AUSTRALIAN ENERGY MARKET OPERATOR

Independent Assurance Report: System Management's compliance with the Wholesale Electricity Market Rules and Market Procedures

FINAL REPORT

9 December 2016

PA Regional Office:
PA Consulting Group
Level 13, 142 Lambton Quay
PO Box 1659
Wellington 6140
New Zealand
Tel: +64 4 499 9053
www.paconsulting.com

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Prepared by: Sue Paul, Jonathan Zukerman, Tim Robinson

FOREWORD

PA Consulting Group undertakes the Western Australian (WA) operational market audits which include:

- An Electricity Compliance Audit of the market operator[1] (*Audit 1*)
- An Electricity Software Compliance Audit of the market operator (*Audit 2*)
- A Gas Compliance Audit of the market operator[2] (*Audit 3*)
- An Electricity Compliance Audit of the system operator[3] (*Audit 4*).

This independent assurance report pertains to Audit 4 above and is part of a series of four audit reports. The reports in this series are:

- Audit 1: *Independent Assurance Report: Compliance of AEMO's internal procedures and business processes with the Wholesale Electricity Market Rules and AEMO's compliance with the Wholesale Electricity Market Rules and Market Procedures*
- Audit 2: *Independent Assurance Report: Compliance of AEMO's software systems and processes for software management*
- Audit 3: *Independent Assurance Report: AEMO's compliance with the Gas Services Information Rules*
- Audit 4: *Independent Assurance Report: System Management's compliance with the Wholesale Electricity Market Rules and Market Procedures*

[1] Australian Energy Market Operator (AEMO) from the AEMO Transition Date as defined in the Electricity Rules (8AM, November 30th 2015); Independent Market Operator (IMO) prior to the AEMO Transition Date.

[2] Australian Energy Market Operator (AEMO) from the AEMO Transition Date as defined in the Gas Rules (8AM, November 30th 2015); Independent Market Operator (IMO) prior to the AEMO Transition Date.

[3] Australian Energy Market Operator (AEMO) from the System Management Transition Date as defined in the Electricity Rules (8AM, 1 July 2016); Western Power (System Management) (SM), prior to the System Management Transition Date.

EXECUTIVE SUMMARY

This independent assurance report sets out the results of the market audit by PA Consulting Group assessing System Management's compliance with the Wholesale Electricity Market Rules (Electricity Rules) and Market Procedures (Electricity Procedures)[4].

Regulatory context and scope

The audit of System Management (referred to as Audit 4) is conducted under (transitional) clause 1.16.4 of the Electricity Market Rules which requires AEMO to ensure that for the first Market Audit following the System Management Transition Date, the Market Auditor audits both AEMO (with respect to clause 2.14.3) and Western Power (in its former capacity as System Management).

See Section 1.1 for further details on regulatory context.

Audit Period

The Audit Year is 1 August 2015 to 30 June 2016, both dates inclusive. We also report some findings from activities in July and August 2016[5].

Approach

Assurance

Our audit has been conducted in accordance with Australian Auditing and Assurance Standards Board's '*Framework for Assurance Engagements*', ASAE 3000 '*Assurance Engagements Other than Audits and Reviews of Financial Information*' and provides limited assurance under this standard.

Risk ratings and materiality

Risk ratings

Audit findings are categorised as follows:

Table 1: Compliance Ratings for Audit Findings

Compliance rating	Description
1	Instances of non-compliance with Electricity Rules and Electricity Procedures noted in audit
2	Findings that are not an instance of non-compliance, but pose compliance risk

[4] For avoidance of doubt, the term Electricity Procedure includes System Management's Power System Operation Procedure.

[5] In past years, the audit year has ended on 31 July, and our site visit has occurred in August, immediately after the end of the audit year. This year, we have an 11 month audit period ending on 30 June (chosen to coincide with the System Management Transition date), and a site visit beginning in mid-September, giving rise to an unusually large gap of 10 weeks between the end of the audit year and our site visit. We have therefore chosen to report some findings from activities in July and August, rather than deferring reporting until the next audit.

Compliance rating	Description
3	Findings related to minor housekeeping issues that do not affect compliance risk

Risk rating descriptors for audit findings were set in consultation with AEMO and are based on AEMO's corporate risk matrix.

Table 2: Risk Ratings for Audit Findings

Risk rating	Description
Critical 	Potential for catastrophic impact on dispatch, settlement or other market outcomes if not addressed immediately. Requires executive actions and monitoring at board level.
Significant 	Potential for major impact on dispatch, settlement or other market outcomes if not addressed as a matter of priority. Requires senior management attention with regular monitoring at executive meetings.
Medium 	Potential for moderate impact on dispatch, settlement or other market outcomes if not addressed within a reasonable timeframe. Requires management attention with regular monitoring.
Low 	Potential for minor impact on dispatch, settlement or other market outcomes if not addressed in the future. Requires team level attention with regular monitoring.

Materiality

In determining materiality we have taken the following factors into account:

- Purpose and objectives of the market audit
- AEMO's overall objectives
- AEMO's risk matrix definitions of impact
- Financial impacts on participants
- The number of participants or other stakeholders affected
- The impact of an issue on market objectives such as transparency, equity and efficiency
- Whether or not an issue is systemic
- Whether or not an issue is recurring (from previous audits).

Audit activities

We have undertaken a combination of reviews of self-reported and IMO/AEMO alleged incidents of System Management non-compliance, compliance auditing and business process walkthroughs.

Our audit activities were focussed on subset of functional areas based on residual compliance risk and materiality. These areas include:

- Dispatch

- Declaration of High Risk and Emergency Operating States
- Short-term (ST) PASA
- Outage planning and approval
- Approval of commissioning tests
- Preparation and transmission of settlement information to AEMO.

In past audits, we have also focussed on areas that have undergone change due to Electricity Rule/Procedure changes or major system changes. During the audit period, there have been no major changes to System Management's obligations. Changes to System Management's obligations have involved minor wording changes or transitional changes to reflect AEMO's new role.

We conducted one field-visit in September 2016 to interview AEMO and System Management staff and to conduct the business process walkthroughs.

Findings and recommendations

Summary of audit findings

Table 3 summarises audit findings by compliance and risk rating.

- The majority of breaches of the Electricity Rules (Compliance Rating 1) related to errors or oversights relating to a manual process. In particular, we have noted multiple breaches of Clause 7.13.1 of the Electricity Rules relating to System Management's obligations with respect to preparing and transmitting settlement data to AEMO.
- As in past years, there have been recurring breaches of System Management's dispatch advisory obligations (under Section 7.11 of the Electricity Rules).
- We have noted only one significant risk breach and this pertains to a breach of clauses 7.6.1C and 7.6.1D (Dispatch Criteria) where System Management dispatched a facility out of merit as a result of an IT issue (whereby outdated BMOs were used for dispatch). This particular breach had a low market impact (as the issue started at midnight and persisted till 6:30 am; there is not much variation in offers during this period; hence the outdated BMOs would have reflected the correct dispatch). However, we have deemed this to be a significant breach as similar issues have recurred three times (outside the audit period). These incidents are still being reviewed by AEMO but are likely to have resulted in multiple breaches of the Dispatch Criteria.

Table 3: Summary of audit findings classified by compliance and risk ratings

Risk rating	Compliance rating		
	1	2	3
C	0	0	0
S	1	3	0
M	11	6	0

Risk rating	Compliance rating		
	1	2	3
L	11	2	1

Table 4 breaks down the audit findings further by chapter of the Electricity Rules. Subsequent sections of this report provide a detailed explanation of each finding on rule chapter by chapter basis.

Table 4: Summary of audit findings broken by chapter of Electricity Rules

Chapter	Compliance rating		
	1	2	3
3: Power System Security and Reliability	M 2 L 2	S 1 M 1	L 1
7: Dispatch	S 1 M 6 L 7	S 2 M 5 L 2	No findings
7A: Balancing Market	M 1 L 1	No findings	No findings
7B: Load following Market	S 0 M 1 L 1	No findings	No findings
9: Settlement	M 1	No findings	No findings

Key findings

Control room staffing risk

The upcoming departure of experienced control room operators poses significant risk to power system security and market dispatch obligations (particularly in light of patchy process documentation in this area)

We understand that none of the experienced Western Power (System Management) control room operators have accepted AEMO's offer with respect to the transfer of system operations functions to AEMO. However,

- AEMO is in the process of recruiting new control room operators and is currently developing a competency based training plan for these new recruits.
- There are plans to extend the System Management control room operator contracts to at least April 2017 (and potentially to October 2017) to facilitate succession planning.

Nevertheless, we note there is significant risk associated with placing new recruits without previous power system operations experience in the control room with only a few months of training (including simulation training). This risk is even more severe during bush-fire season (January – February) when there are often multiple instances of High Risk and Emergency Operating State declarations. For example, if the experienced controllers all depart in 2017, then the new recruits will have to manage the control room without veteran experience during the 2018 bush fire season. As above, we note significant risk in this respect.

We further note that there is still no documented process documentation relating to control room operations (significant work has been done updating Control Room Instructions (CRIs); however, these are facility specific documents and have not as yet formally approved. There are, as yet no high level documents outlining the dispatch process and other aspects of control room operations[6]).

