated that best endeavours would be made to deliver the work as soon as possible.

As for Project Z463 (refer section 4.5.1), SP AusNet was obligated to undertake the work. The scheduling of outages was restricted, as a double circuit outage was very difficult to obtain. The Victorian Network Switching Centre (VNSC) would only permit limited switching on Sundays, provided weather conditions were not extreme.

4.5.3 Project Z623: Lakes Boulevard Transmission Line Alterations

The City of Whittlesea requested the alteration of overhead transmission line installations in preparation for road works at The Lakes Boulevard. The scope of works included the replacement of three transmission line towers to increase clearance heights.

The customer set a target date of autumn 2007 for the completion of the work. SP AusNet suggested that this timeline could be met, provided the customer was prepared to accept additional costs related to the availability of materials.

As for the other projects associated with road works (refer sections 4.5.1 and 4.5.2), SP AusNet was obligated to undertake the work as a customer funded capital project.

Due to system security considerations, the outages on the Dederang-South Morang 330kV lines and Eidon-Thomastown 220kV lines had to be restricted to short, alternate outages.

4.5.4 Audit Findings

SKM found that, for each of these projects, SP AusNet had a statutory obligation to undertake the work to allow for the construction of roads for third parties. In each instance, the project was funded by the customer, and system security requirements placed considerable limitations on the ability of SP AusNet to plan the work.

SKM noted that SP AusNet accepted the obligation, and undertook the work in the most cost effective and efficient manner. In each case, SP AusNet had a limited ability to schedule outages on the affected transmission lines, with the VNSC not permitting SP AusNet to have several transmission lines out of service at any given time.

4.5.5 Recommendation

SKM acknowledges that SP AusNet undertook the capital works associated with projects Z463, Z569 and Z623 in the most cost effective manner, and that SP AusNet was in control, to some extent, with the planning of the outages so as to minimise their impact on the market and customers, and without compromising system security. However, the VNSC imposed conditions on any requested outages for transmission lines.

This work was undertaken in accordance with statutory obligations, and was required to be completed under the contractual conditions that were imposed by the customer requesting the work. Such events have been historically excluded from the performance calculations, and there are precedents during the current regulatory period where SKM has previously allowed these events as exclusions.

Therefore, given the constrained ability of SP AusNet to control all aspects of these particular capital projects, and in accordance with decisions of previous audits, SKM would recommend that the exclusions requested by SP AusNet for these capital project events be accepted.

4.6 Proposed Shunt Reactors Exclusion

In the submission provided by SP AusNet, there were exclusions sought by SP AusNet for specific events related to shunt reactor outages. During 2007, SP AusNet undertook capital work on shunt reactors at Horsham and Redcliffs terminal stations, and maintenance work at Moorabool terminal station.

As shunt reactors are only required to be in-service during the off-peak periods, SP AusNet scheduled this work to occur during the peak periods to minimise any impact on the transmission network.

SP AusNet has only applied for exclusion for those hours of work that occurred during peak periods when the shunt reactors were not required by the network operation, but has included the hours associated with this capital works in the total circuit availability parameter.

4.6.1 Audit Findings

As shunt reactors are required to maintain system stability at low load, they are required to be available during off-peak periods, and hence including these items in the peak circuit availability measure would provide a perverse incentive to operate the network less securely.

SP AusNet accepted that capital works on these system assets are fully within the ability of the TNSP to plan and control any impact on the market and its customers. SKM found SP AusNet to have included these outages in their total circuit availability performance calculations.

4.6.2 Recommendation

Good operating practice for the shunt reactors is in general that they be available during off-peak periods, and that scheduled maintenance, or capital improvement, be conducted during peak periods. To the extent the recommended exclusion removes the perverse penalty for maintenance or capital work during peak periods, SKM considers this to be in accordance with the objectives of the Service Standards guidelines.

Accordingly, it has been agreed in previous years that these items would be excluded from the peak and intermediate circuit availability measure, and SKM recommends this approach be continued for 2007.

4.7 Proposed Special Case Exclusion

In November 2007, the Latrobe River burst its banks and flooded the Yallourn open cut coal mine. The flooding caused major surface movement within the mine, damaging conveyor belts and halting coal production. This coal mine provides coal to the Yallourn Power Station, and as a result of the disruption to production, the power station was reduced to approximately 30% of full capacity output.[9]

The river was diverted to restore downstream river flows, and allow repair work at the mine to proceed.

