# Audit of SP AusNet Service Standards Performance Reporting

## PERFORMANCE RESULTS FOR 2006

- Final Report
- 14 March 2007

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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 "SP AusNet Performance Against Service Standards 2006" report (electricity transmission), based on the service standards established in the document titled "Decision – Victorian Transmission Network Revenue Caps 2003-2008"[1] (the Decision).

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 Wednesday 7th February 2007, to review their data, systems and processes for gathering and processing outage information. The integrity of the system established by SP AusNet for retrieving data from the MAXIMO maintenance system for reporting under the AER service standards was audited. In addition, specific events were 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[2], noting the other findings regarding reporting and application of some exclusion categories;
- 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, subject to observations made in this report;
- the recording system used by SP AusNet to capture the relevant details for outages is accurate and reliable;
- the report submitted by SP AusNet, using the spreadsheet template provided by AER, did not include full details of all exclusions. SKM notes this is the first year the reporting

[1] ACCC, *Decision – Victorian Transmission Network Revenue Caps 2003-2008*, 2002.

[2] ACCC, *Decision – Statement of principles for the regulation of transmission revenues – service standards guidelines*, 2003

spreadsheet has been used, and SP AusNet and AER have held discussions to clarify the level of detail required;

- the categorisation of assets within the MAXIMO maintenance system is generally appropriate and consistent with the categorisation under the AER service standards for critical and non-critical assets. A small number of incorrect asset categorisations were found and should be corrected but these are not considered to have a material impact on the reported results;
- 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;
- the exclusion of VENCorp augmentation and "3rd party" events from the performance measures is not in accordance with the AER service standards guidelines and it is 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 are based on historical reporting practices; and
- the exclusions for the specified events relating to shunt reactors is in accordance with historical performance reporting based on good operational practice.

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;
- The AER accept SP AusNet's exclusion of shunt reactors, on the basis that the outage was conducted in accordance with good operational practice; and
- The S-factors for SP AusNet under the AER service standards scheme for 2006 be **(0.165496%) of the Annual Revenue for the 2006 calendar year**.

SKM has also identified some opportunities to improve the accuracy and integrity of reporting, and recommends:

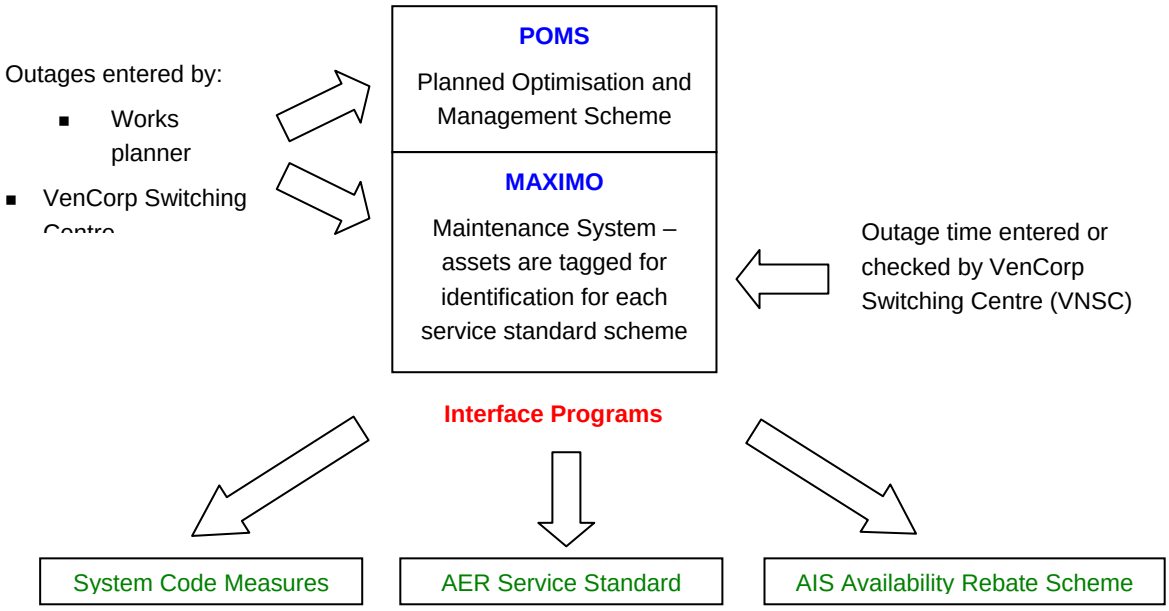
- SP AusNet develop or refine its processes to ensure new assets are categorised appropriately as part of their entry into MAXIMO;
- AER and SP AusNet periodically review the agreed list of assets and categorisations, or agree a process or definitions for what is to be included, so that the categorisation of assets is kept current;

- SP AusNet consider periodic reviews of the categorisation of assets in its MAXIMO system to ensure categorisation remains accurate; and
- AER clarify with TNSPs what level of data and detail it expects to be provided with annual reports, and in particular whether it wants all excluded events under all exclusion categories to be reported, either individually or in aggregate.

# 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 enter 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 2006 performance measure report was extracted using this interface program.

MAXIMO is the single source of database 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 SKM that there have been is no significant changes to the software systems or control room processes since the recording system was last audited. They also advise there were no significant changes to the recording system as a result of the merger with TXU in late 2005.

# 3. System Audit Findings

During 2006, there were 1,512 events[3] that were subject to the AER service standards scheme.