Level of staffing in control room poses risk to security and dispatch obligations

We reiterate our findings from previous years that the low staffing levels in the control room pose significant compliance risk (there is only one controller on shift (with two shifts per day)). This practice is not consistent with the practice of comparable system operators internationally. Specifically:

- In high-risk or emergency situations it can be challenging for a single controller handle both security and dispatch creating scope for non-compliance. Such scenarios are likely to arise during summer peak intervals and carry with them high risk of dispatch non-compliance and/or non-compliance with power system security obligations.
- The timeliness issues around dispatch advisories is related, in part, to a single controller being on shift. The controller may be too occupied with security and dispatch issues to notify market operations staff of the need to issue an advisory.
- In the event that a controller becomes incapable carrying out their duties (e.g. due to sickness or other unforeseen circumstances), the control desk may remain unattended until a replacement controller arrives to take over the shift.

We have also noted practices in the control room[7] that may lead to market outcomes that are inconsistent with market objectives relating to economic efficiency: here we have noted that an increased level of staffing in the control room can help improve these practices to achieve outcomes that are better aligned with the Electricity Rules objectives.

We note that System Management has, in its recent allowable revenue submission, requested budget for a security controller in the control room. As at the time of the audit, however, there was no change to the level of resourcing in the control room.

[6] System Management has advised they have plans to develop this documentation.

[7] For example, using Synergy facilities to manage the LFAS position (instead of using the marginal BMO plant) and keeping the same constraints in place until security issues have been resolved (as opposed to redoing the security analysis in each trading interval to ensure the correct plants are still being constrained – in light of changed BMO offers).

Repeat issues with IT systems availability and performance poses significant risk to market dispatch compliance outcomes

We have noted four instances (one falling within the audit period, and three falling outside the audit period) where IT systems issues have resulted in multiple breaches of the Dispatch Criteria set out in Clause 7.6C of the Electricity Rules (where System Management has been unable to load the latest BMOs from AEMO).

We note AEMO plans to undertake a due diligence on System Management's market systems to better understand the level of risk.

Given the recurrence of this issue and the potential financial impact on multiple participants, we have deemed this to be a significant audit finding.

Governance of processes continues to pose compliance risk

We reiterate our previous audit findings in relation to process governance:

- Process documentation is still lacking. Although System Management has made some progress developing CRIs (see above), process documentation in all areas is patchy or non-existent (except market operations where the level of documentation is thorough). We note particular risks in the processes currently undertaken by the System Operations Planning Engineers (SOPEs). Many of these processes are manual in nature and have no process documentation. We understand that after the AEMO transfer, there will likely be new recruits performing SOPE functions who would benefit from process documentation. We therefore recommend business process documentation be developed for these processes immediately to support new SOPE recruits.
- There is opportunity to improve the level of audit trail for control room activities. For example:
  - The current level of audit trail makes it particularly difficult to determine SM's basis for out of merit dispatch and declaration of high-risk or emergency operating states; both of these areas are of material importance to the market.
  - We have noted six instances during the audit period where the control room operator has overridden the Metrix load forecast (sent to AEMO and used to calculate the BMO), but where System Management has been unable to provide the rationale for the override (as the Metrix forecast was tracking well against actual SCADA outputs at the time of the override) – see also Chapter
  - The Synergy dispatch process is opaque and the audit trail for dispatch decisions around Synergy facilities is intractable.

Timeliness and usefulness of Dispatch Advisories are a continuing concern

In past audits we have noted multiple breaches relating to the provision of Dispatch Advisories to market participants. The breaches are a result of:

- A manual process for issuing advisories.
- Inability of market operations staff to remotely access the dispatch advisory system after hours (control room operators assert that they cannot conduct dispatch/security activities and release advisories).

The vast majority of information is relayed without incident. However, as indicated above, the current dispatch advisory mechanism may not be the most efficient way to provide the necessary information to the market; as a result, there are often instances when Dispatch Advisories are sent out late or without the information required under the rules (including information about the location and quantity of out-of-merit dispatch).

Delays or failures in notifying market participants of out-of-merit dispatch, significant outages, or other significant events compromise market transparency and can compromise efficient decision making by participants.

Opinion

Qualifications

The following qualifications apply to our opinion with respect to whether System Management has complied with the Electricity Rules in all material respects:

- System Management has breached the Dispatch Criteria (clauses 7.6.1C and 7.6.1D) once during the audit period. Nevertheless we consider this to be a material non-compliance due to previously recurring breaches (from previous audits) in this area **and** the recurring episodes in outside the audit period and the potential financial impacts on market participants should similar breaches continue to recur.
- System Management has breached its Dispatch Advisory obligations under Section 7.11 of the Electricity Rules multiple times during the audit period. This is a recurring issue that we have noted for several past audits. Failure to provide participants with timely and accurate information can compromise market transparency objectives and efficient decision making by participants.
- System Management has breached its obligations to provide up to date load forecast information to AEMO under clause 7A.3.15 seven times during the audit period. Although the impact of these breaches are likely to immaterial, this is a recurring finding. System Management does not have the means to send alternate load forecasts to AEMO. Therefore, in instances where System Management uses an alternate load forecast for an extended period of time, AEMO would rely on outdated load forecast information when calculating the BMO.

Conclusion

Our opinion is as follows.

Subject to the inherent limitations set out in Section 1.2.4 and the qualifications set out above, based on the audit procedures we have performed and the evidence we have examined nothing has come to our attention that causes us to believe that System Management has not been compliant with the Electricity Rules and Market Procedures during the audit period, in all material respects.

PA Consulting Group

Stephen James Thornton

Member of PA's Management Group

9 December 2016

CONTENTS

1 INTRODUCTION

This chapter sets out the regulatory context for Audit 4 and our approach to performing the audit.

1.1 Regulatory context and scope

The requirement for the audit of System Management is set out in the **Wholesale Electricity Market Rules** (the *Electricity Rules*).

Table 1 provides further detail on the heads of power that mandate this audit.

Table 5: Electricity Market Rules references pertaining to Market Audits

Clause reference	Comment
2.14.1	Requirement for AEMO to appoint market auditor
2.14.2	Requirement for AEMO to ensure market audits are undertaken no less than annually
2.14.3	Defines the scope of the Audit to include: • The compliance of AEMO's internal procedures and business processes with the Electricity Rules • AEMO's compliance with the Electricity Rules and Market Procedures[8] • AEMO's market software systems and processes for software management[9].
2.14.6[10]	This rule provided the head of power for Audit 4 prior to the System Management Transition Date; the IMO was required to review System Management's compliance on an annual basis. After the System Management Transition Date, however, AEMO becomes the audited entity, and therefore the head of power for Audit 4 will be Clause 2.14.1, 2.14.2 & 2.14.3. In future market audits, Audit 4 will be rolled into Audit 1 (covering AEMO's dual role as market and system operator).
1.16.4 (Transitional)	Requires AEMO to ensure that for the first Market Audit following the System Management Transition Date, the Market Auditor audits both AEMO (with respect to clause 2.14.3) and Western Power (in its former capacity as System Management).

[8] Market Procedures defined in the Electricity Rules will be referred to from here-on as Electricity Procedures. For avoidance of doubt, the term Electricity Procedure includes the Power System Operation Procedure.

[9] i.e. the compliance of the software with the calculations set out in the Electricity Rules, and the compliance of the software management processes with Clause 2.36.1 of the Electricity Rules.

[10] As at 30 Nov 2015 (blank since 1 July 2016):

In accordance with the Monitoring Protocol, the IMO must at least annually, and may more frequently where it reasonably considers that System Management may not be complying with the Market Rules and Market Procedures:

(a) require System Management to demonstrate compliance with the Market Rules and Market Procedures by providing such records as are required to be kept under these Market Rules or any Market Procedure; or

(b) subject System Management to an audit by the Market Auditor to verify compliance with the Market Rules and Market Procedures

This report covers our audit of System Management functions.

For avoidance of doubt, the Audit Year spans 1 August 2015 to 30 June 2016; therefore head of power for Audit 4 is derived from clause 2.14.6 of the Electricity Rules (but will derive from clauses 2.14.1, 2.14.2 & 2.14.3 for subsequent audits)

1.2 Approach

1.2.1 Assurance

Our audit has been conducted in accordance with Australian Auditing and Assurance Standards Board's '*Framework for Assurance Engagements*', ASAE 3000 '*Assurance Engagements Other than Audits and Reviews of Financial Information*' and provides limited assurance under this standard.

1.2.2 Risk ratings and materiality

Compliance and Risk ratings

Audit findings are categorised as follows:

Table 6: Compliance Ratings for Audit Findings

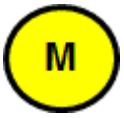
Compliance rating	Description
1	Instances of non-compliance with Electricity Rules and Electricity Procedures noted in audit.
2	Findings that are not an instance of non-compliance, but pose compliance risk
3	Findings related to minor housekeeping issues that do not affect compliance risk

Materiality rating descriptors for audit findings were set in consultation with AEMO and are summarised below. Dimensions of risk (denoted in the matrix below) are defined in accordance with AEMO's corporate risk matrix.