During 2007, SP AusNet was undertaking a program of replacing worn or defective pins on insulators throughout the transmission network to avoid conductor drop due to insulator pin failure. This planned maintenance work included the transmission lines on the Rowville-Yallourn Power Station 220kV transmission lines. To take advantage of the opportunity that this incident presented, SP AusNet chose to undertake this work during the period of reduced output from Yallourn Power Station so as to minimise the impact of this maintenance on the market and customers.

To maximise the opportunity and ensure that the work was completed within the expected two week window for the Yallourn coal mine repairs, SP AusNet planned outages on the Rowville-Yallourn Power Station line during peak period. This would have been otherwise avoided, due to both the penalties under the PI Scheme, and the impact such action has on the market and customers. SP AusNet sought, and received, approval from VENCorp to organise outages during peak periods on these lines, granting an exemption from any penalty from the Victorian Availability Incentive Scheme (AIS). SP AusNet made similar representation to the AER, who

[9] Yallourn Power Station operates four generating units with a capacity of 1480MW. Due to the flooding, only two units were operating with a total output of 440MW, whilst a third generator was out of service for scheduled maintenance.

were not in a position at that time to make a decision regarding possible exclusion from the Service Standards guidelines. For that reason, this event was categorised as "special case".

4.7.1 Audit Findings

SKM reviewed electronic message exchanges between SP AusNet and VENCorp regarding this issue, and found that SP AusNet considered that doing this work during this unexpected constraint on generation from the Yallourn Power Station as the appropriate course of action.

Following agreement from VENCorp, SP AusNet closely monitored the outage situation with TRUenergy (the power station operator) on a daily basis. From Yallourn Power station generation output information, SKM noted that there was a significant drop in output on 15 November 2007, and normal output was restored around 7-9 December.

SKM noted that SP AusNet applied for the exclusion of only those hours of maintenance work that occurred during the peak period, on 22-23 November and 27-30 November 2007, totalling 29.967 hours. SP AusNet included the work that occurred during off-peak periods in their performance calculations, as this was categorised as normal maintenance work.

4.7.2 Recommendation

SKM acknowledges that SP AusNet has included the majority of the hours associated with the maintenance work on the Rowville-Yallourn Power Station transmission line in the calculation of availability performance results, and has only requested exclusion for those hours from peak period, which save for the circumstances surrounding the land slip at the coal mine, would not have otherwise been incurred. Whilst the work being undertaken was maintenance, SP AusNet planned the work, at short notice, to take advantage of a transmission line that was not being utilised at the time.

SKM considers that the actions taken by SP AusNet in this case were those of a prudent and good operator who has sought to minimise the impact of maintenance work on the network.

SKM is of the opinion that this particular exclusion does not meet any of the standard exclusions defined for SP AusNet, nor does it satisfy any provisions of Force Majeure. However, whilst SKM would not allow this "special case" as a standard exclusion, SKM would support the AER in exercising its discretion to allow this particular exclusion of 29.967 hours of work that occurred during peak periods in this instance, due to the unique and unusual circumstances surrounding it, and the prudent behaviour by SP AusNet.

5. Force Majeure

Under the service standards scheme guidelines, Force Majeure is defined as:

For the purpose of applying the service standards performance-incentive scheme, 'force majeure events' means any event, act or circumstance or combination of events, acts and circumstances which (despite the observance of good electricity industry practice) is beyond the reasonable control of the party affected by any such event, which may include, without limitation, the following:

- *fire, lightning, explosion, flood, earthquake, storm, cyclone, action of the elements, riots, civil commotion, malicious damage, natural disaster, sabotage, act of a public enemy, act of God, war (declared or undeclared), blockage, revolution, radioactive contamination, toxic or dangerous chemical contamination or force of nature*
- *action or inaction by a court, government agency (including denial, refusal or failure to grant any authorisation, despite timely best endeavour to obtain same)*
- *strikes, lockouts, industrial and/or labour disputes and/or difficulties, work bans, blockades or picketing*
- *acts or omissions (other than a failure to pay money) of a party other than the TNSP which party either is connected to or uses the high voltage grid or is directly connected to or uses a system for the supply of electricity which in turn is connected to the high voltage grid*
- *where those acts or omissions affect the ability of the TNSP to perform its obligations under the service standard by virtue of that direct or indirect connection to or use of the high voltage grid.*

In determining what force majeure events should be 'Excluded force majeure events', the ACCC will consider the following:

- *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)?*
- *Could the TNSP have effectively reduced the impact of the event by adopting better practices?*

The ACCC Decision added the following qualification to this standard Force Majeure definition:

To avoid doubt where such an event occurs, force majeure specifically includes the event when the outcome includes:

- *The collapse of four or more consecutive intermediate transmission line towers*
- *The loss of or damage to two or more switch bays in a terminal station or substation*
- *The loss of or damage to 11 or more control or secondary cables*
- *The loss or damage to two or more transformers and capacitors, either single or three phase, connected to a bus.*
- *The loss of or damage to a transformer, capacitor bank, reactor, static var compensator, or synchronous condenser, which loss or damage is not repairable on site according to normal practices.*

This is not intended to limit the definition of force majeure rather to provide guidance in its application.