SKM has previously (for 2003, 2004 and 2005 results) conducted random sampling of control room records to ensure events are (a) captured and (b) appropriately categorised. SKM conducted sample testing of about thirty (30) random System Outage Requests from control room paper records to ensure that these events were correctly recorded in MAXIMO and correctly transferred to the Excel file for processing. In general, the events, reasons, and switching times were found to have been correctly recorded, accurately transferred to the Excel file and correctly processed for peak / off-peak hours. Likewise forced and emergency events were entered into MAXIMO at the control room, and appropriately captured and reported.

SKM adopted a slightly different approach for the current audit, taking an extract of raw data from the MAXIMO system and subjecting this to a higher level of scrutiny. This review assumed events had been entered accurately into MAXIMO (which SKM has established previously), and focused on the filtering and processing of data within the reporting system. In particular, SKM identified during discussions with SP AusNet the potential for equipment items incorrectly categorised within MAXIMO to be excluded from the reporting altogether[4].

SP AusNet cooperated fully with this data intensive approach, and provided full extracts of the works order table, and the equipment table, from MAXIMO. SKM then reviewed and analysed the data per the discussion below.

- **For works orders**, SKM filtered the raw MAXIMO data to consider only relevant records (lines, transformers and reactive plant) and compared this list with the list produced by SP AusNet's reporting system. Out of over 3,000 works orders, SKM raised 44 queries.

  Of these queries, 36 were found to be correct (mostly live-line work that did not involve an equipment outage), 6 had status errors[5] and were incorrectly omitted from the reporting system (but did not affect S-factor results as they were otherwise excluded anyway) and 2 were incorrectly omitted.

[3] These "events" were works orders extracted from the MAXIMO system into the reporting system, relating to outages or switching on equipment that falls within the scope of the PI Scheme..

[4] 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 PI Scheme (ie it only extracts those items of equipment shown as subject to the PI Scheme), and also the status of the works order (it must be started or complete).

[5] For example, the works order status in MAXIMO was not changed to "complete" or "switching commenced" as appropriate, meaning it was omitted from the works orders extract used for reporting.

This represented a 0.2% error rate and SKM does not consider it to be material or the result of systemic errors. SKM understands SP AusNet has now corrected these errors.

- **For asset categorisation**, SKM reviewed the "equipment details" table in MAXIMO, and also the reported categorisation for each item of equipment from the works orders. These were then reviewed for consistency with similar plant items, and with the original list of assets agreed with the ACCC when the service standards scheme commenced. Out of 624 items of equipment reviewed, 87 categorisations were queried. Of these 63 were found to be correctly categorised (mostly connection assets); 14 were categorised correctly according to the list agreed with AER but should perhaps be added to this list; and 6 were incorrectly categorised[6]. This represented a 1% error rate, and SKM does not consider this to be material to the reported results.
- **The query code used to extract data from MAXIMO** was also reviewed and no obvious errors were found (though SKM does not have the detailed understanding of the MAXIMO system to necessarily identify every potential error in this code).

Given the depth of the analysis undertaken by SKM, the small number of actual errors identified is not considered likely to have material impacts on the reported results, nor are they evidence of systemic errors with MAXIMO or the PI reporting system. SP AusNet was cooperative in reviewing these categorisations, and has indicated they intend to review and correct the apparent errors identified for future reporting periods.

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 be had been correctly applied.

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.

[6] This was mostly new assets (eg a new transformer, and an existing line that was split in two) that were not tagged appropriately when entered into MAXIMO.

# 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 Decison are as follows:

| | |
|---|---|
| ***Measure 1***<br>Transmission Circuit Availability | 1.1 Exclude unregulated transmission assets.<br>1.2 Exclude connection assets<br>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)<br>1.4 Force majeure events |
| ***Measure 2***<br>Loss of Supply Event Frequency Index | 2.1 Exclude unregulated transmission assets (e.g. some connection assets)<br>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<br>2.3 Planned outages<br>2.4 Force Majeure events |
| ***Measure 3***<br>Average Outage Duration | 3.1 Planned outages<br>3.2 Excludes momentary interruptions (< 1 minute)<br>3.3 Force majeure events |
| ***Measure 4***<br>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<br>4.2 Excludes connection assets<br>4.3 Hours of binding constraints where non-credible generation contingencies coincide with previously notified planned outages<br>4.4 Force majeure events |
| ***Measure 5***<br>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<br>5.2 Hours of binding constraints where non-credible generation contingencies coincide with previously notified planned outages<br>5.3 Any event which was clearly as a consequence of action or inaction of another TNSP<br>5.3 Force majeure events |

## 4.2 Exclusions proposed by SP AusNet during revenue cap application

Attachment G of the 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 are:

- Any outage caused by a fault, outage request or other event on a 3rd party system connected to the TNSP's Network
- An outage which occurs within a period a connected person (high voltage customer) 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 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
- Any outage requested by a 3rd party for construction or demolition activities on land over which the TNSP has an easement
- 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 Brunswick Terminal Station to Richmond Terminal Station 220 kV Cable system that is caused by damage to a part of the cable that is not on an SP AusNet site and is caused by someone other than SP AusNet
- 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
- Force majeure events

SKM reviewed the outage code applied by SP AusNet for the excluded events claimed in 2006 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 under the augmentation works funded by VENCorp and carried out by SP AusNet or its agents (see outage reasons[7] 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 PI 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.

There is also the exception of the 3rd party exclusion which is discussed in section 4.5.

