



Audit of Murraylink Service Standards Performance Reporting

PERFORMANCE RESULTS FOR 2004

- Final Report
- 31 March 2005



Australian Competition
and Consumer Commission



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Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
A	18.03.2005	J Butler	C Jones	18.03.2005	For comment
1.0	31.03.2005	J Butler	G Edwards	31.03.2005	For issue

Distribution of copies

Revision	Copy no	Quantity	Issued to
A	Electronic	1	ACCC
1.0	Electronic	1	ACCC
	Bound	1	Library

Printed:	13 June 2005
Last saved:	30 March 2005 10:20 PM
File name:	I:\QHIN\Projects\QH43504\Deliverables\Reports\Murraylink\QH43504-000-RE-UZ-006.doc
Author:	Jeff Butler
Project manager:	Jeff Butler
Name of organisation:	Australian Competition and Consumer Commission (ACCC)
Name of project:	Audit of Murraylink Service Standards Performance Reporting
Name of document:	Final Report
Document version:	1.0
Project number:	QH43504



1. Executive Summary

Sinclair Knight Merz (SKM) was engaged by the Australian Competition and Consumer Commission (ACCC) to conduct an audit of the performance report of Murraylink for 2004 under the ACCC Performance Incentive (PI) Scheme.

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

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

SKM met with Murraylink staff in Brisbane on Tuesday 22 February 2005, to review their data systems and procedures for gathering and processing outage information. The integrity of the system established by Murraylink for retrieving data from the Events Database for reporting under both internally and the ACCC PI Scheme was audited. As a result of audit activities undertaken, Sinclair Knight Merz has formed an opinion that:

- the performance reporting by Murraylink was free from material errors and was in accordance with the requirements of the ACCC service standards guidelines;
- Murraylink correctly determined coefficients to calculate the performance incentive amount using the equations contained in the revenue cap decision;
- the recording system used by Murraylink to capture outage data is accurate and reliable; and
- the application of exclusions was in accordance with the ACCC Service Standards Guidelines and the standard measure definitions in the PI Scheme.

SKM recommends:

- Murraylink's calculation of its S factor be accepted as free from material errors;
- the bonus for Murraylink under the ACCC PI Scheme for the 84 days of regulated operation in 2003 is **0.4216% of the agreed Annual Revenue for 2003**, and the penalty for 2004 is **(0.7858%) of the agreed Annual Revenue for 2004**.



2. Recording System

Murraylink is an electricity transmission asset operated by the Murraylink Transmission Company (MTC). It includes the 180km underground power cable and connects the Victorian and South Australian regions of the National Electricity Market (NEM), transferring power between the Red Cliffs substation in Victoria and the Monash substation in South Australia. Murraylink's current rated capacity is 220 Megawatts (MW).

The main control centre for Murraylink is located in the Brisbane CBD, with some control facilities and historical data logging available on site.

The recording of outages is done via manual entry into an Outage Register. Planned outages are taken following discussions within the Brisbane office. For unplanned outages, operators comment on the reason for the outage, and these comments are reviewed on a monthly basis.

The primary cause for outages on Murraylink are failures in Insulated Gate Bipolar Transistor (IGBT) devices. Murraylink can operate with up to 6 faulty IGBTs before the line trips, although planning for replacement begins when 4 IGBTs have failed. There is an annual outage for shutdown maintenance for 2 days in October.

2.1 Categorisation and Exclusions

All outages are categorised as planned/scheduled or unplanned/forced. For unplanned outages, duration is recorded for peak period (0700 to 2200 hours) and off peak (2200 to 0700 hours).

2.2 Processing of Outage Data

Murraylink compile the Outage Register into warranty and regulation Excel spreadsheets which records the basic details of both included and excluded events, and totals the peak and off-peak components. The cause for each outage is categorised as occurring at either MLRC (Red Cliffs) and MLBI (Berri) converter stations, or both where the entire interconnector is affected.