5.1 Bushfires in North-East Victoria

Victoria is one of the most bushfire prone areas in the world. The summer of 2006/07 proved to be one of the worst, with bushfires destroying around 1 million hectares, 39 houses and claiming one life. Extreme weather conditions with temperatures forecast in excess of 40°C increased the fire danger and worsened the condition under which fire fighters had to operate.

On Tuesday, 16 January 2007 at around 3:00pm, bush fires in the Tatong area in north-east Victoria resulted in the operation of the protection on the two 330kV transmission lines between Dederang and South Morang. The operation of the two 330kV feeder protection schemes resulted in the load being transferred to the lower voltage networks, leading to the cascaded operation of the 220kV supply to Victoria from NSW and eventually to the 275kV network supplying Victoria from South Australia via the Heywood interconnector, effectively severing the interconnected power system between South Australia, Victoria / Tasmania and NSW / Queensland. At the time of the event, a new maximum demand was being experienced in the Victorian region.

A NEMMCO investigation [10] noted that there was regular contact between SP AusNet and NEMMCO control room and operations staff, where NEMMCO were advised that the bushfire was in the vicinity of the transmission line easements, but running parallel to the easement and did not pose an immediate threat to the lines. The conclusion made by NEMMCO at that time was that the

[10] NEMMCO, *Power System Incident Report: System Separation and Load Shedding 16 January 2007*, version 1.0, June 2007

simultaneous loss of the two Dederang-South Morang 330kV lines was considered an unlikely event, and was therefore not classified as a credible contingency event. By approximately 3:00pm, the fire had spread to the Dederang-South Morang easement, causing the transmission line protection to operate, leading to the separation of the Victorian and South Australian power systems from New South Wales. SP AusNet immediately advised NEMMCO of this incident.

Had NEMMCO classified the bushfire as a credible contingency event at the time of the initial discussion with SP AusNet, NEMMCO would have:

- issued a market notice; and
- reduced the flow from Snowy to Victoria to maintain power system security for both loss of lines.

SKM noted that the NEMMCO investigation did not imply that SP AusNet had in any way contributed to the extent of the power separation incident. The report noted that SP AusNet " … *advised that transmission protection schemes operated correctly and in accordance with design settings … NEMMCO has not identified any shortcomings in respect of network protection operations during the event.*"[11]

There were 21 recommendations that were listed in the NEMMCO investigation, but there was no suggestion of apportioning any responsibility to SP AusNet for the incident, or any recommendations for change in either transmission line protection systems, or general operations.

The VENCorp investigation[12] summarised the performance of the Victorian transmission network during and following the network separation, the effects of load shedding and the restoration process. It revealed that, with some minor exceptions which were identified for further investigation and correction, the performance of the "*… protection, control and automatic load shedding schemes prior to, during and following the event was found to be satisfactory and generally in accordance with the design.*"[13]

VENCorp noted that "*… the control and protection schemes, installed on the transmission network, operated as intended during the entire event, thereby securing supply to the maximum number of customers connected in the National Electricity Market. The design and performance of control and protection schemes, that on this occasion enabled the system to successfully ride through a*

[11] ibid, section 3.3, pp 27

[12] VENCorp, *System Incident Report : 16 January 2007*, issue 1.0, June 2007

[13] ibid, section 6, pp 48

major event, must be periodically reviewed, maintained and tested to ensure that they continue to perform as intended."[14]

An investigation by the AER[15] identified a number of key issues that required attention, most of which related to actions that were incorrectly taken by NEMMCO. The report highlighted the load shedding that occurred during this event, and found that, in the main, the automatic load shedding system in the Victorian network performed as intended. There were two load blocks (out of 19) that had been disabled due to substation works that were in progress at the time; a situation that may have not been adequately communicated by SP AusNet to both NEMMCO and VENCorp. However, there was no breach of any performance standards by SP AusNet in relation to the shedding of the relevant load blocks.

SP AusNet is seeking to exclude 52.7 hours for these events.