### 4.3 Categorisation of 2006 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 | 40,663 | 57% | 2,397 | 54% | 4,933 | 61% | 33,333 | 57% |
| All Excluded Events | 30,276 | 43% | 2,082 | 46% | 3,173 | 39% | 25,020 | 43% |
| Total | 70,939 | 100% | 4,480 | 100% | 8,106 | 100% | 58,353 | 100% |

Note there appears to be some confusion regarding the use of the word "exclusion", with the AER Guidelines and Decision using the term to mean both:

- Identifying specific events or circumstances where it is considered the TNSP should not reasonably be held responsible for an outage
  (for example, force majeure events, outages caused by correct operation of protection to isolate a fault on a 3rd party network are "excluded")
- Defining the boundaries of what is to be regulated under the Scheme.
  (for example, connection assets and unregulated assets are "excluded")

SKM considers the latter category should be re-defined as "outside the scope" of the scheme and not to be reported as either included or excluded events. SP AusNet has provided supplementary information that indicates when only "in scope" items are considered, the total outage hours are 15,831, of which 13,527 (85%) are included, and 2,304 (14%) are excluded. SKM has not audited these figures, but considers this would be a better basis for reporting in future years.

There were no out-of-service assets in 2006 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 are in general conformance with the exclusions defined under the Decision, except those specifically discussed in this report.

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

These results are taken from SP AusNet's internal reporting system spreadsheet. SKM notes that SP AusNet did not report all excluded events in the spreadsheet report provided to AER. Only the bushfire and shunt reactor exclusion events were included in the report to AER.

### Table 2 Breakdown of results by Outage Reasons

| Outage Code | Reason | Exclusion | No of Events | Hours |
|---|---|---|---|---|
| 3RDPARTY | Outage due to actions of third party | x | 8 | 66 |
| APDALCOA | Work by Alcoa or work by SPI PowerNet during outage initiated by Alcoa | x | 12 | 110 |
| BUSHFIRE | Outage requested during bushfire for safety of fire fighters | x | 16* | 255* |
| CONSCON | Element stranded by system design by outage of another element due to capital works by SP AusNet | - | | |
| CONSMAIN | Element stranded by system design by outage of another element due to maintenance works by SP AusNet | - | | |
| CONSTR | Redundant code for outage due to SP AusNet asset maintenance | - | | |
| DB_AUG | Augmentation works funded by distribution company and carried out by SPI PowerNet or its agents | x | 45 | 15,693 |
| DBPROX | Outage due to work by, or requested by, distribution company in proximity | x | 9 | 49 |
| ELECTRAN | Work during outage initiated by ElectraNet SA | x | | |
| EXCAPX | Excluded shunt reactor outage | x | | |
| EXCLUDE | Excluded from AIS and AER service standards | x | | |
| EXMAINT | Excluded shunt reactor outage | x | | |
| FAULT | Fault on SPI PowerNet network - not caused by distribution company | - | 124 | 4,065 |
| FORCED | Forced outage on SPI PowerNet network | - | 62 | 532 |
| FORCMAJ | Force majeure event | x | | |
| GEN_AUG | Augmentation works funded by generation company and carried out by SPI PowerNet or its agents | x | 1 | 12 |
| GENCO | Outage requested by generator to carry out own works | x | 76 | 9,342 |
| HVCUST | Work by SPI PowerNet during HV customer plant shutdown | x | 4 | 14 |
| INTERCON | Interconnector constrained by SP AusNet or its agents | x | | |
| LANDOWN | Outage due to private landowners to work in proximity to lines over their land | x | | |
| RECOVER | Outage where AIS rebate is recoverable from third party | x | | |
| SNOWY | Outage requested by Snowy Mountains Control Room | x | | |
| SPICAPX | Outage due to SPI PowerNet capital works | - | 500 | 15,714 |
| SPIMAINT | Outage due to SPI PowerNet operational maintenance | - | 526 | 20,352 |
| STHHYDRO | Work during outage initiated by Southern Hydro on their assets | x | 1 | 77 |
| SW_NEM | Switching of network requested / directed by NEMMCO | x | 7 | 8 |
| SW_VEN | Switching for VENCorp load shedding – power restrictions | x | | |
| TPPROX | Outage due to work by third party in proximity | x | | |
| TRANSGRD | Outage requested by TransGrid for work on their assets | x | 2 | 9 |
| VEN_AUG | Augmentation works funded by VENCorp and carried out by SPI PowerNet | x | 135 | 4,895 |
| VICROADS | Outage due to actions of / requested by Vic Roads | x | | |
| SPICAPX & SPIMAINT | Shunt reactor peak period outages, to be excluded from peak and intermediate non-critical outage measures | x | 19* | 220* |
| Total | | | 1,512 | 70,939 |

* These events were not included in SP AusNet's internal ACCC reporting system spreadsheet, but have been identified from the events in the exclusions page of the spreadsheet 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."*[8]

### 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 2006 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 previously, , but has clarified the treatment of such exclusions in the Service target performance incentive scheme released for public consultation on 31 January 2007, which will apply to SP AusNet in their next regulatory period.

## 4.5 Outage Code 3rd Party

From discussions with SP AusNet staff, SKM understands that the majority of the events excluded under the "3rd party" outage code were planned outages.

In considering specific third party events proposed by SP AusNet as exclusions, the ACCC considered that in some 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[9].

As a consequence, SKM is of the view that the events in this outage code should be included in calculating the performance measures, as these do not fall within the definition of Force Majeure detailed in the ACCC Decision. 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

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[8] Section 7.6, pp 103

[9] ACCC, *Victorian transmission network revenue caps: Decision*, 11 December 2002, pp 103

excluded from the performance reporting for the remainder of the term of the current determination. As similarly recommended in section 4.4.2, this would ensure a fair and reasonable comparison between agreed performance targets and the historical results calculated by SP AusNet.