2.3 Calculation of Performance Measure Results

The performance measures are calculated using the S-factor equations defined in Tables 9.4, 9.5 and 9.6¹ of the MTC Application for Conversion and Maximum Allowed Revenue of 1 October 2003.

¹ pp 179



2.4 System Audit Findings

During 2004, there were 24 outage events that were subject to the ACCC PI Scheme. SKM conducted a sample testing of twelve (12) random outage records from the operator log to ensure that these were correctly recorded in the Excel file for processing. In each instance, the events, reasons and switching times were found to have been correctly transferred to the Excel file, and correctly processed for peak / off-peak hours.

SKM reviewed the categorisation of each outage event and accepted that it was in accordance with the accepted definitions of planned and unplanned.

SKM is satisfied that the recording and data processing systems that have been put in place by MTC appear to accurately log and calculate performance.



3. Performance Measures

As part of the ACCC decision on the application for Murraylink to become a regulated asset, PB Associates was commissioned to develop a performance incentive framework. PB adopted a similar approach to that used by SKM in establishing performance measures and targets.

Due to the unavailability of historical performance data, the measures and targets were developed from a review of technical documents released by the manufacturer (ABB) of much of Murraylink’s assets and a CIGRE survey.

3.1 Agreed measures

PB recommended that Measure 1 Circuit Availability be adopted, subdivided into three sub-measures:

- planned availability;
- forced availability during peak periods; and
- forced availability during off-peak periods.

and associated performance targets be set for each category rather than a single overall target.

With consideration of information provided by MTC, the Commission adopted the three sub-measures with targets that take account of the Murraylink maintenance and inspection program. The parameters for the sub-measures are shown in Table 3-1.

▪ **Table 3-1 Performance Targets**

No	Measure	Performance for Maximum Penalty	Target Performance	Performance for Maximum Bonus	Weighting Factor
1a	Planned circuit availability	99.04%	99.17%	99.38%	0.40
1b	Forced outage circuit availability in peak periods	98.90%	99.48%	100.00%	0.40
1c	Forced outage circuit availability in off-peak periods	98.84%	99.34%	99.94%	0.20

These parameters considered advice from MTC regarding its required maintenance program, which includes 3-hour outages for monthly inspections. This allowance reduced Murraylink’s planned availability.



4. Exclusions

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

4.1 Excluded Events

The exclusions allowed under the standard definition for Circuit Availability² are:

- Exclude unregulated transmission assets;
- Exclude from 'circuit unavailability' any outages shown to be caused by a fault or other event on a '3rd party system' eg. intertrip signal, generator outage, customer installation; and
- Exclude force majeure events.

In addition, in the decision related to the MTC application for conversion, the Commission defined that the replacement of a transformer will be an exclusion "... from the incentive scheme, if:

- *Murraylink can demonstrate that the replacement of the transformer was needed;*
- *Murraylink can demonstrate that the time taken was needed; and*
- *The Commission is satisfied that the replacement was the best alternative and all reasonable preventative measures had been taken.*"³

4.2 Audit Findings

Two sets of results were provided by Murraylink – the 84 days of regulated operation in 2003, and 2004.

■ Table 4-1 Outages in 2003

Type	No of Events	Duration mins	Peak mins	Off-Peak mins	Total mins
Scheduled maintenance	4	3780	-	-	3780
Forced outages	4	-	376	540	916
Excluded events	-	-	-	-	-
Total	8	3780	376	540	4696

² Statement of principles for the regulation of transmission revenue – Service standards guidelines, ACCC, 12 November 2003