Table 7: Risk Ratings for Audit Findings

		Consequence of risks associated with finding				
		Immaterial	Minor	Moderate	Major	Extreme
Likelihood of risk manifesting if finding not addressed	Almost Certain	Medium	Medium	Significant	Critical	Critical
	Likely	Low	Medium	Significant	Critical	Critical
	Possible	Low	Medium	Significant	Significant	Critical
	Unlikely	Low	Low	Medium	Medium	Significant
	Rare	Low	Low	Medium	Medium	Significant

Risk rating	Description
Critical 	Potential for catastrophic impact on dispatch, settlement or other market outcomes if not addressed immediately. Requires executive actions and monitoring at board level.

Risk rating	Description
Significant 	Potential for major impact on dispatch, settlement or other market outcomes if not addressed as a matter of priority. Requires senior management attention with regular monitoring at executive meetings.
Medium 	Potential for moderate impact on dispatch, settlement or other market outcomes if not addressed within a reasonable timeframe. Requires management attention with regular monitoring.
Low 	Potential for minor impact on dispatch, settlement or other market outcomes if not addressed in the future. Requires team level attention with regular monitoring.

Materiality

In determining materiality we have taken the following factors into account:

- Purpose and objectives of the market audit
- AEMO's overall objectives
- AEMO's risk matrix definitions of impact
- Financial impacts on participants
- The number of participants or other stakeholders affected
- The impact of an issue on market objectives such as transparency, equity and efficiency
- Whether or not an issue is systemic
- Whether or not an issue is recurring (from previous audits).

1.2.3 Audit activities

We have undertaken a combination of:

- Reviewing System Management and AEMO reported incidents of System Management non-compliance with the Electricity Rules and Electricity Procedures
- Business process walkthroughs and interviews with staff to audit the application of operating controls and to determine the level of compliance risk associated with selected business processes.
- Compliance testing to audit System Management's operational compliance with the Electricity Rules and Electricity Procedures and to determine the effectiveness of operating controls. In doing so, we have requested information and data primarily from System Management, but also from AEMO.

The first two activities were conducted as part of a field-visit in September 2016. Remaining activities have been undertaken remotely.

Compliance testing and business process walkthroughs were focussed on subset of functional areas based on residual compliance risk and materiality. These areas include:

- Dispatch which includes:
  - Real-time dispatch and security management in the control room

  - Use of the Real-Time-Dispatch-Engine (RTDE) to implement the Dispatch Criteria (Section 7.6) of the Electricity Rules
  - Synergy Dispatch Planning
  - Load forecasting
- Declaration of High Risk and Emergency Operating States
- Short-term (ST) PASA
- Outage planning and approval
- Approval of commissioning tests
- Preparation and transmission of settlement information to AEMO

In past audits, we have also focussed on areas that have undergone change due to Electricity Rule/Procedure changes or major system changes. During the audit period, there have been no major changes to System Management's obligations. Changes to System Management's obligations have involved minor wording changes or transitional changes to reflect AEMO's new role.

1.2.4 Inherent limitations and qualifications

As in previous years, we note that there are limitations to any external audit. Audits are not an absolute guarantee of the truth or reliability of agency information or the effectiveness of internal controls. They may not identify all matters of significance. This is because external audit techniques involve:

- Professional judgement as to "good industry and market operational practice"
- The use of sample testing
- An assessment of the effectiveness of internal control structures and
- An assessment of risk.

A market audit does not guarantee every procedure and action carried out in the operation of the electricity market in the audit report, nor does it examine all evidence and every transaction. However, our audit procedures should identify errors or omissions significant enough to adversely affect market outcomes.

Our opinion with respect to System Management's compliance with the Electricity Rules and Market Procedures is therefore subject to the following caveats:

1. Our audit procedures did not include assessing irregularities such as fraudulent or illegal activities. As such, our audit should not be relied upon to disclose such irregularities. However, in the event that we were to detect any fraudulent or illegal activity, we would report this to AEMO or System Management. No such findings have been made during this audit.
2. Our audit is not designed to detect all weaknesses in control procedures as it is not performed continuously throughout the audit period and is performed on a sample basis. Specifically, our business process reviews assessing the use of controls were undertaken after the end of the audit period. As such:
    a. Although our findings are indicative of System Management's practices during the audit period, they do not constitute definitive evidence that System Management applied those controls during the audit period.
    b. Projections of our findings to future periods carry the risk that:
        i. Controls may become inadequate over time due to changes in the Electricity Rules or System Management's business processes, procedures and systems
        ii. Degree of compliance with the control procedures we have reviewed deteriorate over time.
        iii. Effectiveness of or requirements for controls change due to significant changes to systems or staffing. Particularly, the transfer of system operations functions to AEMO

means that that there will be new recruits performing complex tasks (implementing material obligations) with limited process documentation in place. Therefore, our opinion cannot be used as an indicator of future compliance in the risk areas we have noted in our findings.

c. As in previous year, we have noted a lack of audit trail in a number of areas, including control room operations. As a result we have been unable to form a definitive with respect to System Management obligations relating to dispatch of Synergy facilities under Chapter 7 and System Management's load forecasting obligations under Chapter 7A. We therefore provide a qualified opinion in these areas. Please see respective chapters for more details.

1.3 Structure of this report

The remainder of this report is structured based on the chapters of the Electricity Rules and includes:

- A brief summary of rule chapter contents.
- Commentary on whether System Management's procedures (Electricity Procedures and Internal Procedures) have been updated to reflected amendments to the Electricity Rules during the audit period. Changes beyond the end of the audit period are not included.
- Commentary on System Management's operational compliance and areas of compliance risk (where relevant).

Unless otherwise specified, all references to the Electricity Rules refer to the most recently applicable rules as at the end of the audit period (i.e. the Electricity Rules as at 1 June 2016).

2 ELECTRICITY RULES CHAPTER 1 – INTRODUCTION

Electricity Rules Chapter 1 sets out the Introduction to the Electricity Rules and covers areas such as the objectives of the market, conventions and transitional arrangements.

2.1 System Management processes and procedures

2.1.1 Amendments to System Management obligations since last audit

There have been only transitional amendments to System Management's obligations under Chapter 1. Amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

2.1.2 Amendments to Electricity Procedures and Internal Procedures

There are neither Power System Operation Procedure sections nor internal procedures relevant to Chapter 1.

2.2 Compliance with Chapter 1

We have not conducted any audit procedures to assess System Management's compliance with Chapter 1 of the Electricity Rules.

There have been no self-reported or IMO/AEMO alleged instances of System Management non-compliance with Chapter 1.

3 ELECTRICITY RULES CHAPTER 2 – ADMINISTRATION

Chapter 2 of the Electricity Rules sets out obligations relating to Functions and Governance; Market Documents; Monitoring, Enforcement and Audit; Reviewable Decisions and Disputes; Market Consultation; Budgets and Fees; Maximum and Minimum Prices and Loss Factors; Participation and Registration; Communications and Systems Requirements; Prudential Requirements and Emergency Powers.

3.1 System Management's processes and procedures

3.1.1 Amendments to System Management obligations since last audit

There have been only transitional amendments to System Management's obligations under Chapter 2. Amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

3.1.2 Procedures

There have been no amendments to the Power System Operation Procedure or to System Management's Internal Procedures relating to Chapter 2 of the Electricity Rules since last year's market audit.

3.2 Compliance with Chapter 2

We have not conducted any audit procedures to assess System Management's compliance with Chapter 2 of the Electricity Rules.

There have been no self-reported or IMO/AEMO alleged instances of System Management non-compliance with Chapter 2.

4 ELECTRICITY RULES CHAPTER 3 – POWER SYSTEM SECURITY AND RELIABILITY

Chapter 3 of the Electricity Rules sets out obligations relating to Power System Security and Reliability; Ancillary Services; Medium and Short Term Planning; Commissioning Tests; Decommitment and Reserve Capacity Obligations; and Settlement Data relating to power system operation.

4.1 System Management's processes and procedures

4.1.1 Rule amendments

There has been a combination of minor cosmetic amendments (e.g. changes to clause wording to enhance clarity) and transitional amendments to Chapter 3 since last year's market audit. Transitional amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

4.1.2 Procedures

There have been no amendments to the Power System Operation Procedure or to System Management's Internal Procedures relating to Chapter 3 of the Electricity Rules since last year's market audit.

4.2 Compliance with Chapter 3

4.2.1 Audit Activities

We have undertaken compliance testing and business process walkthroughs in the following functional areas relating to Chapter 3 of the Electricity Rules:

- Preparation of the ST PASA report under Section 3.17 of the Electricity Rules (we did not review the preparation of the Metrix forecast that is an input to the ST PASA report)
- Approval of scheduled generator outages under Section 3.18 of the Electricity Rules.
- Approval of Commissioning Test requests under Section 3.21A of the Electricity Rules
- Declaration of High Risk and Emergency Operating States under Sections 3.4 and 3.5 (respectively) of the Electricity Rules.

We have also reviewed self-reported and AEMO/IMO alleged instances of System Management non-compliance with Chapter 3.

4.2.2 Audit Findings

Table 8 summarises audit findings by compliance rating and risk rating.

Table 9 provides details of audit findings that were classified as Compliance Rating 1 (i.e. incidents of non-compliance with Chapter 3 of the Electricity Rules).

Table 10 provides details of audit findings that were classified as Compliance Rating 2 and 3.