SKM also notes the quantum of 3rd party exclusions for 2006 to be relatively small, and mostly on assets beyond the scope of the Scheme.

### 4.6 Event Based Exclusions Sought by SP AusNet

In the submission provided by SP AusNet, there were exclusions were sought by SP AusNet for specific events related to shunt reactor outages.

In previous years SKM has identified the situation where shunt reactors were unavailable during peak periods and counted in the peak time availability measure. 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.

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 2006.

Good operating practice for the shunt reactors is in general that they be available during off-peak periods, and that scheduled maintenance be conducted during peak periods. To the extent the recommended exclusion removes the perverse penalty for maintenance during peak periods, SKM considers this to be in accordance with the objectives of the PI scheme. It is arguable there should be a corresponding incentive to increase availability during off-peak periods, that is not achieved as yet. SKM recommends AER and SP AusNet discuss appropriate complementary mechanisms to encourage availability during off-peak periods.

# 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 defines Force Majeure as:

*For the purpose of applying the service standards PI scheme to SPI PowerNet, "Force majeure events" means any event, act or circumstance or combination of events, acts and circumstances which (notwithstanding 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, NEMMCO, 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.*

*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 Bushfire

SP AusNet has identified 16 bushfire related outages that occurred in December 2006, and were part of a series of bushfires that caused major damage and disruption to Eastern Victoria.

SKM has made enquiries with the Victorian Country Fire Authority, who confirms these fires were severe in terms of scale, number, severity and area:

- The number of wildfires recorded in December was up 50% on average;
- Close to 1 million hectares of bushland was burnt out in the Gippsland and Alpine region;
- Resources were stretched due to the number, severity and length of this bushfire event, which continued over several weeks; and
- Commonwealth assistance was sought and provided, including army and other resources, under the Commonwealth Disaster Plan which was activated by the Commonwealth.

At the time of conducting this audit, there was no official report or categorisation of the fires from CFA that SKM could use to provide objective classification of these events as Force Majeure. However, from the qualitative information available, SKM considers these bushfires in aggregate to constitute a severe event, removed in scale and severity from "typical" bushfire events.

It has not been possible to verify whether the full duration of these outages was due to the bushfire, and whether it was possible the duration of the outages could have been reduced. SKM considers

however that SP AusNet's explanation of the practical difficulties[10] in returning lines to service following a bushfire were reasonable and in accordance with industry practice, and that it is likely the lines could not have been returned to service any sooner.

SKM also notes the total duration of exclusion sought for these events, at some 255 hours, is small and will not have a significant impact on the results for 2006.

On the basis of the severity of these events SKM considers they meet the definition of force majeure. Further, they were accepted as exclusions by VENCorp for the Victorian rebate scheme, and assuming VENCorp is consistent in its application of the rebate scheme rules, would therefore have been excluded from historical reporting and hence from historical baseline data on which SP AusNet's targets were based.

Accordingly SKM recommends these events be accepted as excluded from 2006 performance.

### 5.2 Richmond – Brunswick cable fault

During 2006, SP AusNet suffered an outage on the Richmond to Brunswick cable which runs underground through the Melbourne CBD. This single event contributed almost 50% of the 2006 forced outage hours due to delays in finding the fault location, receiving permission from roads authorities to excavate, and sourcing appropriately skilled personnel to repair the fault.

SP AusNet has not sought to claim this event as an exclusion for 2006, but SKM understands they have been in discussions with AER regarding exclusions for further outages that will be required in future years to rectify type faults identified in the cable joints on this circuit.

[10] Such as difficulty gaining access to the lines to patrol for damage, fallen trees blocking tracks, bridges burned out, and access blocked by other fires.

# 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 | Performance | | S-factors | |
|---|---|---|---|---|---|---|
| | | | SP AusNet Without Exclusion | SP AusNet With Exclusion | SP AusNet Without Exclusion | SP AusNet With Exclusion |
| S1 | Circuit Availability (total) | 99.20% | 99.237% | 99.251% | 0.012177% | 0.016890% |
| S2 | Circuit Availability (critical)(peak) | 99.90% | 99.873% | 99.878% | (0.003992%) | (0.003253%) |
| S3 | Circuit Availability (non-critical)(peak) | 99.85% | 99.589% | 99.786% | (0.020360%) | (0.005005%) |
| S4 | Circuit Availability (critical)(intermediate) | 99.85% | 99.541% | 99.541% | (0.024127%) | (0.024127%) |
| S5 | Circuit Availability (non-critical)(intermediate) | 99.75% | 98.595% | 98.972% | (0.025000%) | (0.025000%) |
| S6 | Average Outage Duration (Line) | 8 - 10 | 30.926 | 33.379 | (0.125000%) | (0.125000%) |
| S7 | Average Outage Duration (Transformer) | 6 - 10 | 7.184 | 7.692 | 0.000000% | 0.000000% |
| | **Total** | | | | **(0.186302%)** | **(0.165496%)** |