SKM considers that the investigations conducted by NEMMCO and VENCorp do not suggest that SP AusNet contributed in any way to the cause of the power separation incident. The bushfire was an extreme event, due to its size and severity, and the protection schemes in place operated correctly. SKM noted during the audit that the easement was clear and the vegetation management program was up to date.

SP AusNet positioned work crews along the Dederang-South Morang route to re-energise the transmission lines as quickly as possible, following clearance from the Country Fire Authority that it was safe to do so.

SKM found that, whilst the AER investigation noted a need for SP AusNet to review communication procedures with regards to the unavailability of load blocks to NEMMCO and VENCorp, the primary findings related to the power separation event were directed towards entities other than SP AusNet. Whilst the AER recognised that the failure of the relevant 19 load blocks to fully shed was not a breach of the appropriate National Electricity Rules provisions and performance standards, SKM noted that the AER signalled its intention to audit the SP AusNet protection and control systems and load shedding facilities for compliance.

SKM considers that this event was an extreme event, beyond the ability of SP AusNet to control. From the information reviewed by SKM during the audit, and the findings of NEMMCO, AER and VENCorp into the incident, SKM is of the opinion that this bushfire event satisfies the provisions

[14] ibid, pp 5

[15] AER, *The events of 16 January 2007: Investigation Report*, September 2007

of the Force Majeure definition, and recommends that it be excluded from the performance calculation.

6. Calculation of S-factors

Table 3 shows the results of S-factor calculation proposed by SP AusNet and that recommended by SKM following its audit of SP AusNet service performance report.

SKM confirmed that SP AusNet has used the AER performance incentive model that contains S-factor equations and coefficients in the Decision to correctly calculate the S-factors.

- **Table 3 Performance Results**

No	Performance Measure	Target	SP AusNet without exclusions	SP AusNet with all proposed exclusions	SKM assessment
S1	Total circuit availability	99.20%	98.989312%	99.113875%	99.113875%
S2	Peak critical circuit availability	99.90%	99.638789%	99.751883%	99.751883%
S3	Peak non-critical circuit availability	99.85%	99.447666%	99.857372%	99.857372%
S4	Intermediate critical circuit availability	99.85%	98.992739%	99.321869%	99.321869%
S5	Intermediate non-critical circuit availability	99.75%	95.708840%	95.777835%	95.777835%
S6	Average outage duration - lines	8-10	1.597879	1.597879	1.597879
S7	Average outage duration - transformers	6-10	5.435546	5.435546	5.435546

- **Table 4 Calculated S-factors**

No	Performance Measure	SP AusNet without exclusions	SP AusNet with proposed exclusions	SKM assessment
S1	Total circuit availability	(0.038307%)	(0.015659%)	(0.015659%)
S2	Peak critical circuit availability	(0.039182%)	(0.022218%)	(0.022218%)
S3	Peak non-critical circuit availability	(0.025000%)	0.001843%	0.001843%
S4	Intermediate critical circuit availability	(0.025000%)	(0.025000%)	(0.025000%)
S5	Intermediate non-critical circuit availability	(0.025000%)	(0.025000%)	(0.025000%)
S6	Average outage duration - lines	0.125000%	0.125000%	0.125000%
S7	Average outage duration - transformers	0.023519%	0.023519%	0.023519%
	TOTAL	**(0.003970%)**	**0.062485%**	**0.062485%**