³ pp 176, MTC Application for Conversion and MAR: Decision, ACCC, 1 October 2003



■ **Table 4-2 Outages in 2004**

Type	No of Events	Duration mins	Peak mins	Off-Peak mins	Total mins
Scheduled maintenance					
Equipment / control repair	7	3037	-	-	3037
Annual maintenance	2	3085	-	-	3085
Building fumigation	1	374	-	-	374
<i>Subtotal</i>	<i>10</i>	<i>6496</i>	<i>-</i>	<i>-</i>	<i>6496</i>
Forced outages					
Equipment fault	5	-	5315	3126	8441
Control fault	3	-	326	75	401
Fire system fault	2	-	117	0	117
Runback incident 30.04.2004	1	-	37	274	311
<i>Subtotal</i>	<i>11</i>	<i>-</i>	<i>5795</i>	<i>3475</i>	<i>9270</i>
Excluded events	3	-	995	21	1016
Total	24	6496	6790	3496	16782

The 3 exclusions in 2004 were due to trips caused by third parties.

4.3 Recommendations

SKM is satisfied that the outages have been appropriately categorised, and that the exclusions in 2004 are reasonable, as the events were caused by third parties.



5. Force Majeure

In the Service Standards Guidelines published by the Commission⁴, there are four (4) considerations listed for determining what force majeure events should be “excluded force majeure events”. These are:

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

5.1 Definition

The definition used by Murraylink in the determination of performance under the ACCC PI Scheme reflects the definition outlined in the ACCC service standards guidelines, and is outlined in Appendix C.

5.2 Event

There were no events during 2003 or 2004 for which Murraylink sought an exclusion as force majeure events.

⁴ Schedule 2, Statement of principles for the regulation of transmission revenues – Service standards guidelines, ACCC, 12 November 2003



6. Calculation of Bonus / Penalty

The results provided by Murraylink were entered into the PI Scheme model provided to the ACCC. In accordance with the ACCC decision, the penalties and bonus have been capped at 1 percent of the regulated revenue. Separate calculations have been completed for the 2003 and 2004 performance results.

■ Table 6-1 Calculated 2003 Performance

No	Performance Measure	Calculated bonus / (penalty)		% variation to SKM values
		ACCC S-factors	SKM	
1a	Circuit Availability (planned)	\$ 5,343	\$ 5,300	0.81%
1b	Circuit Availability (forced)(peak)	\$ 4,308	\$ 4,300	0.19%
1c	Circuit Availability (forced)(off-peak)	\$ 1,895	\$ 1,900	(0.26%)
	TOTAL	\$ 11,545	\$ 11,500	0.39%

■ Table 6-2 Calculated 2004 Performance

No	Performance Measure	Calculated bonus / (penalty)		% variation to SKM values
		ACCC S-factors	SKM	
1a	Circuit Availability (planned)	(\$ 50,252)	(\$ 50,252)	0.00%
1b	Circuit Availability (forced)(peak)	(\$ 50,252)	(\$ 50,252)	0.00%
1c	Circuit Availability (forced)(off-peak)	\$ 1,784	\$ 1,790	(0.34%)
	TOTAL	(\$ 98,720)	(\$ 98,714)	(0.01%)

These calculations have been done for comparative purposes only, as the final calculation of the bonus or penalty is based on the S-factor equations defined in the ACCC determination. The profile for each of the applicable measures are shown in Appendix A, based on the performance results calculated using the exclusions outlined in Section 3.



The ACCC decision nominated the revenue for each financial year⁵ from 2003/04 (commencing 1 October 2003) to 2012/13. Based on the amounts nominated, the following revenues for the 84 days in 2003 and the calendar year 2004 have been used in determining the bonus and penalty amounts:

- For 2003 results⁶ $\sim (84/273) * \$8.90M = \$2.738M$
- For 2004 results $\sim (189/273) * \$8.90M + 0.5 * \$12.803M = \$12.563M$

Table 6-3 and Table 6-4 summarises the service standards S-factors for 2003 and 2004, based on the equations contained in the Murraylink conversion decision.⁷

■ **Table 6-3 Service Standards S-factors for regulated performance in 2003**

Measure	Performance	S-factor
Circuit Availability (planned)	99.27245 %	0.001951
Circuit Availability (forced)(peak)	99.68455 %	0.001573
Circuit Availability (forced)(off-peak)	99.54753 %	0.000692
Total		0.004216