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

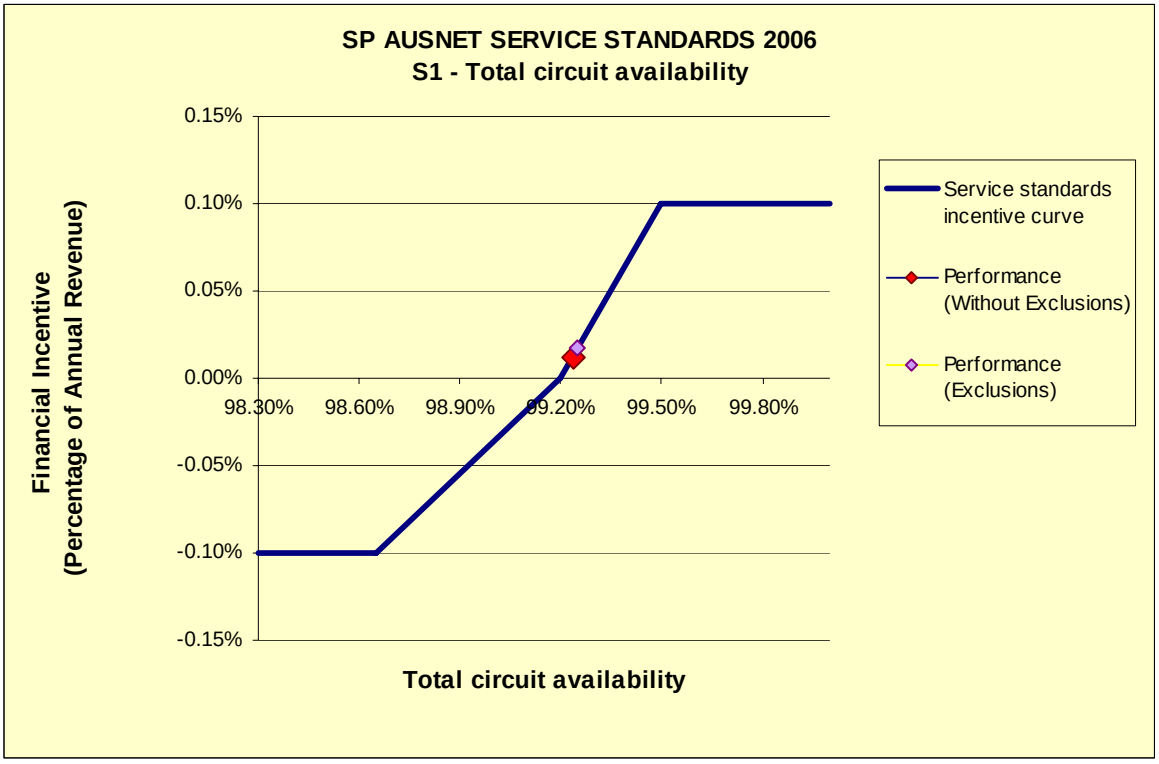
Based on these results, SKM considers SP AusNet's calculation of its S-factor to be free of material errors, and recommends that the financial penalty for SP AusNet under the AER Service Standards Scheme for 2006 is **(0.165496%) of the Annual Revenue for 2006 calendar year.**

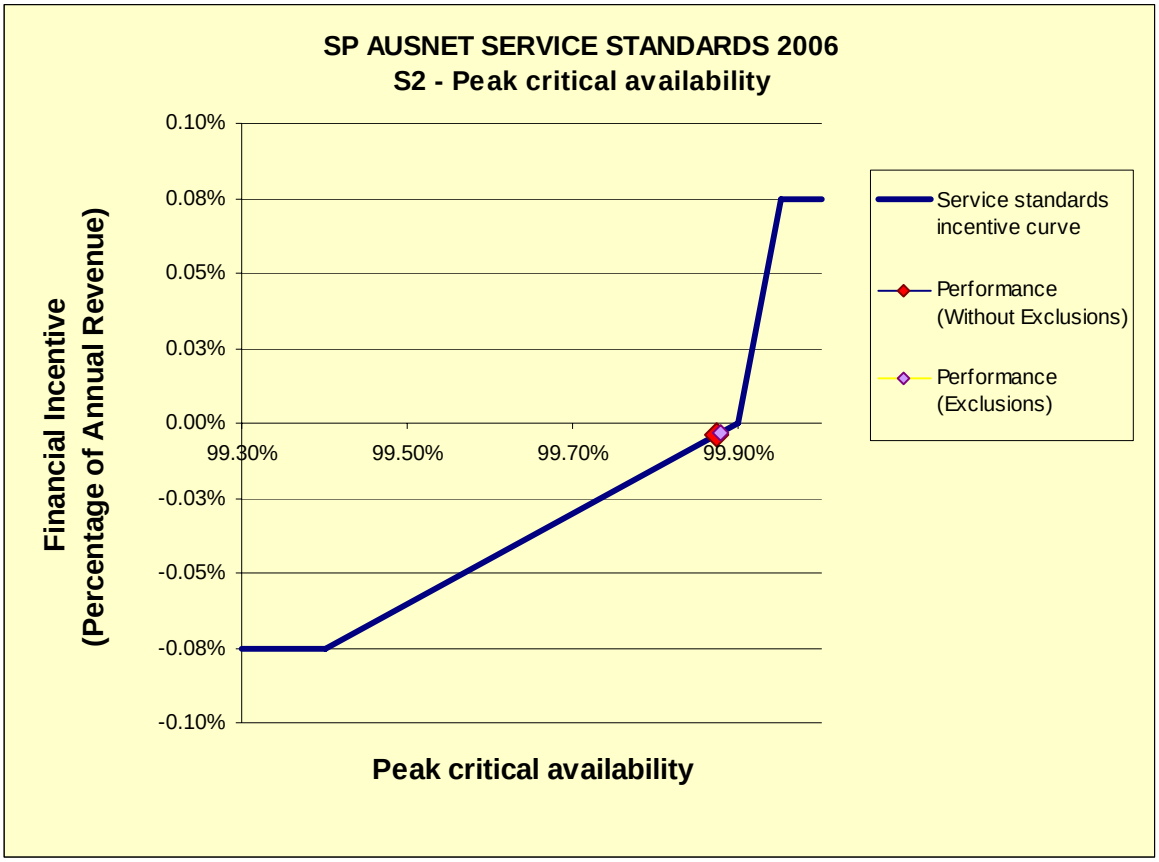
# Appendix A Performance Measure Profiles