Table 8: Summary of audit findings classified by compliance and risk ratings

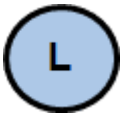
Risk rating	Compliance rating		
	1	**2**	**3**
		1	
	2	1	
	2		1

Table 9: Summary of Compliance Rating 1 Audit Findings (i.e. incidents of non-compliance with Chapter 3 of the Electricity Rules).

Electricity Rules clause	Risk Rating	Description
3.18.11(a), 3.18.11(aA), 3.19.6(a) (Multiple breaches)		Clauses 3.18.11(a) and 3.18.111A requires System Management to take into account a reasonable estimate of available DSM when approving outages. When approving outages, System Management does not take available DSM into account (assuming zero availability). This is due to the complications arising as a result of constraints around DSM availability (for example, DSM would typically only be dispatched in summer; additionally there are constraints around maximum number of hours, maximum number of consecutive calls, calls per day, etc.). Most facilities schedule long-duration outages (under Section 3.18 of the Electricity Rules) in the off-peak/shoulder months. During this time the omission of DSM as part of the outage approval process will not impact on outage decisions, as DSM are unlikely to be called on during off-peak months. Therefore, this breach is unlikely to have negligible impact on market outcomes.
3.19.3A(b)		Under this rule, System Management must not approve Opportunistic Maintenance for a facility on two consecutive Trading Days. On 15 June 2016, a facility rang up the control room requesting On the Day Opportunistic Maintenance (ODOM). However, this facility had already been granted ODOM the day before. ODOM requests and approvals are logged manually in the control room operator's shift log; in this instance the previous ODOM request had been granted by a previous operator whose log sheet was not available to the on-shift operator. As a result, the on-shift operator did not realise the facility had already been on outage the day before and granted the ODOM request. Due to the manual nature of processing ODOM in the control room and the fact that there are no preventive controls in place, it is possible that this breach will recur. However, the impact of such a breach is likely to be immaterial as the operator would not allow an outage to proceed if it violated the security requirements set out in Chapter 3 of the Electricity Rules. However, we do note that there is a possibility that participants may deliberately request ODOM on two consecutive days to avoid exposure to the reserve capacity refunds (which they would be forced to pay if they were on forced outage). Under clause 3.19.3A(c) of the Electricity Rules, System Management must not approve an outage request made principally to avoid exposure to reserve capacity refunds. However, System Management currently has no process (or means) to make this determination (please see our related finding in Table 10).
3.21.6(b)		Clause 3.21.6(b) requires System Management to convert forced outage amounts to a sent out basis at 41 degrees Celsius; the formula is a function of the Reserve Capacity Obligation Quantity (RCOQ) of the relevant facility. Clause 4.12.3(aA) further states that the Reserve Capacity Obligation quantity for intermittent generators is zero. For trading dates 14 May 2016 and 15 May 2016 System Management calculated (and provided to AEMO) an incorrect converted forced outage amount for an intermittent generator (failing to note that the facility RCOQ was zero under clause 4.12.3(aA)). System Management therefore reported a non-zero forced outage value for the facility (when the value should have been zero). AEMO uses this forced outage value to reduce the maximum quantity a participant can offer into the STEM. The error was noted by AEMO staff (on 13 May 2016) who notified System Management. However, System Management were unable to provide corrected data before the STEM submission deadline (at 8:30am on 13 May 2016).

Electricity Rules clause	Risk Rating	Description
		The conversion process is manual and in this instance, System Management staff overlooked the conversion process (and reported the raw ex-ante outage value). System Management has advised that they have logged an IT service issue requesting automation of systems to convert intermittent generator outages zero RCOQs[11]. This breach had no market impact as the participant does not trade in the STEM (and as the affected facility was an intermittent generator, it is unlikely they would submit into the STEM). If, however, the affected facility were a scheduled generator, then System Management's error may have restricted the facility's ability to participate in the STEM.
3.22.3 See also related breach of 9.20.5(c)(ii) in Chapter 12.		Clause 3.22.3 requires System Management to provide AEMO (previously IMO) with financial details of Ancillary Services contracts for a given Trading Month. On 16 May 2015, System Management provided AEMO erroneous information with respect to a market participant for the April Trading Month (as a result of a manual error). The participant subsequently raised a disagreement with the IMO (as the error had resulted in an incorrect payment to the participant). System Management was subsequently required to submit, under clause 9.20.5(c)(ii) a revised value to rectify the previous error. The revised value provided by System Management (on 6 July 2015) was also incorrect. See related breach in Chapter 12. The manual nature of compiling the ancillary services information means that error may occur from time to time (we noted a breach of the same rule during last year's audit as well). In this case, the breach resulted in a market participant being paid an incorrect settlement amount twice (once during the initial settlement (discrepancy of $55,812.92) and again during the first adjustment (discrepancy of $72,365.91)). AEMO subsequently rectified this error in the second adjustment.

Table 10: Summary of Compliance Rating 2 & 3 Audit Findings (Chapter 3)

Finding	Compliance & Risk Rating	Description
Lack of internal procedures (or business process documentation) poses compliance risk in light of departing System Operations & Power Engineers (SOPE) and transition of system operator role to AEMO		As noted in previous years, many of System Management's business processes are undocumented. This includes obligations under Chapter 3 such as outage planning and approval, process for setting ancillary services requirements, commissioning tests and power system security obligations (regarding the latter, see related finding in Chapter 8 on Control Room Instructions and dispatch procedures). As further noted in previous years, network outage scheduling and approval is undertaken by Western Power staff (as System Management has delegated these functions to Western Power due to resourcing issue) and is likewise undocumented.

[11] The IT issue remains open and is ongoing.

Finding	Compliance & Risk Rating	Description
		With the impending transfer of System Management functions to AEMO and the departure of most SOPEs, we note that this lack of procedural documentation poses significant risk of non-compliance if new recruits will be carrying out obligations in the functional areas described above. We recommend that processes in the above areas be immediately documented.
Manual process to include transmission outages and potential constraints for ST PASA report (under clause 3.17.9(f)) poses risks of omission and errors.	3 L	Clause 3.17.9(f) of the Electricity Rules requires System Management to include information about transmission outages and potential constraints in the ST PASA report. System Management retrieves outages from their SMITTS and manually checks them against the Equipment List (as Western Power uses different labels to identify transmission equipment). During our process walkthrough we noted that Western Power's identification of generators affected by transmission outages is ad-hoc (and may not reflect potential consequential outages). System Management is dependent on the integrity of information provided by participants. Furthermore, the manual processing of transmission outages has some risk of omissions and errors. We recommend equipment labelling be made consistent across different System Management systems to avoid potential omissions and to enhance the efficiency of the ST PASA process.
System Management has no process to determine whether a participant has lodged an outage request to avoid exposure to paying reserve capacity refunds (as required under clause 3.19.3A(c)).	2 M	Under clause 3.19.3A(c) of the Electricity Rules, System Management must not approve an outage request made principally to avoid exposure to reserve capacity refunds. Since market start, System Management has had no process to make this determination. With AEMO adopting the system operator role, and in light of AEMO staff's greater knowledge and understanding of the Reserve Capacity Mechanism, we recommend AEMO establish a process to meet its obligations under this clause.

5 ELECTRICITY RULES CHAPTER 4 – RESERVE CAPACITY

Chapter 4 of the Electricity Rules sets out the Reserve Capacity Rules, including: Expressions of Interest; LT PASA; Certification of Capacity; Auctions and Bilateral Trades; Capacity Credits; Special Price Arrangements; Shortages of Reserve Capacity; Testing, Monitoring and Compliance; Funding; Capacity Refunds; Early Certification; and Settlement Data.

5.1 System Management's processes and procedures

5.1.1 Amendments to System Management obligations since last audit

There have been only transitional amendments to System Management's obligations under Chapter 4. Amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

5.1.2 Procedures

There have been no amendments to the Power System Operation Procedure or to System Management's Internal Procedures relating to Chapter 4 of the Electricity Rules since last year's market audit.

5.2 Compliance with Chapter 4

We have not conducted any audit procedures to assess System Management's compliance with Chapter 4 of the Electricity Rules.

There have been no self-reported or IMO/AEMO alleged instances of System Management non-compliance with Chapter 4.

6 ELECTRICITY RULES CHAPTER 5 – NETWORK CONTROL SERVICES

Chapter 5 of the Electricity Rules sets out obligations relating to Network Control Services, including the process, and settlement data requirements.

There are currently no Network Control Service contracts in operation in the WEM.

6.1 System Management's processes and procedures

6.1.1 Amendments to System Management obligations since last audit

There have been only transitional amendments to System Management's obligations under Chapter 5. Amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

6.1.2 Procedures

System Management has no procedures relating to Chapter 5 of the Electricity Rules.

6.2 Compliance with Chapter 5

We have not conducted any audit procedures to assess System Management's compliance with Chapter 5 of the Electricity Rules as there are no network control service contracts registered in the WEM.

7 ELECTRICITY RULES CHAPTER 6 – ENERGY MARKET

Chapter 6 of the Electricity Rules sets out obligations relating to the Energy Scheduling Timetable and Process; the Short Term Energy Market; Non-Balancing Dispatch Merit Orders; Balancing Prices and Quantities; Market Advisories and Energy Price Limits; and Settlement Data.