■ **Table 6-4 Service Standards S-factors for 2004**

Measure	Performance	S-factor
Circuit Availability (planned)	98.74969 %	- 0.004
Circuit Availability (forced)(peak)	98.88827 %	- 0.004
Circuit Availability (forced)(off-peak)	99.38274 %	0.000142
Total		-0.007858

With reference to the comparative calculation results, SKM considers that Murraylink's calculation of its S-factor is free of material errors. The bonus recommended for Murraylink under the ACCC PI Scheme for the 84 days of regulated operation in 2003 is **0.4216% of the agreed Annual Revenue for 2003**, and the penalty for 2004 is **(0.7858%) of the agreed Annual Revenue for 2004**.

⁵ pp 181, section 10

⁶ The revenue cap for the 2003/04 period of \$8.90M is for the year commencing 1 October 2003, being the commencement of regulated operation of Murraylink. There are 273 days between this date and 30 June 2004.

⁷ pp 179

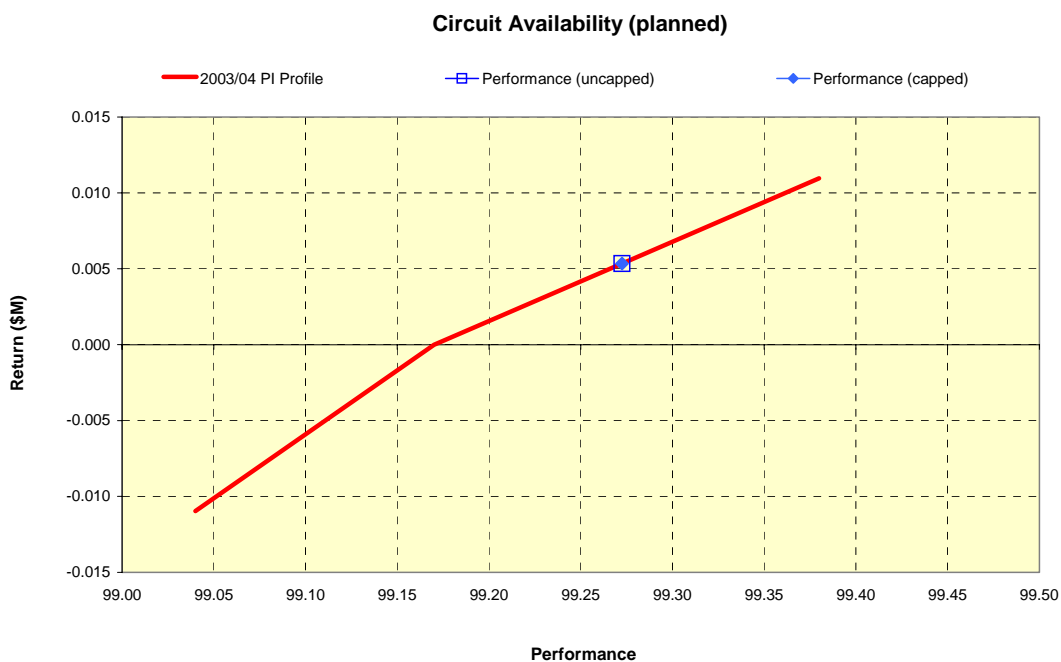


Appendix A 2003 Performance Measure Profiles

The Performance Measure profiles graphically illustrate the 2003 performance against the targets for Circuit Availability sub-measures.