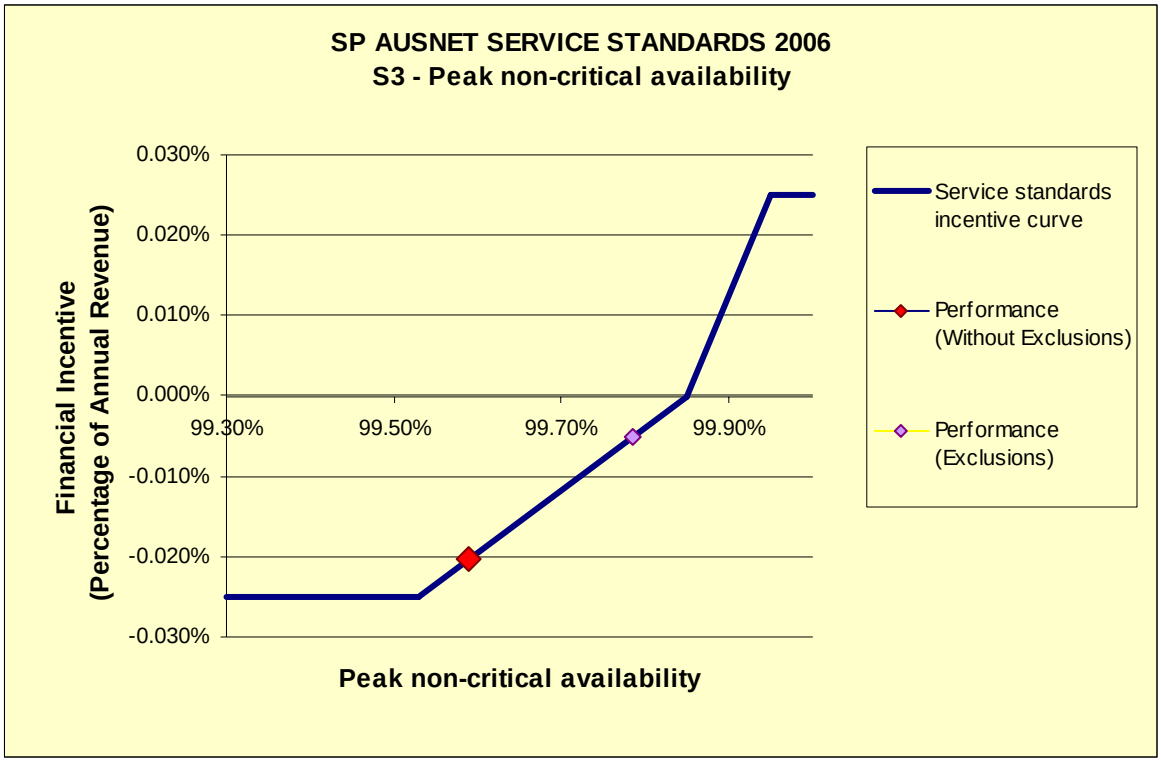
The Performance Measure profiles graphically illustrate the 2005 performance against the targets for Circuit Availability and Average Outage Duration.

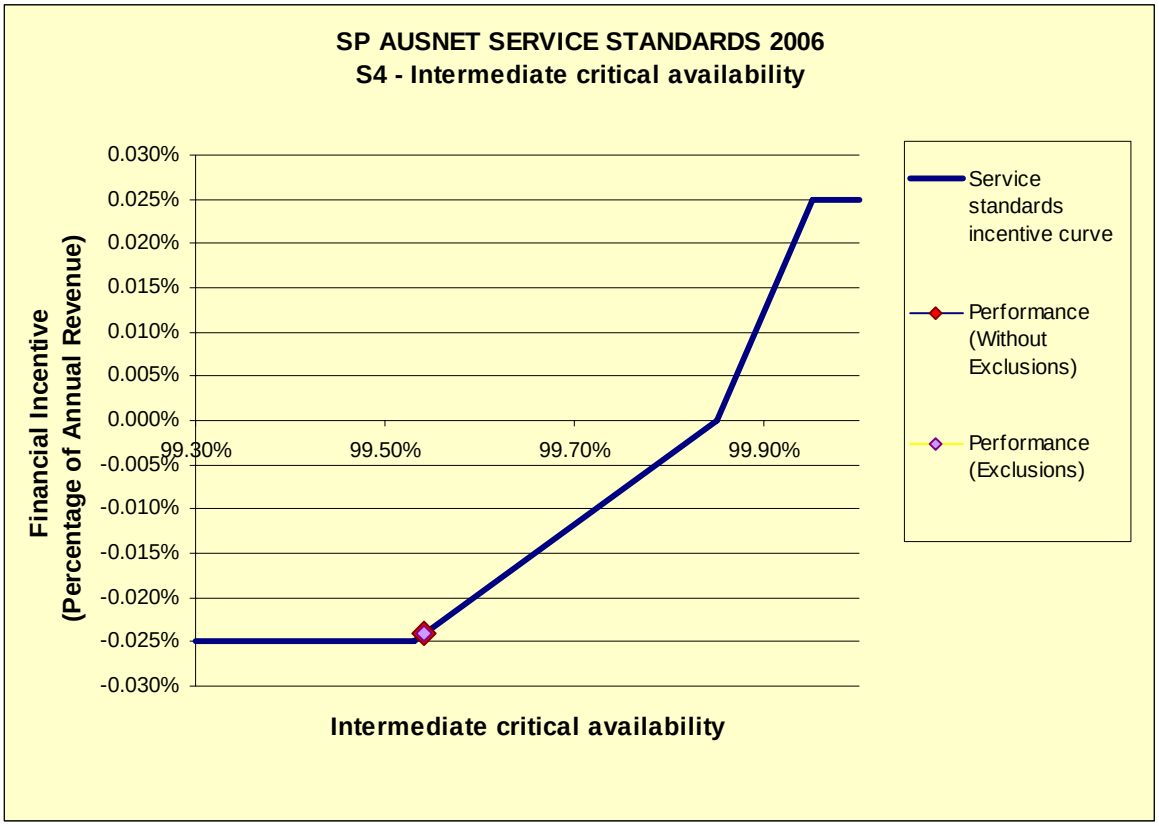
The profiles shown are:

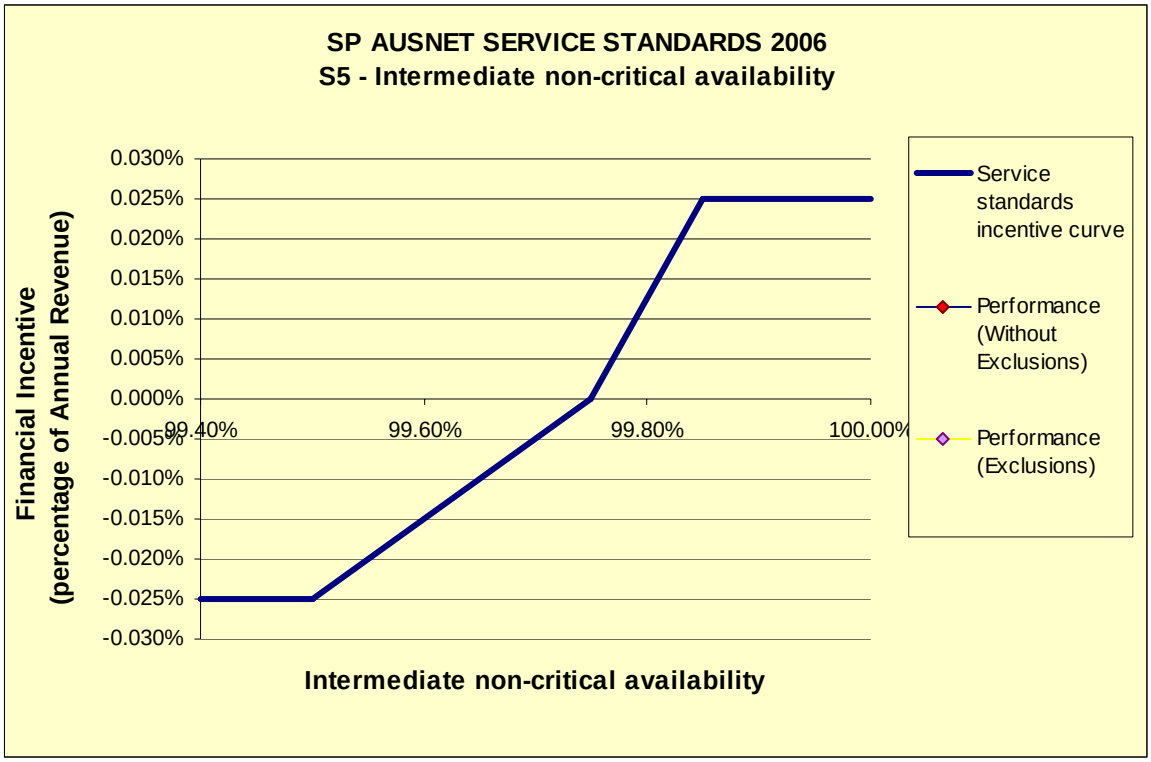
- S1 - Measure 1 Circuit Availability (total)
- S2 - Measure 1a Circuit Availability (critical)(peak)
- S3 - Measure 1b Circuit Availability (non-critical)(peak)
- S4 - Measure 1c Circuit Availability (critical)(intermediate)
- S5 - Measure 1d Circuit Availability (non-critical)(intermediate)
- S6 -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

