ROBINSON BOWMAKER PAUL

AUSTRALIAN ENERGY MARKET OPERATOR

INDEPENDENT ASSURANCE REPORT ON AEMO'S COMPLIANCE WITH THE WEM RULES AND MARKET PROCEDURES

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Prepared by: Richard Bowmaker, Sue Paul

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Robinson Bowmaker Paul
Level 8
104 The Terrace
Wellington 6011
New Zealand
rbp.consulting

EXECUTIVE SUMMARY

This independent assurance report sets out the results of the market audit by Robinson Bowmaker Paul (RBP). The audit assesses AEMO's compliance with the Wholesale Electricity Market Rules (WEM Rules) and Market Procedures for the period 1 July 2019 to 30 June 2020, both dates inclusive.

REGULATORY CONTEXT AND SCOPE

Regulatory context

The regulatory context for the audit is summarised in Table 1.

Table 1: Regulatory context for the Electricity Compliance Audit

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, at minimum: • The compliance of AEMO's Internal Procedures and business processes with the WEM Rules • AEMO's compliance with the WEM Rules and Market Procedures • The compliance of AEMO's market software systems and processes for software management with clause 2.36.1 of the WEM Rules.
2.36.1	Defines obligations with respect to AEMO's software management systems and controls; this provides the compliance criteria for the review of processes for software management

Scope

Given the regulatory context above, the purpose of the Electricity Compliance Audit is to assess:

- How AEMO implements its obligations under the WEM Rules
- How AEMO manages non-compliance risk with respect to the obligations above
- Instances of non-compliance by AEMO during the Audit Period
- AEMO's market software systems and its processes for software management, and specifically, AEMO's compliance with clause 2.36.1 of the WEM Rules. It includes an assessment of whether:

- AEMO maintains appropriate records
- The software used by AEMO to implement its obligations under WEM Rules is compliant with the underlying mathematical formulations and the rules themselves.
- AEMO has been compliant with its market systems certification obligations
- AEMO can reproduce past results.

The Electricity Compliance Audit includes AEMO's role as both market and system operator and includes the following work streams within scope:

- Compliance Assessment of AEMO's operational compliance and application of controls to mitigate compliance risk
- Procedures Assessment of Market Procedures and Internal Procedures that have changed during the Audit Period
- Software Compliance Assessment
- Review of General IT Controls.

Key Themes and Findings

The impact of Covid-19 on the business

The review highlighted that controls operated effectively when AEMO transitioned to remote working arrangements to manage the impact of Covid-19:

- In WA Market Operations, AEMO staff were already set up to work remotely for weekend and public holiday shifts. Hence, performing daily operations procedures under Covid-19 working arrangements has not been a difficult transition.
    - From a Settlements perspective, staff were likewise set up to access systems remotely. The use of workflow management tools like JIRA to progress and record validation activities during remote working has enabled staff to communicate effectively with each other.
    - In the Reserve Capacity space, there was a potential minor risk in completing certification activities remotely. However, lockdown arrangements eased before certification activities peaked; and staff have been communicating via messaging apps when working remotely.

- In System Management, an appropriate balance between maximising working at home versus keeping essential functions operating was struck. The most challenging aspect was the regular use of the backup control room at Malaga; a facility not designed for regular use. However, any issues presented by this location were addressed in a timely manner. This was reflected by the fact that no breach findings or system security events were attributable to the Covid-19 working arrangements.

One possible impact of Covid-19 is delays in implementing IT projects for System Management, which is discussed further below.

Strong compliance culture and accountability prevalent across AEMO

AEMO teams generally have a strong culture of compliance, where self-reporting of alleged breaches (hereafter referred to as 'breaches') is encouraged and the approach to compliance risk management is proactive rather than reactive. This is supported by the following:

- Audit findings from previous years have been consistently addressed and closed. More than half of all findings from the current audit period and open findings from the previous audit period have already been closed.
- The overall number of breaches identified in the current audit period (45) has increased compared with last year (32 in 2018/19). This has been largely driven by an increase in the number of low rated breaches[1], but is also indicative of an improving compliance culture with higher levels of self-reporting. The root causes of breaches were consistent with prior years and attributable to:
  - Process not aligned to rules
  - Human error
  - Manual processes
  - System defects.
- Of the 45 breach findings in the current audit period:
  - 35 (3 Medium, 32 Low) were AEMO self-reported breaches
  - 10 (2 Medium, 8 Low) were identified by RBP.

[1] See commentary in the summary section for a discussion on what is driving the increase in low-rated breaches.