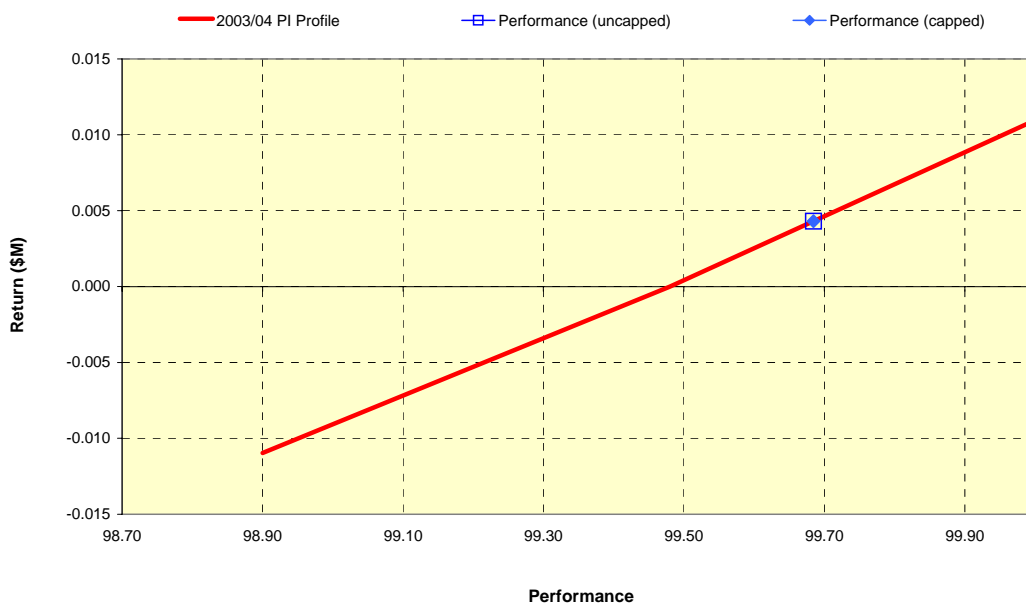
The profiles shown are:

- Measure 1a Circuit Availability (planned)
- Measure 1b Circuit Availability (forced)(peak)
- Measure 1c Circuit Availability (forced)(off-peak)

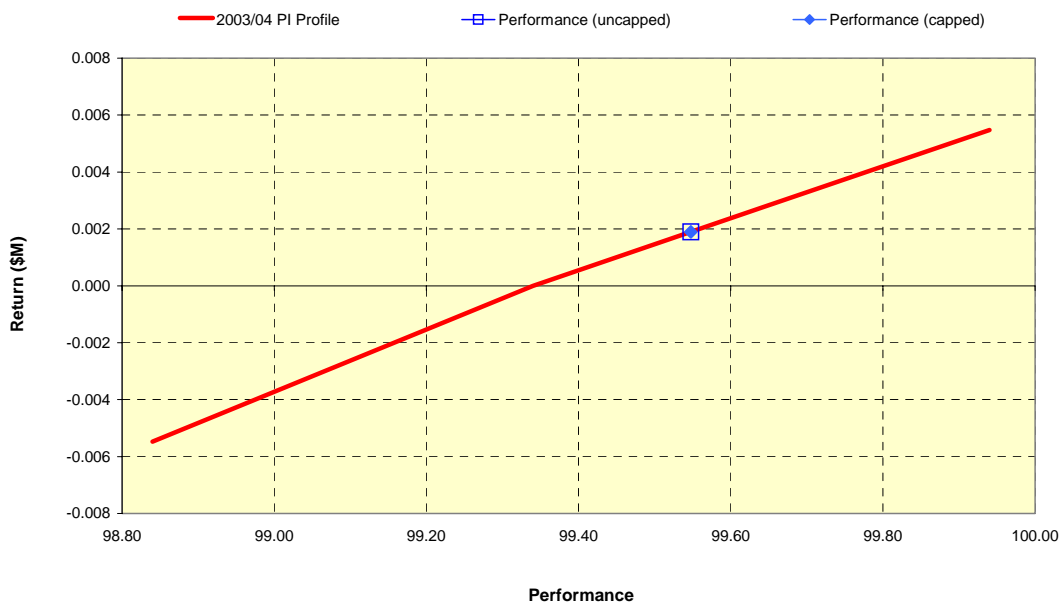




Circuit Availability (forced)(peak)