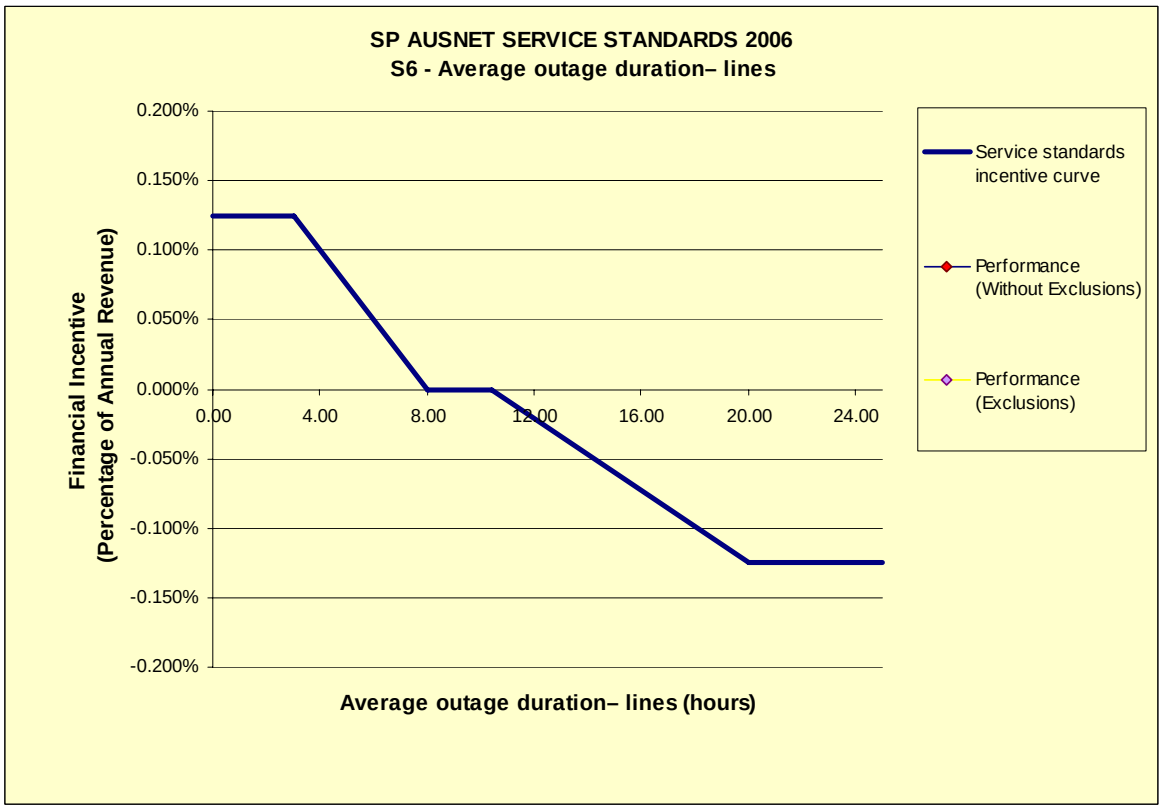


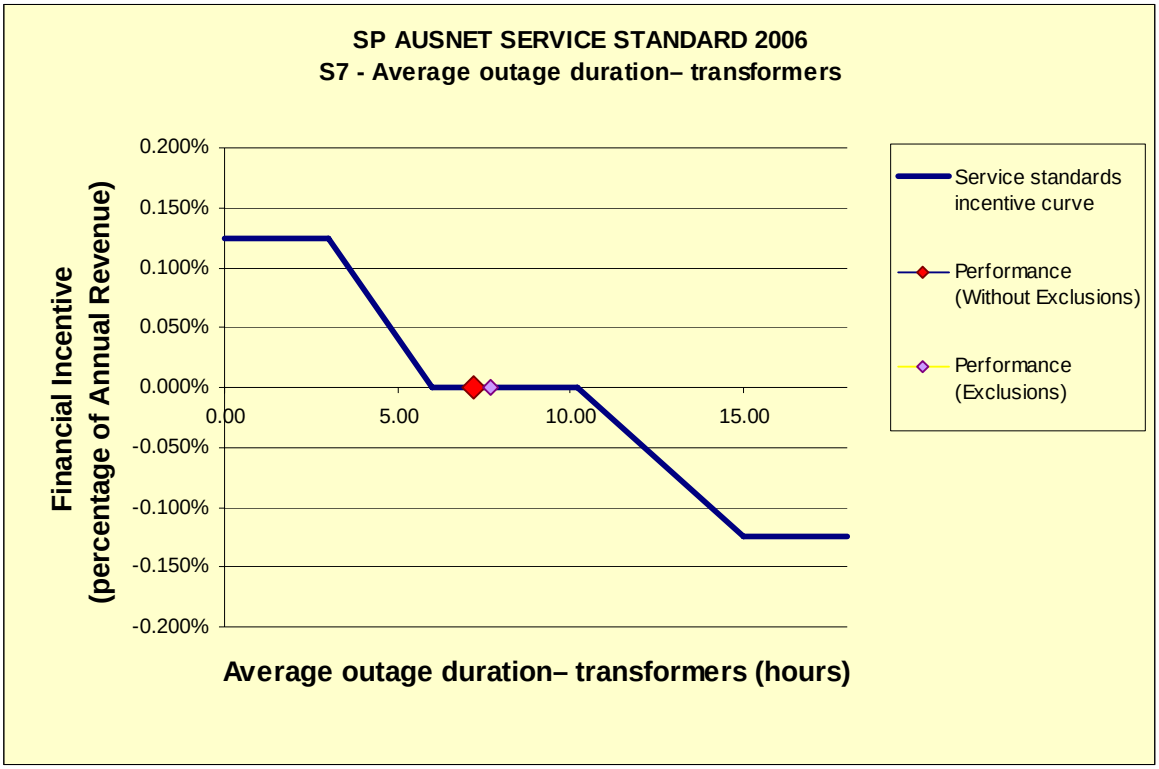

SP AUSNET SERVICE STANDARDS 2006
S2 - Peak critical availability
Financial Incentive
(Percentage of Annual Revenue)
0.10%
0.08%
0.05%
0.03%
0.00%
-0.03%
-0.05%
-0.08%
-0.10%
99.30%
99.50%
99.70%
99.90%
Peak critical availability
Service standards incentive curve
Performance (Without Exclusions)
Performance (Exclusions)


SP AUSNET SERVICE STANDARDS 2006
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 2006
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 2006
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 2006
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 STANDARD 2006
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)