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

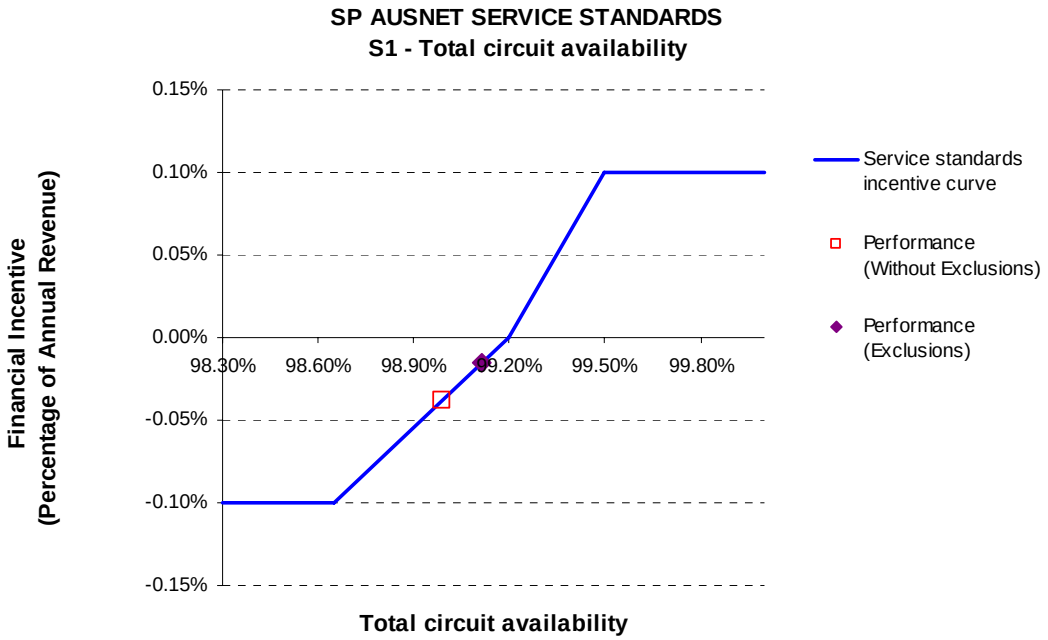
Based on these results, SKM considers SP AusNet's calculation of its S-factor to be free of material errors, and recommends that the financial bonus for SP AusNet under the AER Service Standards Scheme for 2007 is **0.062485% of the Annual Revenue for 2007 calendar year.**