Circuit Availability (forced)(off-peak)



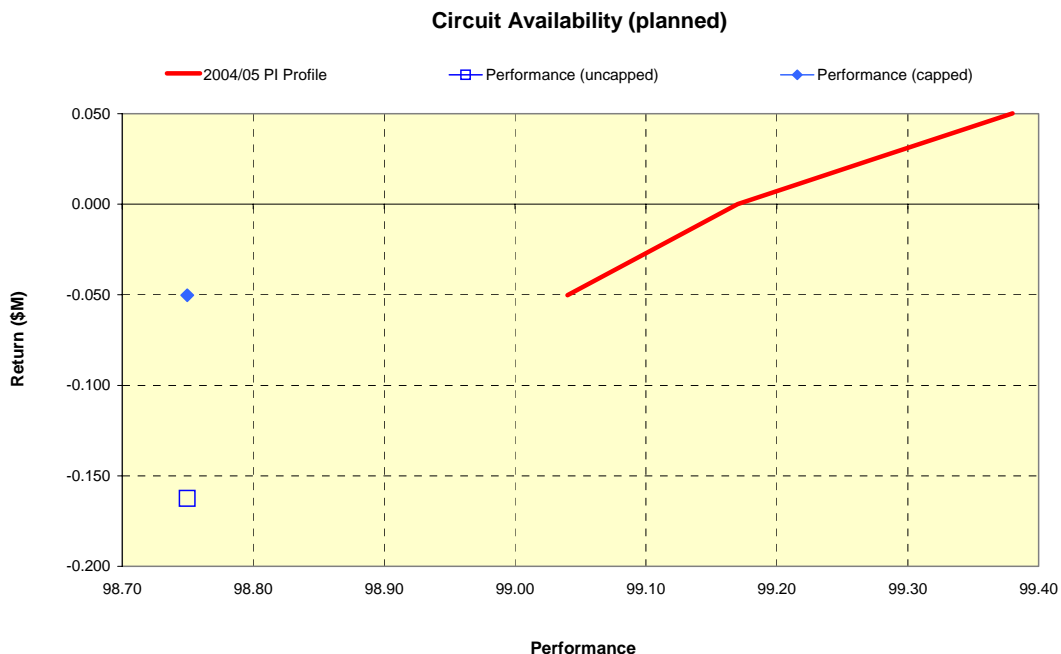


Appendix B 2004 Performance Measure Profiles

The Performance Measure profiles graphically illustrate the 2004 performance against the targets for Circuit Availability sub-measures.

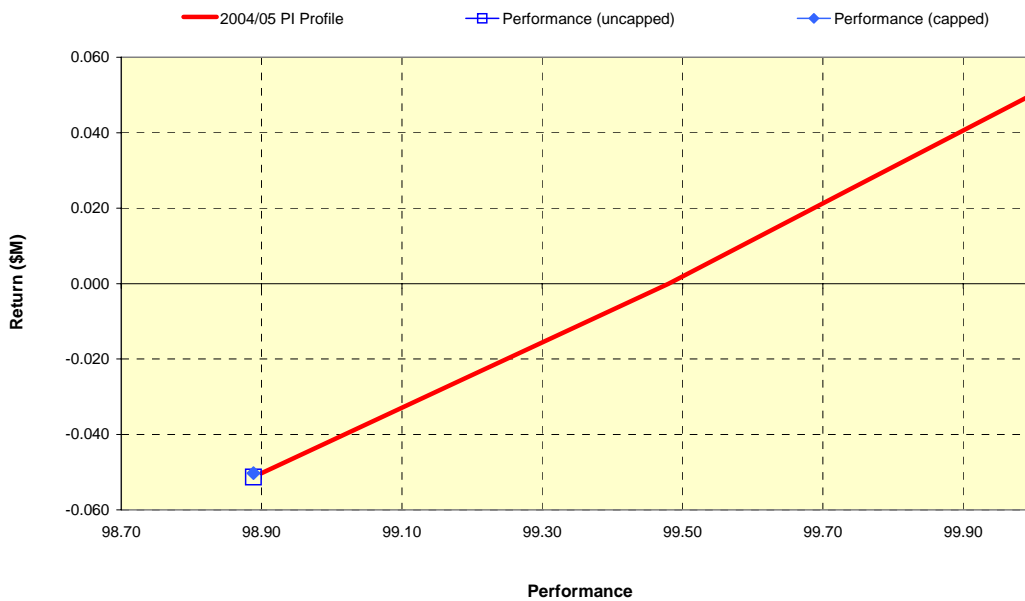
The profiles shown are:

- Measure 1a Circuit Availability (total)
- Measure 1b Circuit Availability (forced)(peak)
- Measure 1c Circuit Availability (forced)(off-peak)

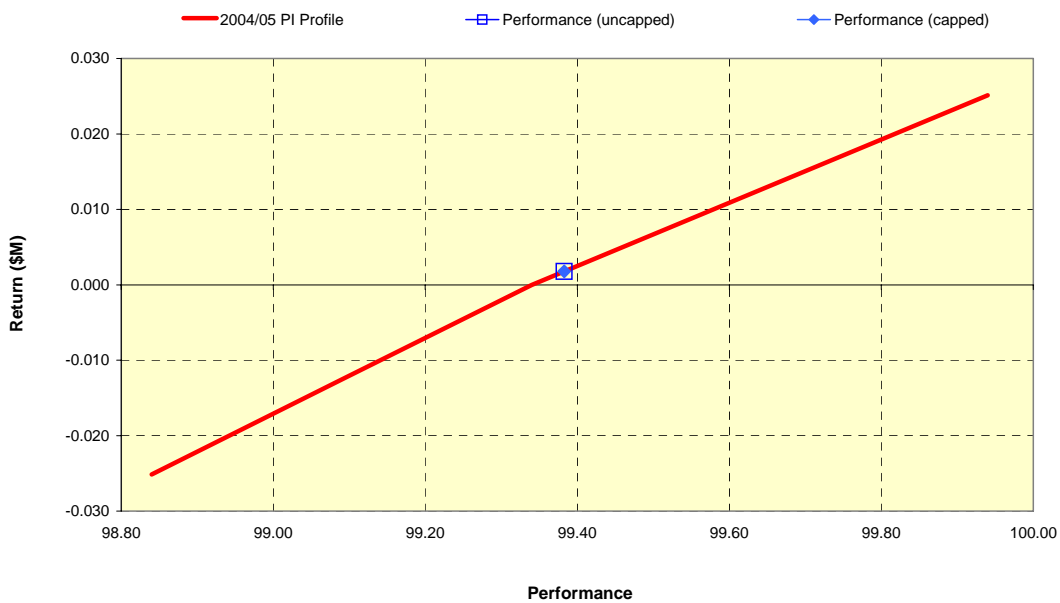




Circuit Availability (forced)(peak)



Circuit Availability (forced)(off-peak)





Appendix C Definition of Force Majeure

The following is an extract from Appendix H to the ACCC decision on the MTC application for conversion and MAR⁸:

“In its past revenue cap decisions and draft service standards guidelines the Commission has excluded force majeure events from the performance-incentive scheme. Below is the definition of force majeure, which Murraylink should report on to the Commission on an annual basis. The Commission will review, amongst other things, performance results and excluded events to ensure compliance with the revenue cap decision.

The following definition is to provide guidance of what may be considered a force majeure event, rather than specifically prescribe every event that may possibly occur.

For the purpose of applying the service standards performance-incentive scheme, ‘force majeure events’ are any events, acts or circumstances or combination of events, acts and circumstances which (despite the observance of good electricity industry practice) are 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; and
- 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.”

⁸ pp 176