7.1 System Management's processes and procedures

7.1.1 Rule amendments

There have been no amendments to Chapter 6 since last year's market audit:

7.1.2 Procedures

System Management has limited obligations under Chapter 6. There are no Power System Operation Procedure sections.

There have been no amendments to System Management's Internal Procedures relating to Chapter 6 of the Electricity Rules since last year's market audit.

7.2 Compliance with Chapter 6

We have not conducted any audit procedures to assess System Management's compliance with Chapter 6 of the Electricity Rules.

There have been no self-reported or IMO/AEMO alleged instances of System Management non-compliance with Chapter 6.

8 ELECTRICITY RULES CHAPTER 7 – DISPATCH

Chapter 7 of the Electricity Rules sets out obligations relating to the dispatch process, including: non-balancing dispatch; dispatch compliance; advisories, balancing suspension and reporting; and settlement and monitoring data relating to dispatch.

8.1 System Management's processes and procedures

8.1.1 Rule amendments

There have been only transitional amendments to System Management's obligations under Chapter 7. Amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

8.1.2 Procedures

There have been no amendments to the Power System Operation Procedure or to System Management's Internal Procedures relating to Chapter 7 of the Electricity Rules since last year's market audit.

8.2 Compliance with Chapter 7

8.2.1 Audit Activities

We have undertaken compliance testing and business process walkthroughs in the following functional areas relating to Chapter 7 of the Electricity Rules:

- Dispatch scheduling. We have reviewed outputs of System Management's Real-Time-Dispatch-Engine (RTDE) for selected intervals during the audit period against system inputs (such as the BMO, RTDE constraints, load forecasts, etc.) to determine whether RTDE is producing results that are compliant with Section 7.6 (Dispatch Criteria) of the Electricity Rules.
- Control room operations. We have shadowed System Management staff to review how Section 7.6 is applied in practice (as well as LFAS obligations under Chapter 7B and power system security obligations under Chapter 3).
- Synergy dispatch planning under Section 7.6A of the Electricity Rules.
- Dispatch advisories. We reviewed the timeliness and content of all dispatch advisories:
  - Relating to High Risk or Emergency Operating States
  - Sent out more than 10 hours after the relevant incident commenced.
- Preparation and transmission of settlement information to AEMO under clause 7.13.1 of the Electricity Rules.

We have also reviewed self-reported and AEMO/IMO alleged instances of System Management non-compliance with Chapter 7.

8.2.2 Audit Findings

Table 11 summarises audit findings by compliance rating and risk rating.

Table 12 provides details of audit findings that were classified as Compliance Rating 1 (i.e. incidents of non-compliance with Chapter 7 of the Electricity Rules).

Table 13 provides details of audit findings that were classified as Compliance Rating 2 and 3.

Table 11: Summary of audit findings classified by compliance and risk ratings

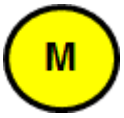
Risk rating	Compliance rating		
	1	**2**	**3**
	1	2	0
	6	5	0
	7	2	0

Table 12: Summary of Compliance Rating 1 Audit Findings (i.e. incidents of non-compliance with Chapter 7 of the Electricity Rules).

Electricity Rules clause	Risk Rating	Description
7.4.2, 7.5.2 (multiple breaches)		Clauses 7.4.2 and MR 7.5.2 require System Management to acknowledge receipt of Dispatch Merit Orders, Fuel Declarations and Resource Plans (for a Trading Day) within 5 minutes of receiving said files from AEMO. A self-review initiated by System Management found that receipt acknowledgements were sent a few minutes late in nine instances for MR 7.4.2 and seven instances for MR 7.5.2. The acknowledgement receipt process is manual and is subject to delay from time to time. We note, however, that a breach of this clause has no underlying risk associated with it and failure on the part of SM to acknowledge receipt has no impact on AEMO activities. Furthermore, these clauses were, as of 1 July 2016, deleted.
7.6A.2(c)		Clause 7.6A.2(c) requires System Management to provide Synergy, by 4:00pm on the Scheduling Day associated with a Trading Day, information associated with Synergy's dispatch plan. On 13 March 2016 System Management provided Synergy with the Dispatch Plan and Forecast Fuel Requirements for 14 March three hours late at 7:43pm. The process used to derive, collate and transmit Synergy's dispatch plan is manual and prone to human error and oversight. In this instance, the operator on duty forgot to transmit the file that was prepared earlier in the day. However, the dispatch plan is sent the Synergy three times each day (in the morning, in the afternoon and in the evening). The evening files contain the most accurate forecast as it used BMO data (whereas the 4pm forecasts use Resource Plan data). The impact of this breach is therefore immaterial, as Synergy received the third (most accurate) forecast on time.
7.6.A2(e) (Two breaches)		Under clause 7.6A.2(e) System Management must provide to AEMO (previously the IMO) by 4:00pm on the Scheduling Day associated with a Trading Day the aggregate forecast output of all Non-Scheduled Generators (NSG) for the Trading Day, referred to in clause 7.6A.2(c)(I)(2). System Management breached this clause twice during the audit period (on 29 October 2015 and 9 June 2016). On both occasions, as a result of oversight, System Management sent the NON-SCHEDULED_SYSTEM_GENERATION_FORECAST.xml file to IMO/AEMO approximately one hour late. Given the manual nature of this process such oversights are likely to occur from time to time. We note that the NSG forecast provided to AEMO under this rule is used for informational purposes only and is not an input into the BMO. Therefore, the impact of this breach is immaterial.
7.6.1C, 7.6.1D		Clauses 7.61C and 7.6.1D set out the Dispatch Criteria and the rules around out of merit dispatch. On 23rd of November 2015, due to an IT systems issue, System Management was unable to load the latest BMOs from the IMO to its systems. The issue started at midnight and was not resolved till 6:30 a.m. During this time, System Management continued to dispatch in accordance with the last loaded BMO. As this issue occurred in the early hours of the morning (when generation and load is flat) the system impact was minor. Only one facility was dispatched out of merit (synchronising at 7:01 a.m. instead of 6:30 a.m.). This out of merit dispatch was a breach of Clauses 7.6.1C and 7.6.1D of the Electricity Rules and resulted in a constraint payment to a participant who would have otherwise not received one.

Electricity Rules clause	Risk Rating	Description
		We further note that three similar IT systems incidents have recurred outside the audit period on the 22 July, 26 July and 3 August[12]. These incidents are still being investigated but are likely to have resulted in multiple breaches of the dispatch criteria (Section 7.6C of the Electricity Rules). We further note AEMO plans to undertake a due diligence on System Management's market systems to better understand the level of risk. Given the recurrence of this issue and the potential financial impact on multiple participants, we have deemed this to be a significant audit finding.
7.7.6 (multiple breaches)		Clause 7.7.6 of MR requires System Management to issue an Operating Instruction (OI) to market participants when providing instructions pertaining to ancillary services, commissioning tests or reserve capacity tests. On multiple instances between 1 and 13 October 2016, System Management issued commissioning test Operating Instructions to the operator of the relevant facility (who was listed as the contact on the commissioning test plan), instead of the market participant associated with the facility. System Management has revised its communication protocol with respect to Operating Instructions to prevent further similar breaches. We note that this breach had no market impact.
7.11.3 (eight breaches)		Clause 7.11.3 requires System Management to send out Dispatch Advisories (in accordance with clause 7.11.5) as soon as practicable after System Management becomes aware of the relevant event. In the sample we have tested, we have noted eight instances in which System Management sent out Dispatch advisories over an hour late. These includes DA # 16402, 11377, 14967, 15478, 15606, 15603, 15824 and 16385. With the exception of #16402 (this was an out of merit dispatch advisory issued under clause 7.11.5(g) and was issued over 10 hours late) , all other breaches pertained to High Risk Operating State events. As such, it is important for System Management to release such advisories promptly. We further note that these dispatch advisories were issued late as the events occurred outside of business hours and there was no market operations staff on site to prepare and transmit the advisory.
7.11.5(g)		Clause 7.11.5(g) requires System Management to release a Dispatch Advisory in the event it expects to dispatch a facility out of merit (in accordance with Section 7.6A of the Electricity Rules). On the 28 January 2016 System Management dispatched a facility out of merit (constraining its output downward from 16:42 to 19:50) to avert a system security issue. However, System Management failed to release a Dispatch Advisory under clause 7.11.5(g). This is a recurring breach that we have noted in previous years – see our related finding in Table 13. The manual process associated with the Dispatch Advisory process combined with the low level of staffing in the control room means that this type of breach will likely recur. This type of breach impacts on market transparency and decision making by participants (who may choose to revise offers based on the latest dispatch information).

[12] In the event that such an issue recurs (within business hours), a possible mitigation measure is for System Management to print out the Balancing Merit Orders and manually input the information into the Real Time Dispatch Engine (RTDE). However, such a process would be subject to input error. We further note that after business hours, there would be no market operations staff to perform this manual role.