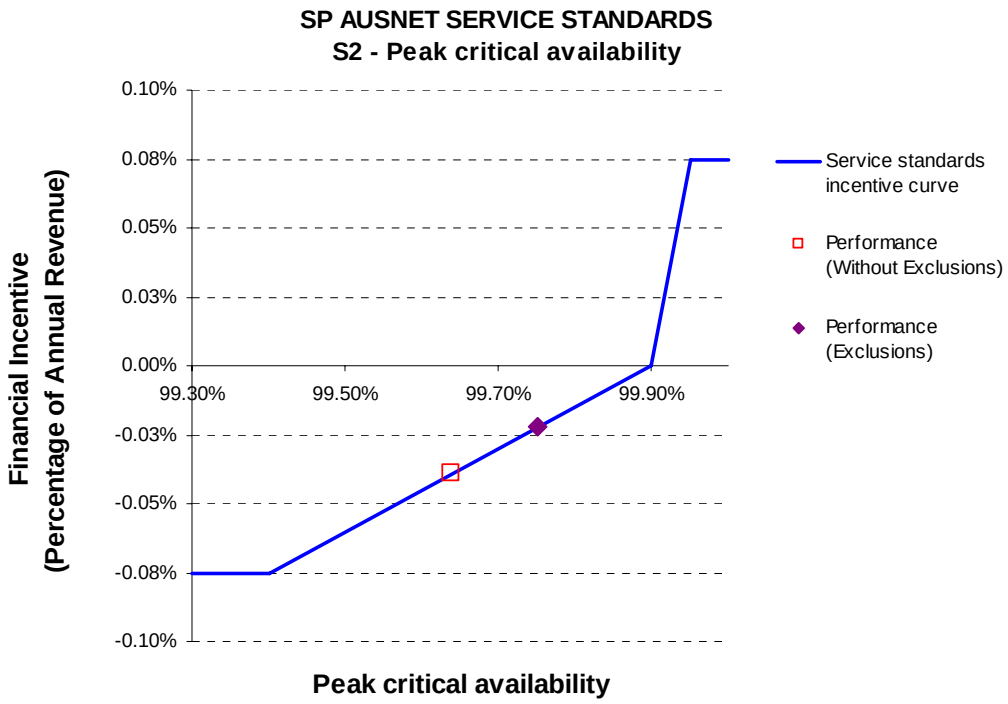
Appendix A Performance Measure Profiles

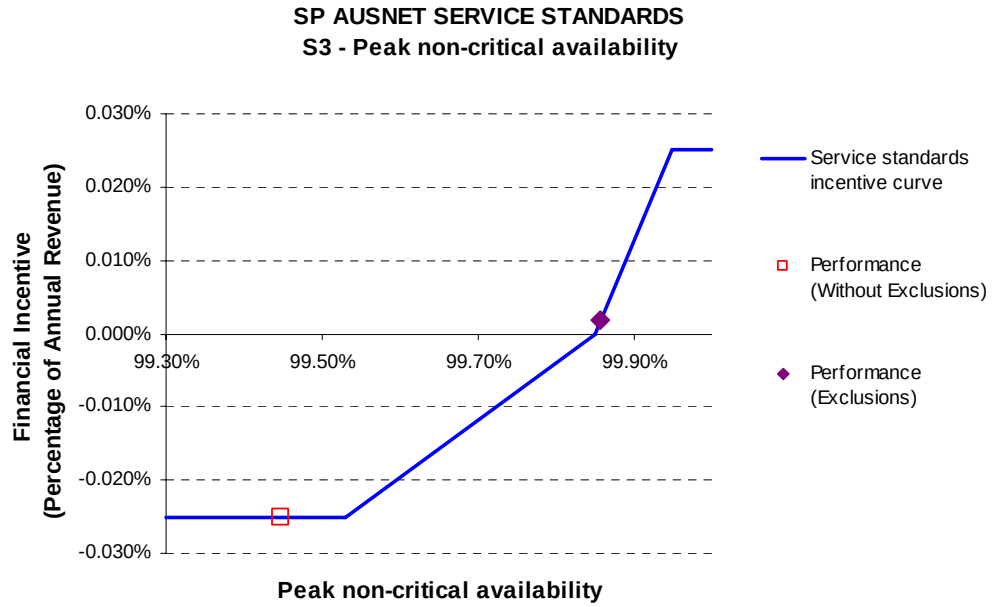
The Performance Measure profiles graphically illustrate the 2007 performance against the targets for Circuit Availability and Average Outage Duration.

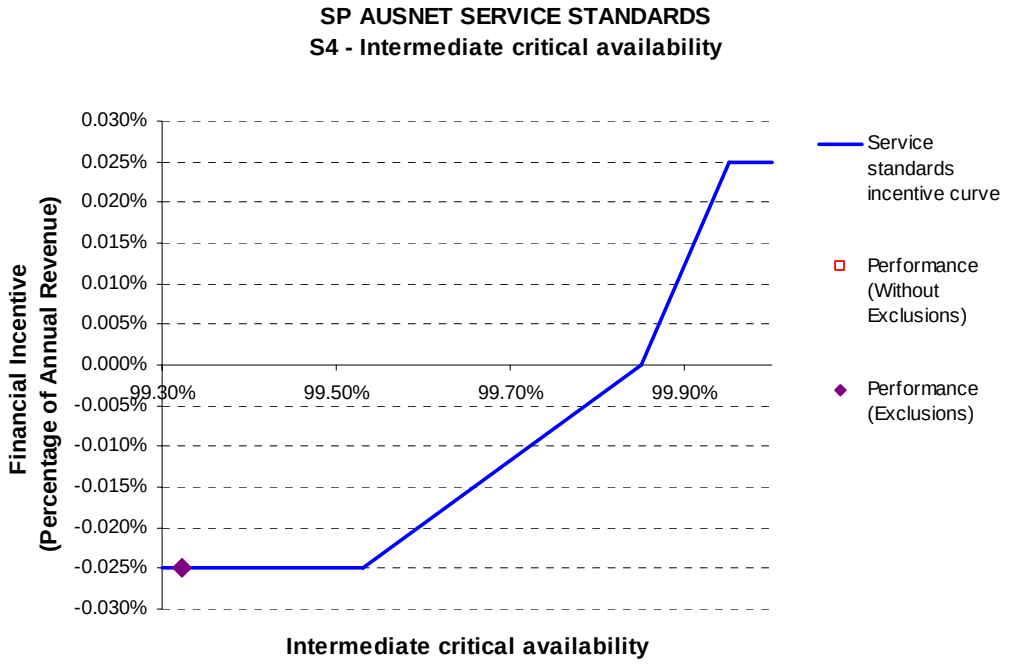
The profiles shown are:

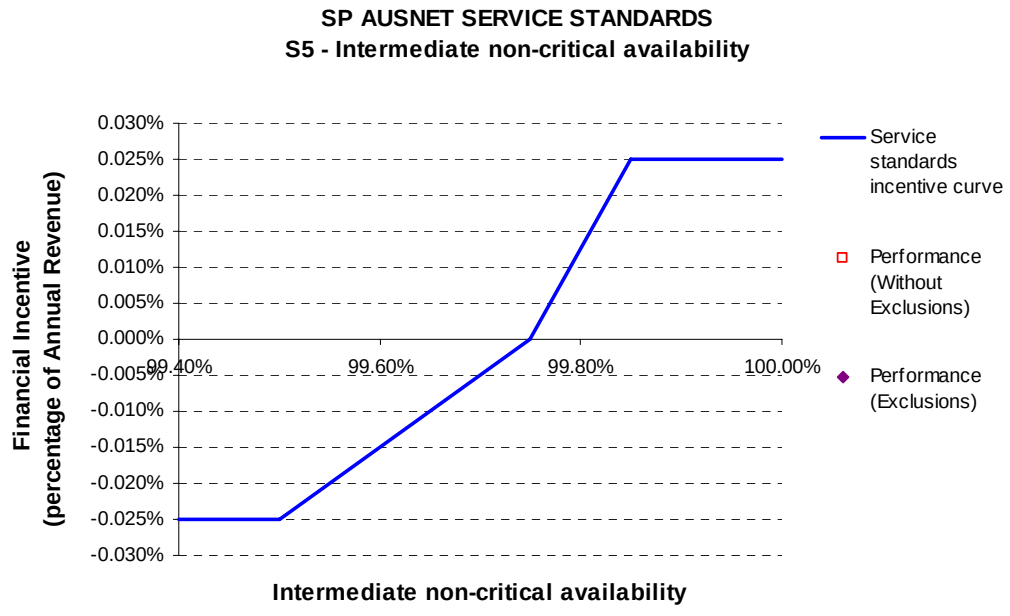
- S1 - Measure 1 Circuit Availability (total)
- S2 - Measure 1a Circuit Availability (critical)(peak)
- S3 - Measure 1b Circuit Availability (non-critical)(peak)
- S4 - Measure 1c Circuit Availability (critical)(intermediate)
- S5 - Measure 1d Circuit Availability (non-critical)(intermediate)
- S6 - Measure 3a Average Outage Duration (lines)
- S7 - Measure 3b Average Outage Duration (transformers)