- Of the 35 breach findings self-reported by AEMO, 31 have already been closed with 2 Low and 2 Medium findings still open.
- There are currently two High risk findings open: one finding in the current audit period[2], and one finding in the previous audit period. Both findings pertain to controls and are not breach findings.
- Our interviews indicated that AEMO teams maintain and apply effective controls to manage compliance risk in most cases. The quality of controls in Settlements, Market Operations and Reserve Capacity are particularly robust.
- Teams take a proactive approach to compliance management with a focus on continuous improvement, particularly in the Settlements area. For example, proactive intervention to mitigate the impacts of Covid-19. This has included:
    - Changes to validation processes and audit trails to mitigate risks associated with remote working.
    - Review of and changes to prudential practices (participant monitoring and access to prudential security) to manage the potential impacts of participant default as a result of Covid-19.

Robust settlement validating and software testing procedures identified minor breaches

There were eight settlement breaches during this audit period, six of which were self-reported. The breaches were very minor, related to software defects for edge case scenarios that manifest under rare circumstances and mostly detected through AEMO's testing[3] and validation controls.

Delayed implementation of System Management IT projects

Three findings are as a result of delays to IT projects that were expected to have been completed during the audit year as detailed in Table 2 below.

[2] See 20WEM1.45 in Table 5

[3] The testing has been conducted to support the Reduction of Prudential Exposure (ROPE) project.

Table 2: Audit findings relating to IT project delays

Finding	Projects	AEMO activities
19WEM1.25 - Accuracy of Metrix and Similar Day forecasting methodologies deteriorating given increased PV (Control Observations, High)	The demand forecasting system to be brought into AEMO from Western Power	Deferral of previous year's audit action was approved from 30 June 2020 to 31 December 2020. Demand forecasting system implemented on 23 June 2020. Further work to improve the forecast accuracy is being undertaken.
20WEM1.04 - RDQ forecasts published by AEMO do not always reflect best estimate of forecast load (Breach, Low)		
20WEM1.01 - DSM availability not taken into account when assessing outages (Breach, Low)	An enhanced PASA tool	In-flight with implementation expected in October 2020

The delays appear to be driven by a combination of common IT project implementation issues (such as resourcing, inter-project dependencies; unexpected technical challenges) and the impact of Covid-19 (based on verbal assertions by AEMO management).

Increase in LFAS[4] Enablement breaches

There were 10 self-reported breaches (all rated Low) for under-activation of LFAS, covering 61 trading intervals. There were no such self-reported breaches in the previous audit period. The prevalence of these findings this year reflects both an increased level of compliance monitoring by AEMO and human error following a change in LFAS requirements, rather than any deterioration in procedures or systems. The root cause is that the activation of facilities for LFAS is a manual process rather an automatic one, so is subject to human error.

These occurrences are not considered to present a risk to system security as the Synergy portfolio can be dispatched intra-interval to ensure power system security. Using the portfolio in this way circumvents the results of the competitive LFAS market, so is not in line with WEM market objectives.

Increase in confidentiality breaches

Three data confidentiality breaches were reported this year, all relating to human error. Only one finding relating to confidentiality was reported in the previous audit. AEMO took remediating actions tailored to each individual incident and followed AEMO's updated organisation-wide data breach response plan guidance for the incident occurring after the guidance was introduced. More broadly,

[4] Load Following Ancillary Services.

AEMO has established an EXECUTIVE LEADERSHIP TEAM led workgroup to further enhance the management of confidential information followed by delivery of updated continuing privacy and confidentiality training.

WEM Reforms will reduce dispatch compliance risk

As noted in previous audits, the largely manual nature of dispatch carries with it a number of risks; for example, effectively managing the impacts of increasing Distributed Energy Resource and grid-connected intermittent generation on system security at least cost; and managing risks associated with unjustified out-of-merit dispatch of energy and LFAS. The implementation Security Constrained Economic Dispatch (SCED) with co-optimised Essential System Services (ESS) and related reforms will result in more sophisticated mechanisms (and associated tools) to manage dispatch and the risks above.

Summary of findings

There has been an increase in the overall level of findings compared with previous years. This increase has been largely been driven by an increase in the number of low risk breaches self-reported by AEMO. As noted above, this increase is being driven by the following:

- AEMO self-reported six new settlement breaches detected through validation activities and system testing conducted for the ROPE project. An additional settlement breach reported by RBP was detected while certifying software changes to fix a defect identified by AEMO.
- AEMO self-reported 10 instances of non-compliance relating to LFAS enablement. This is driven by an increased level of compliance monitoring by AEMO and human error following a change in LFAS requirements.