Electricity Rules clause	Risk Rating	Description
7.11.6(DA)	M	Clause 7.11.6(DA) requires System Management to include information about the location and quantity of out of merit dispatch for Dispatch Advisories issued under clause 7.11.5(g). On 7 January System Management issued a Dispatch Advisory (DA 15610) stating two facilities had been dispatched out of merit. However, no quantities were provided. This is a recurring issue that we have noted in previous audits that we have noted can be addressed by publishing the latest dispatch schedule to market participants. As noted in our previous audit reports, the absence of information on out of merit dispatch advisories can compromise efficient bidding decisions by market participants (see our related finding in Table 13).
7.12. Status Reports	L	Clause 7.12.1 requires System Management to provide a report to the ERA (previously to the IMO) once every three months on the performance of the market with respect to the Dispatch process. The 7.12.1 Status Report for the third quarter of 2015 was submitted a week late due to an oversight. This status report is for informational purposes only and the delay would not have impacted market outcomes.
7.13.1A(b)	M	Clause 7.13.1A(b) requires System Management to provide AEMO (previously the IMO), by 12:00 PM on the fifteenth Business Day following a Trading Day, with a schedule of all Planned Outages, Forced Outages and Consequential Outages relating to each Trading Interval in the Trading Day by Market Participant and Facility. System Management breached this clause when it did not provide the Forced Outage values for a particular facility on Trading Day 2 April 2015. The omission was caused as a result of the relevant facility retiring on 2 April 2015, and due to the fact that SM systems used a definition of calendar date (as opposed to Trading Day) to determine outages. Hence, System Management's systems determined that the facility had 0MW of Capacity Credits from midnight (2 April 2016) instead of from 8am (2 April 2016). As a result of this breach, the affected participant did not pay the correct reserve capacity refund ($61,000) during initial settlement; however, this was rectified in the first adjustment. As noted above, this breach occurred as a result of System Management's systems defining "trading day" inconsistently with the Electricity Rules definition. We therefore note that this breach may recur given the expected retirement of approximately 300MW of Synergy generation by late 2017. System Management has stated that they have plans to implement a manual workaround to address this issue. We recommend that System Management updates its procedures to reflect this manual workaround[13].
7.13.1(cA)	M	Clause 7.13.1(cA) requires System Management to provide AEMO (previously the IMO) by noon on the first Business Day following the day on which the Trading Day ends, a schedule of the MWh output of each generating system monitored by System Management's SCADA system for each Trading Interval of the Trading Day (i.e. the sent-out energy for each facility). On 6 November 2015, System Management breached clause 7.13.1(cA) when it provided the facility SCADA information for Trading Day 5 November 2015 which contained an incorrect value for a particular facility during a single interval. The error was caused by a SCADA issue which meant that data for the relevant facility was missing (or 0 MWH) for a single interval. System Management staff validate SCADA data on a daily basis to check for such errors. However, due to an oversight, this error was not picked up. In this particular instance there was no financial impact (but recurrence of this breach can potentially cause financial errors).

[13] As at the time of the audit, we have not seen any procedures to this effect.

Electricity Rules clause	Risk Rating	Description
		The manual nature of the SCADA cleansing process means that from time to time errors may occur due to similar oversights.
7.13.1(eE)		Clause 7.13.1(eE) requires System Management to send to AEMO details of fuel change notifications that participants have provided System Management under clause 7.5.4. System Management provides this data to AEMO in the daily DISPATCH_VOLUMES file which includes a fuel type variable (which should reflect any changes participants have notified under clause 7.5.4). On 15 February 2016, as result of human error, System Management provided a DISPATCH_VOLUMES file that included an incorrect fuel type for a particular facility (on a Reserve Capacity Test). System Management provided corrected data for this facility on 18 February 2016. Note that there would have been no impact on settlement outcomes even if the fuel indicator had been incorrect (all other aspects of the DISPATCH_VOLUMES file was correct). Therefore the impact of this breach is immaterial.
7.13.1(eF)		Clause 7.13.1(eF) requires System Management to send to AEMO the maximum quantity of sent out energy in MWh which each Non-Scheduled Generator, by Trading Interval, would have generated in the Trading Interval had a Dispatch Instruction not been issued, as determined in accordance with clause 7.7.5B. System Management provided AEMO with erroneous data (under this clause) for a particular facility for trade dates 21 May 2016 and 22 May 2016 for selected intervals. System Management provided revised (corrected) data to AEMO on 1 June 2016. The error was caused as a result of SCADA data dropping out during the relevant intervals. System Management has a validation process to detect such anomalies (which PA has sighted). In this instance, due to an oversight, the missing data was not detected. In this instance, the breach did not have a financial impact (as System Management provided a corrected value before settlement deadlines). If settlement deadlines had been missed, then this may have resulted in an incorrect constraint payment being paid to the affected participant. Given the manual nature of the SCADA cleansing/validation process similar oversights could occur. Further, given the potential impact on constraint payments, we have noted this breach as a medium risk finding.
7.13.1(h)		Clause 7.13.1(h) requires System Management to provide a Dispatch Volume file to AEMO (previously IMO) that identifies all facilities undergoing a Commissioning Test. On 2 September 2015, System Management sent the IMO the Dispatch Volumes file for Trading Day 3 June 2015, but failed to include a facility that had been undergoing a Commissioning Test. The oversight was due to a misunderstanding on the part of System Management. The relevant facility had emailed System Management on the evening prior to the Trading Day advising that it did not plan to proceed with part of the test. System Management interpreted this as a cancellation notification and therefore cancelled the entire test but did not inform the participant. The participant subsequently conducted the test, but as System Management had cancelled it on their records, they did not include it on the list of commissioning tests to be sent to the IMO. As a result of this breach, the affected participant was erroneously charged a Net STEM shortfall refund amount of $34,317.74. However, this was rectified in subsequent adjustments. To prevent the recurrence of this issue, System Management have advised that in future cancellations will be communicated explicitly to the participant in question. However, we have not noted any procedural updates to this effect.

Table 13: Summary of Compliance Rating 2 & 3 Audit Findings (Chapter 7)

Finding	Compliance & Risk Rating	Description
Upcoming departure of experienced control room operators poses significant risk to power system security and market dispatch obligations (particularly in light of patchy process documentation in this area)	2 S	We understand that none of the experienced Western Power (System Management) control room operators have accepted AEMO's offer with respect to the transfer of system operations functions to AEMO. We further understand that AEMO is in the process of recruiting new control room operators and is currently developing a competency based training plan for these new recruits. There are plans to extend the System Management control room operator contracts to at least April 2017 (and potentially to October 2017) to facilitate succession planning. Nevertheless, we note there is significant risk associated with placing new recruits without previous power system operations experience in the control room with only a few months of training (including simulation training). This risk is even more severe during bush-fire season (January – February) when there are often multiple instances of High Risk and Emergency Operating State declarations. For example, if the experienced controllers all depart in 2017, then the new recruits will have to manage the control room without veteran experience during the 2018 bush fire season. As above, we note significant risk in this respect. We further note that there is still no documented process documentation relating to control room operations (significant work has been done updating Control Room Instructions (CRIs); however, these are facility specific documents and have not as yet formally approved. There are, as yet no high level documents outlining the dispatch process and other aspects of control room operations[14]). •
Level of staffing in control room poses risk to security and dispatch obligations	2 S	We reiterate our findings from previous years that the low staffing levels in the control room pose significant compliance risk (there is only one controller on shift (with two shifts per day)). This practice is not consistent with the practice of comparable system operators internationally. Specifically: • In high-risk or emergency situations it can be challenging for a single controller to handle both security and dispatch creating scope for non-compliance. Such scenarios are likely to arise during summer peak intervals and carry with them high risk of dispatch non-compliance and/or non-compliance with power system security obligations. • The timeliness issues around dispatch advisories is related, in part, to a single controller being on shift. The controller may be too occupied with security and dispatch issues to notify market operations staff of the need to issue an advisory. • In the event that a controller becomes incapable carrying out their duties (e.g. due to sickness or other unforeseen circumstances), the control desk may remain unattended until a replacement controller arrives to take over the shift[15].

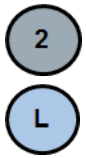
[14] System Management have had plans to develop such documentation for at least the last three years, but we are yet to note any progress in this area

[15] In the interim network operators may be able to provide some level of coverage until a replacement controller arrived. However, this interim relief would depend on the network operator's skillset; in particular the network operator would need system operations experience which is not the same as network operations experience.

Finding	Compliance & Risk Rating	Description
		We note that System Management has, in its recent allowable revenue submission, requested budget for a security controller in the control room. As at the time of the audit, however, there was no change to the level of resourcing in the control room.
The processes around the issuance of Dispatch Advisories continues to pose risk of breaches with Section 7.11 of the Electricity Rules.	2 M	This year we have, again, noted breaches relating to the timeliness and content of Dispatch Advisories. This is a recurring theme from past audits. The breaches are a result of: • A manual process for issuing advisories. • Inability of market operations staff to remotely access the dispatch advisory system after hours (control room operators assert that they cannot both conduct dispatch/security activities and release advisories). The vast majority of information is relayed without incident. However, as indicated above, the current dispatch advisory mechanism may not be the most efficient way to provide the necessary information to the market[16]; as a result, there are often instances when Dispatch Advisories are sent out late or without the information required under the rules (including information about the location and quantity of out-of-merit dispatch[17]). Delays or failures in notifying market participants of out-of-merit dispatch, significant outages, or other significant events compromise market transparency and can compromise efficient decision making by participants. We note that none of our previous audit findings in this area have been addressed. As such, we reiterate this audit finding.
The lack of procedural documentation and upcoming departure of SOPEs may mean potential future breaches of Section 7.6A of the Electricity Rules.	2 M	As noted in our previous audits, there is no process documentation relating to the Synergy Dispatch Planning process (under Section 7.6A of the Electricity Rules). This is a manual process that requires good knowledge of the capabilities of different Synergy plant. With the imminent departure of all but one experienced SOPE, we note that the absence of process documentation in this manual process means it is likely there will be errors and breaches in this area in the future. However, as noted below, the Synergy Dispatch plan is a nominal estimate used by Synergy for fuel planning. Therefore, errors or breaches in this area are likely to have minor impacts only. To mitigate this risk we recommend finalising and approving process documentation in this area to support newly recruited SOPEs.
There is room to better align the dispatch process with market objectives around economic efficiency	2 M	During our control room walkthrough we noted two practices that may compromise economically efficient market outcomes: • System Management controllers using Synergy plant to manage LFAS position instead of the marginal plant. Although this may be considered “Dispatch Support Services”, when there is large movement in load during the interval, rerunning RTDE (with an updated load forecast) would lead to a more economically efficient outcome. In this sense, rerunning RTDE more frequently during the trading interval (e.g. once every five minutes; at the moment RTDE is run three times during the interval) would yield a more efficient outcome.