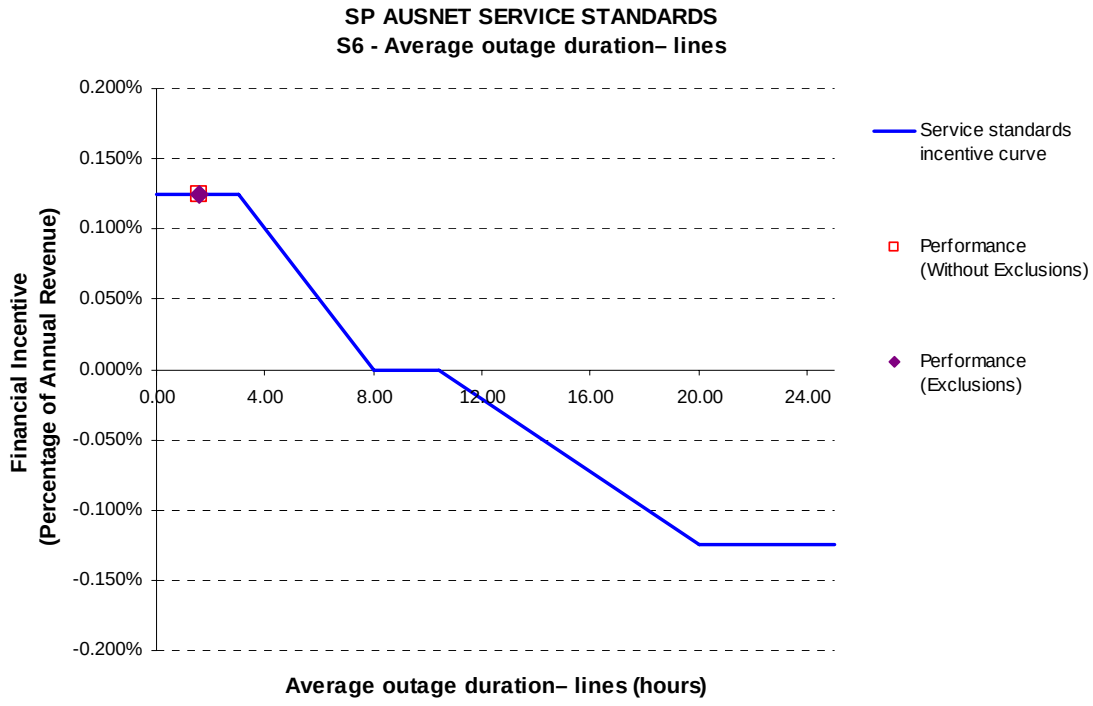


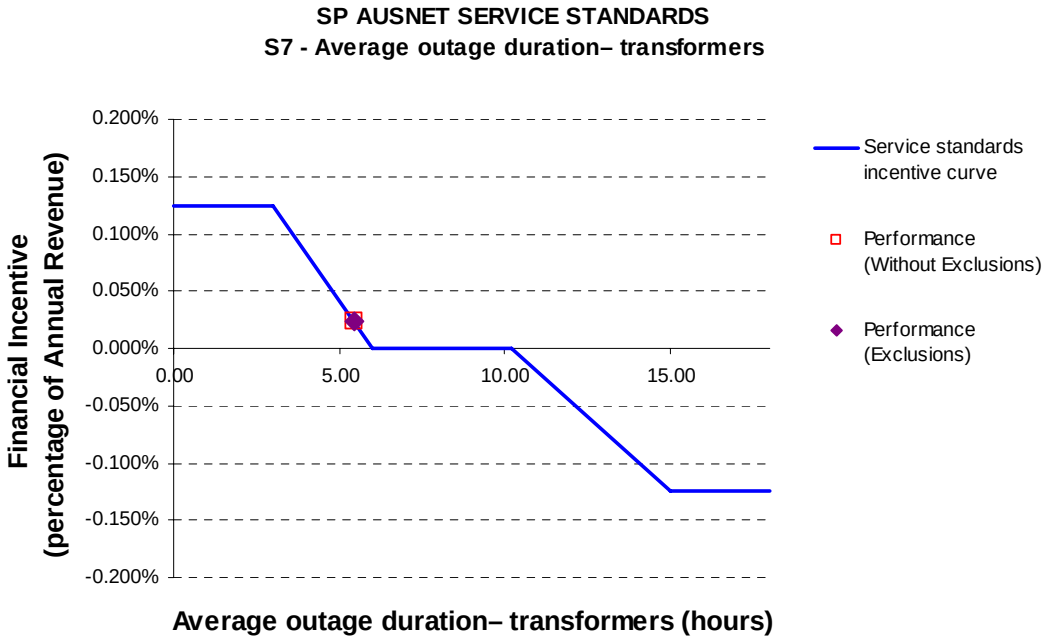

SP AUSNET SERVICE STANDARDS
S2 - Peak critical availability
Financial Incentive
(Percentage of Annual Revenue)
0.10%
0.08%
0.05%
0.03%
0.00%
-0.03%
-0.05%
-0.08%
-0.10%
99.30%
99.50%
99.70%
99.90%
Peak critical availability
Service standards incentive curve
Performance (Without Exclusions)
Performance (Exclusions)


SP AUSNET SERVICE STANDARDS
S3 - Peak non-critical availability
Financial Incentive
(Percentage of Annual Revenue)
0.030%
0.020%
0.010%
0.000%
-0.010%
-0.020%
-0.030%
99.30%
99.50%
99.70%
99.90%
Peak non-critical availability
Service standards incentive curve
Performance (Without Exclusions)
Performance (Exclusions)


SP AUSNET SERVICE STANDARDS
S4 - Intermediate critical availability
Financial Incentive
(Percentage of Annual Revenue)
0.030%
0.025%
0.020%
0.015%
0.010%
0.005%
0.000%
-0.005%
-0.010%
-0.015%
-0.020%
-0.025%
-0.030%
99.30%
99.50%
99.70%
99.90%
Intermediate critical availability
Service standards incentive curve
Performance (Without Exclusions)
Performance (Exclusions)


SP AUSNET SERVICE STANDARDS
S5 - Intermediate non-critical availability
Financial Incentive
(percentage of Annual Revenue)
0.030%
0.025%
0.020%
0.015%
0.010%
0.005%
0.000%
-0.005%
-0.010%
-0.015%
-0.020%
-0.025%
-0.030%
99.40%
99.60%
99.80%
100.00%
Intermediate non-critical availability
Service standards incentive curve
Performance (Without Exclusions)
Performance (Exclusions)


SP AUSNET SERVICE STANDARDS
S6 - Average outage duration– lines
Financial Incentive
(Percentage of Annual Revenue)
0.200%
0.150%
0.100%
0.050%
0.000%
-0.050%
-0.100%
-0.150%
-0.200%
0.00
4.00
8.00
12.00
16.00
20.00
24.00
Average outage duration– lines (hours)
Service standards incentive curve
Performance (Without Exclusions)
Performance (Exclusions)


SP AUSNET SERVICE STANDARDS
S7 - Average outage duration– transformers
Financial Incentive
(percentage of Annual Revenue)
0.200%
0.150%
0.100%
0.050%
0.000%
-0.050%
-0.100%
-0.150%
-0.200%
0.00
5.00
10.00
15.00
Average outage duration– transformers (hours)
Service standards incentive curve
Performance (Without Exclusions)
Performance (Exclusions)