Table 3: Audit findings identified during audit period by risk rating: 2017/18, 2018/19 and 2019/20

	2017/18	2018/19	2019/20			
Risk Rating	Total	Total	Total	Finding Type		
				Breaches[5] - reported by		Control Observations[6]
				AEMO	RBP	RBP
High	0	7	1	0	0	1
Medium	5	15	6	3	2	1
Low	24	21	45	32	8	5
Totals	**29[7]**	**43**	**52**	**35**	**10**	**7**

Table 4: Audit findings movement

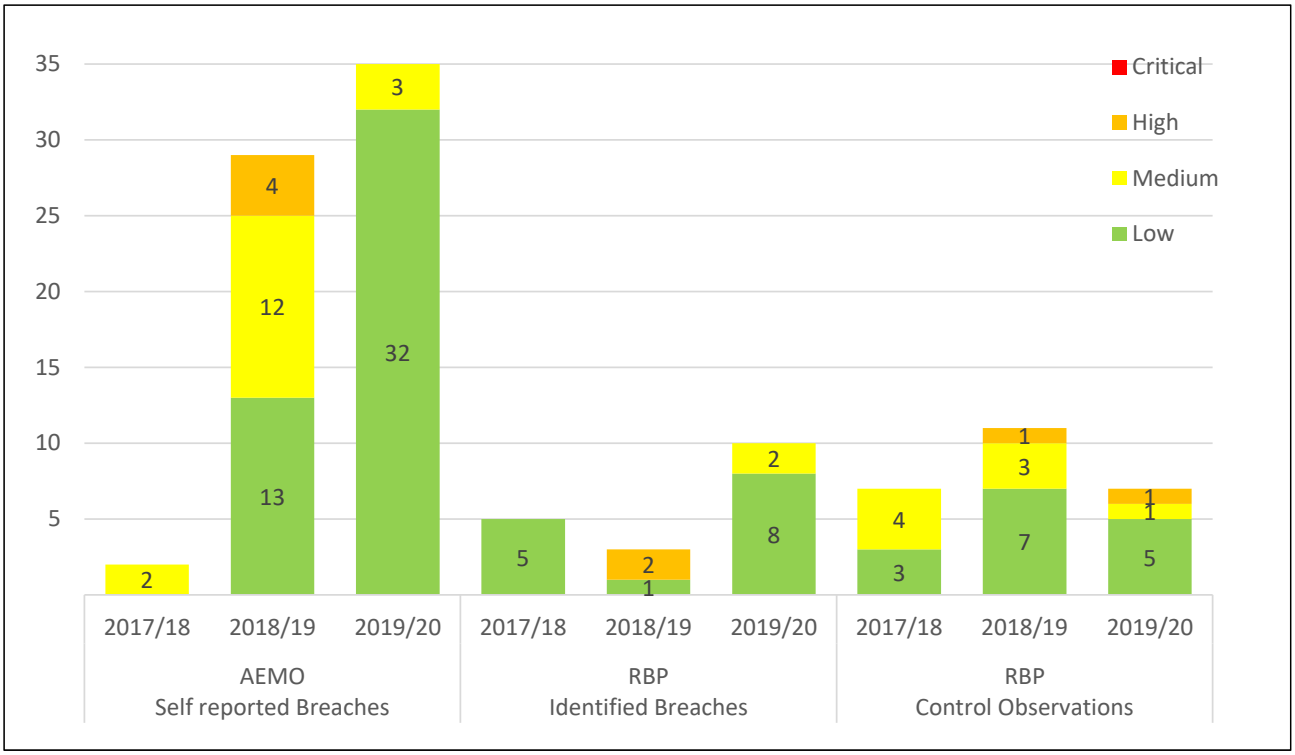
Finding status	Risk Rating			Total
	High	Medium	Low	
Open @ 01/07/2019	3	7	7	**17**
Add: New findings (01/07/19 – 30/06/20)	1	6	45	**52**
Less: Closed findings (01/07/19 – 30/06/20)	2	8	36	**46**
Open @ 01/07/2020	2	5	16	**23**
Prior year findings	1	1	3	**5**
Current year findings	1	4	13	**18**

[5] Findings that are instances of non-compliance with the WEM Rules

[6] Findings that are not instances of non-compliance with the WEM Rules, but which pose compliance risk (Rating 2) or are opportunities for improvement which do not affect compliance risk (Rating 3)

[7] The lower number of breaches for the 2017/18 audit year reflects a change in reporting methodology: In 2017/18, similar self-reported breaches were grouped together as a single finding; from 2018/19 onwards, each self-reported breach is reported as an individual finding.