[17] We have previously recommended that dispatch schedules be published to market participants every time RTDE is rerun using new information (e.g. new forecasts, new constraints, etc.).

Finding	Compliance & Risk Rating	Description
		• Constraints are manually entered into RTDE and remain in place until the issue has been resolved. Sometimes constraints can remain on for hours. This means that if participants change their offers to avoid being constrained on or off, this change in bidding will not be reflected in market outcomes (as System Management does not conduct a security constrained economic dispatch each interval). This may lead to potential breaches of Section 7.6.1C and 7.6.1D of the Electricity Rules (e.g. if a more expensive plant remains constrained on or a cheaper plant remains constrained off). We understand that the low level of staffing in the control room is a contributing factor to the above practices. However, with the proposed increase in control room staffing (as per System Management's recent allowable revenue submission) we recommend AEMO consider applying 5 minute dispatch and inter-interval security constrained dispatch to address the issues above.
The manual nature of settlement data preparation and transmission (under clause 7.13.1 of the Electricity Rules) means that breaches and errors may occur from time to time	2 M	We have noted multiple breaches of clause 7.13.1 of the Electricity Rules during this market audit. Clause 7.13.1 sets out System Management's obligations with respect to preparing settlement data (to be used by AEMO). The majority of the processes used to implement these obligations are manual (but well-documented in internal procedures). Given the manual nature of the processes, it is inevitable that from time to time errors and oversights will occur. To mitigate future breaches and errors we recommend System Management be diligent in validating settlement data prepared under clause 7.13.1, and investigate the potential for automation of these tasks.
Communication protocols between Western Power and AEMO will be required to ensure seamless application of network constraints in dispatch	2 M	As noted in previous audits, security assessments used by the controller to place security constraints in RTDE are undertaken by Western Power Network Operations staff (as the single controller cannot both dispatch and undertake the security assessment, particularly during high risk/emergency situations). Likewise, the network aspects of system monitoring required to monitor the system state as defined in clauses 3.3.1, 3.4.1 and 3.5.1 (e.g. overloading of transmission lines, voltage issues, circuit issues) are undertaken by Network Operations staff (who then notify the controller). As System Management is currently co-located with Western Power Network Operations staff these security related processes can be undertaken with ease. However, we note System Management will be transferring to new premises in late 2017. When this happens, it will be important for there to be communication protocols in place to ensure network security constraints and network security status is communicated to System Management staff in a timely and efficient manner.
System Management's dispatch decisions around Synergy plant are opaque - there is potential for breaches of Clauses 7.6.2 and 7.13.1(a)	2 L	Clause 7.6.2 requires System Management to dispatch the Synergy Portfolio either under a Dispatch Plan or a Dispatch Order (the former notifying a deviation from a Dispatch Plan). Clause 7.13.1 requires System Management to send Dispatch Orders to AEMO. System Management prepares a Dispatch Plan under clause 7.6A.2 on the Scheduling Day which it sends to Synergy (which includes low, mean and high bounds for all portfolio facilities). In practice, however, this Dispatch Plan's primary purpose is to assist Synergy with its gas nomination. During real-time operations, the controller may vary individual Synergy facilities as they deem necessary to maintain power system security requirements. In effect, this means that the Dispatch Plan prepared on the Scheduling Day may not be, in practice, a reflection of System Management's real-time dispatch decisions. Additionally, System Management does not issue electronic Dispatch Orders to Synergy facilities; relying instead

Finding	Compliance & Risk Rating	Description
		on AGC or the telephone, meaning the Synergy dispatch audit trail is intractable. Due to the lack of audit trail it is difficult to definitively state whether or not System Management has breached Clause 7.6.2 (or 7.13.1 as a result of not sending Dispatch Orders to AEMO when there has been a deviation from the Dispatch Plan), as System Management alleges that Synergy facilities are typically dispatched between the high and low bounds of the Dispatch Plan. However, we have in the past (during our site visits), noted that this is not always the case. It is also, unlikely that System Management would never depart from the high and low bounds of the Dispatch Plan which is based on forecasts that may not always reflect real-time conditions. Although we are not alleging a breach, we reiterate our past findings that the approach adopted to dispatching Synergy is opaque and runs counter to market transparency objectives. We also note the lack of proper governance around processes (specifically around audit trails) is a recurring issue in multiple areas such as control room operations and planning.
There is opportunity to improve the audit trail of control room operations		The level of records for control room activities is not sufficient to reconstruct events after the fact. The written log provides little (and sometimes no) information on actions or rationale for actions taken by the controller. On some days the control room log for a particular shift can contain as little as three or four entries. While there are database records of actions taken such as constraints applied, these are not sufficient. This year, we have further noted instances where the control room operator has overridden the Metrix forecast with an alternate load forecast (see Chapter 9, Table 15) without indicating the rationale for doing so (our review showed that there was no reason at the time for an override as Metrix was tracking well against SCADA actuals).

9 ELECTRICITY RULES CHAPTER 7A - BALANCING MARKET

Electricity Rules Chapter 7A sets out the Balancing Market Rules.

9.1 System Management's processes and procedures

9.1.1 Amendments to System Management obligations since last audit

There have been only transitional amendments to System Management's obligations under Chapter 7A. Amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

9.1.2 Procedures

There have been no amendments to the Power System Operation Procedure or to System Management's Internal Procedures relating to Chapter 7A of the Electricity Rules since last year's market audit.

9.2 Compliance with Chapter 7A

9.2.1 Audit Activities

We have undertaken compliance testing and business process walkthroughs in the following functional areas relating to Chapter 7A of the Electricity Rules:

- We have reviewed System Management's obligation to provide updated load forecasts to AEMO under clause 7A.3.15.

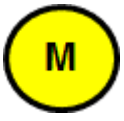
We have also reviewed self-reported and AEMO/IMO alleged instances of System Management non-compliance with Chapter 7A.

9.2.2 Audit Findings

Table 14 summarises audit findings by compliance rating and risk rating.

Table 15 provides details of audit findings that were classified as Compliance Rating 1 (i.e. incidents of non-compliance with Chapter 7A of the Electricity Rules).

Table 14: Summary of audit findings classified by compliance and risk ratings

Risk rating	Compliance rating		
	1	2	3
	0	0	0
	1	0	0

Risk rating	Compliance rating		
	1	2	3
	1	0	0

Table 15: Summary of Compliance Rating 1 Audit Findings (i.e. incidents of non-compliance with Chapter 7A of the Electricity Rules).

Electricity Rules clause	Risk Rating	Description
7A.3.7		Clause 7A.3.7 requires System Management to provide AEMO (previously the IMO) within two hours of the end of the Trading Day, an estimate of the Start of Interval (SOI) Quantity and End of Interval (EOI) Quantity for each Balancing Facility and the Relevant Dispatch Quantity (RDQ), for each Trading Interval in the Trading Day. System Management has breached this clause twice during the audit period and once outside the audit period: • On 16 October 2015, System failed to provide the IMO the EOI Quantity of Balancing Facilities and the RDQ for certain trading intervals for Trading Day 15 October 2015. The calculation of the EOI and RDQ quantities were affected by a SCADA issue. • On 15 April 2016, System Management were experiencing IT issues and provided a partial dataset for RDQ and EOI files. • On 19 July 2016 (outside audit period), System Management were experiencing IT issues and provided a partial dataset for RDQ and EOI files. Breaches of this clause do not affect settlement timelines or outcomes[18] as the data under Clause 7A.3.7 is used by AEMO for publishing purposes (to publish provisional and final Balancing Prices under clause 7A.3.13). In the event incomplete data is provided, AEMO can publish balancing prices using the most recent forecast Relevant Dispatch Quantity (RDQ) (from the System Management's balancing load forecasts, rather than provisional RDQ values) and applying it against the most recent Balancing Merit Order (BMO). Nevertheless, we note that this breach is related to issues with System Management's IT systems; this a recurring theme that we have noted in other breaches also.
7A.3.15 (7 breaches)		Clause 7A.3.15 requires System Management to provide a forecast of the Relevant Dispatch Quantity (RDQ) for each future Trading Interval. Additionally, each time it has new information on which to determine the forecast RDQ, System Management must update the forecast (but does not need to do so more than once per Trading Interval). System Management uses the Metrix tool to determine the forecast RDQ, which is transmitted to AEMO every half hour. However, from time to time (e.g. 2.09% of intervals during the audit period), the control room operator will over-write the Metrix forecast with an alternate forecast (if they deem the Metrix forecast to not be tracking well against the actual SCADA outputs). System Management asserts that this override is a real-time decision; the Metrix tool self-corrects within 15-20 minutes there is limited value in sending AEMO the alternate load forecast (as an update under clause 7A.3.15), as the Metrix forecast is still their best forecast for the next trading interval. To this end, PA reviewed System Management's use of alternate forecasts and noted seven instances in which the Metrix forecast was overridden by an alternate forecast for an extended period (the longest override was for 7.5 hours on 21 June - see Table 16). In all, but one case, System Management was unable to justify the use of these alternate forecasts as, at the time the overrides were occurring, the Metrix forecast appeared to be tracking well against actual SCADA outputs. We have determined these seven instances to be a breach of clause 7A.3.15 as the prolonged use of the alternate forecast is a clear indication of System Management not believing Metrix to be the best forecast of RDQ in upcoming intervals. As this is a recurring issue and System Management has no means to transmit alternate forecasts to AEMO, it is possible this breach may recur. The impact of these

[18] As long as corrected data is provided to AEMO before initial settlement.

Electricity Rules clause	Risk Rating	Description
		particular breaches are likely to be immaterial or minor, as it is likely the alternate forecasts would have been similar to the Metrix forecasts (given how well Metrix was tracking against actuals). However, we note that this issue is a recurring and systemic issue around the provision of market data (see also Chapter 8 findings on the issuance of Dispatch Advisories). In this case, the most recent and accurate forecast should be transmitted to AEMO as this is a crucial input into the BMO. If System Management is using alternate load forecasts for multiple consecutive intervals then it is the alternate load forecast that should be transmitted to AEMO (as this is the best estimate at the time). We further note that there is opportunity to improve the audit trail around the use of alternate forecasts in the control room. Currently, the controller notes in the log that they have overridden Metrix but do not provide any justification for doing so. As noted above, for six of the instances reviewed, System Management was unable to provide justification for the Metrix load forecast override. We recommend instituting a more robust audit trail in this area.

Table 16: Selected instances of Metrix load forecast override

Load forecast override – start time	Load forecast override – end time	Total consecutive period over which Metrix load forecast overwritten (hh:mm:ss)
16-Aug-2015 11:00:49	16-Aug-2015 14:21:18	3:20:29
23-Aug-2015 09:29:20	23-Aug-2015 12:20:58	2:51:38
24-Aug-2015 10:14:17	24-Aug-2015 12:50:19	2:36:02
26-Aug-2015 11:05:39	26-Aug-2015 14:35:20	3:29:41
28-Jan-2016 00:59:54	28-Jan-2016 03:39:13	2:39:19
30-Jan-2016 10:14:01	30-Jan-2016 12:59:25	2:45:24
21-Jun-2016 08:41:37	21-Jun-2016 16:09:59	7:28:22

10 ELECTRICITY RULES CHAPTER 7B – LFAS MARKET

Electricity Rules Chapter 7B sets out the Load Following and Ancillary Services (LFAS) Market Rules.

10.1 System Management's processes and procedures

10.1.1 Amendments to System Management obligations since last audit

There have been only transitional amendments to System Management's obligations under Chapter 7B. Amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

10.1.2 Procedures

There have been no amendments to the Power System Operation Procedure or to System Management's Internal Procedures relating to Chapter 7B of the Electricity Rules since last year's market audit.

10.2 Compliance with Chapter 7B

10.2.1 Audit Activities

We have undertaken compliance testing and business process walkthroughs in the following functional areas relating to Chapter 7B of the Electricity Rules:

- LFAS dispatch: We have reviewed System Management's LFAS enablement for selected intervals during the audit period against system inputs (i.e. the LFAS merit order) to determine System Management has enabled LFAS in accordance with clause 7B.3.6.

We have also reviewed self-reported and AEMO/IMO alleged instances of System Management non-compliance with Chapter 7B.

10.2.2 Audit Findings

Table 17 summarises audit findings by compliance rating and risk rating.

Table 18 provides details of audit findings that were classified as Compliance Rating 1 (i.e. incidents of non-compliance with Chapter 7B of the Electricity Rules).

Table 17: Summary of audit findings classified by compliance and risk ratings

Risk rating	Compliance rating		
	1	2	3
S	0	0	0
M	1	0	0

Risk rating	Compliance rating		
	1	2	3
	1	0	0

Table 18: Summary of Compliance Rating 1 Audit Findings (i.e. incidents of non-compliance with Chapter 7B of the Electricity Rules).

Electricity Rules clause	Risk Rating	Description
7B.1.4 (two breaches)		Clause 7B.1.4 requires System Management to provide AEMO, by 12:00pm on the Scheduling Day, System Management's forecast of the LFAS Quantity for each Trading Interval in the next Trading Day. System Management breached this clause twice during the audit period (on 17 February 2016 and 2 June 2016). On both these occasions, as a result of oversight, System Management sent the LFAS Requirements data file to AEMO approximately 40 minutes late. Note, however, that the LFAS quantities are always 72MW. This, coupled with the fact that the late transmission did not affect any market operations timelines for AEMO, means that the impact of this breach is immaterial.
7B.3.6 (three breaches)		Clause 7B.3.6 requires System Management to enable facilities for load following in reasonable proportion to the LFAS Merit Order determined by AEMO. PA's analysis of BMO and LFAS dispatch data has uncovered three intervals (21-2, 22-1, 22-2) on 6 January 2016, where a facility was cleared for LFAS but not enabled. System Management instead enabled a different facility. As a result, the facility (who was cleared but not enabled) would have foregone revenue. We note this is a recurring breach that we have noted in previous audits. We note further that System Management was unable to provide us with a reason for the breach. As such, we reiterate our finding regarding the absence of audit trail in control room operations.

11 ELECTRICITY RULES CHAPTER 8 – WHOLESALE MARKET METERING

Chapter 8 of the Electricity Rules sets out obligations relating to metering, including: Metering Data Agents; Meter Registry; Meter Data Submissions; Metering Protocol Requirements; and Support of Calculations.

11.1 Compliance with Chapter 8

System Management has no obligations under Chapter 8 of the Electricity Rules.

12 ELECTRICITY RULES CHAPTER 9 – SETTLEMENT

Chapter 9 of the Electricity Rules sets out obligations relating to Settlement Data; Settlement Calculations; Settlement Statements; Invoicing and Payment; and Default and Settlement in Default Situations.

12.1 System Management's processes and procedures

12.1.1 Rule amendments

There have been only transitional amendments to System Management's obligations under Chapter 9. Amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

12.1.2 Procedures

There have been no amendments to the Power System Operation Procedure or to System Management's Internal Procedures relating to Chapter 9 of the Electricity Rules since last year's market audit.

12.2 Compliance with Chapter 9

12.2.1 Audit Activities

We have also reviewed self-reported and AEMO/IMO alleged instances of System Management non-compliance with Chapter 9.

12.2.2 Audit Findings

Table 19 summarises audit findings by compliance rating and risk rating.

Table 18 provides details of audit findings that were classified as Compliance Rating 1 (i.e. incidents of non-compliance with Chapter 9 of the Electricity Rules).

Table 19: Summary of audit findings classified by compliance and risk ratings

Risk rating	Compliance rating		
	1	2	3
S	0	0	0
M	1	0	0
L	0	0	0

Table 20: Summary of Compliance Rating 1 Audit Findings (i.e. incidents of non-compliance with Chapter 9 of the Electricity Rules).

Electricity Rules clause	Risk Rating	Description
9.20.5(c)(ii) See related breach of clause 3.22.3 in Chapter 4.		Clause 9.20.5(c)(ii) requires System Management to provide corrected information for settlement adjustment purposes. On 6 July 2015, System Management provided updated Ancillary Services contract information to AEMO (in relation to a previous breach of clause 3.22.3 on 16 May 2015). However, this updated information contained an error. The breach resulted in the market participant being paid an incorrect amount during the first adjustment (a discrepancy of $72,365.91). AEMO subsequently rectified this error in the second adjustment. The manual nature of compiling the ancillary services information means that error may occur from time to time.

13 ELECTRICITY RULES CHAPTER 10 – MARKET INFORMATION

Chapter 10 of the Electricity Rules sets out obligations relating to Market Information, including: confidentiality; and publication on the Market Web Site.

13.1 System Management's processes and procedures

13.1.1 Amendments to System Management obligations since last audit

System Management has limited obligations under Chapter 10. Amendments relate to AEMO's adoption of functions previously undertaken by the IMO.

13.1.2 Procedures

System Management has no procedures relating to Chapter 10 of the Electricity Rules.

13.2 Compliance with Chapter 10

We have not conducted any audit procedures to assess System Management's compliance with Chapter 10 of the Electricity Rules.

There have been no self-reported or IMO/AEMO alleged instances of System Management non-compliance with Chapter 10.

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Corporate headquarters
123 Buckingham Palace Road
London SW1W 9SR
United Kingdom
+44 20 7730 9000

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