Figure 1: Audit findings by risk rating and observation type: 2017/18 - 2019/20[8]



2

[8] The lower number of breaches for the 2017/18 audit year reflects a change in reporting methodology: In 2017/18, similar self-reported breaches were grouped together as a single finding; from 2018/19 onwards, each self-reported breach is reported as an individual finding.

Table 5: Summary of audit findings identified by RBP during the current audit period 2019/20

Area	Process	Finding Type	Risk Rating	Ref#	Findings
System Management	Real-time dispatch	Control	High	20WEM1.45	Design of GIA constraint implementation threatens power system security
	PASA	Breach	Medium	20WEM1.02	Forecast transmission capacity between potentially constrained regions is not included in ST PASA report
	Real-time dispatch	Breach	Medium	20WEM1.42	Constraints due to network outages with OIs issued as per rule change RC_2018_07 with no audit trail in control room logs.
	Outage planning	Control	Medium	20WEM1.43	When assessing outage applications, process for ensuring sufficient Ancillary Services capacity has high risk of human error.
	Outage planning	Breach	Low	20WEM1.01	DSM availability not taken into account when assessing outages
	Real-time dispatch	Breach	Low	20WEM1.04	RDQ forecasts published by AEMO do not always reflect best estimate of forecast load
	Real-time dispatch	Breach	Low	20WEM1.39	Failure to issue Dispatch Advisory for Emergency Operating State
	Real-time dispatch	Breach	Low	20WEM1.41	Constraints due to network outages with no OI issued as per rule change RC_2018_07
	Real-time dispatch	Breach	Low	20WEM1.56	Failure to issue DAs for insufficient LFAS activation
	Real-time dispatch (Ancillary Services)	Control	Low	20WEM1.50	Implemented controls have not sufficiently addressed problem of under-activation of LFAS.
	Real-time dispatch (Ancillary Services)	Control	Low	20WEM1.55	Long periods of insufficient LFAS Down
	Real-time dispatch (Ancillary Services)	Control	Low	20WEM1.54	Worsening Spinning Reserves shortfall situation
Markets	Settlements	Breach	Low	20WEM1.06	Intermittent loads without registered facilities not allocated SR share
	Settlements	Breach	Low	20WEM1.44	Erroneous LF_Capacity_Cost_Share calculation for participants registering part way through a month

Area	Process	Finding Type	Risk Rating	Ref#	Findings
	Reserve Capacity - Relevant Demand	Control	Low	20WEM1.05	Opportunity to improve audit trails in Consumption Deviation Application (CDA) process for Demand Side Programmes (DSP)
Finance	Budget and fees	Control	Low	20WEM1.48	Process for calculating Market Fees has potential for errors
Technology	Market Systems	Breach	Low	20WEM1.49	Ability to reproduce past results has not been demonstrated by AEMO

Audit findings open from prior years and self-reported breaches are listed in the detailed audit report and reported to management on a monthly basis and to the RAC each quarter.

OPINION

Qualifications

We have not noted any instances of material non-compliance with the WEM Rules; our definition of materiality is set out in the detailed audit report.

Conclusion

Opinion on AEMO's operational compliance with the WEM Rules and Market Procedures

Subject to the inherent limitations set out in the detailed audit report, 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 AEMO has not been compliant with the WEM Rules and Market Procedures during the Audit Period, in all material respects.

Opinion on the compliance of AEMO's Market Software Systems with the WEM Rules

Subject to the inherent limitations set out in the detailed audit report, based on the audit procedures we have performed and the evidence we have examined, AEMO's Market Software Systems are compliant with the WEM Rules in all material respects.

Opinion with respect to the compliance of AEMO's software management processes with the WEM Rules

Subject to the inherent limitations set out in the detailed audit report, 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 AEMO's processes for software management have not been compliant with the WEM Rules and Market Procedures during the Audit Period in all material respects.

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1 INTRODUCTION

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

1.1 AUDITED ENTITY

The audited entity for this report is AEMO.

1.2 AUDIT PERIOD

The Audit Period is 1 July 2019 to 30 June 2020, both dates inclusive.

1.3 REGULATORY CONTEXT AND SCOPE

1.3.1 Regulatory context

The regulatory context for the audit is summarised in the table below. For avoidance of doubt, the heads of power for the market audit are derived from clauses 2.14.1, 2.14.2 & 2.14.3 of the WEM Rules and covers AEMO's role as both market operator and system operator.

Table 6: Regulatory context for the market audit

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, at minimum: • The compliance of AEMO's Internal Procedures and business processes with the WEM Rules. • AEMO's compliance with the WEM Rules and Market Procedures. • The compliance of AEMO's market software systems and processes for software management with clause 2.36.1 of the WEM Rules.
2.36.1	Defines obligations with respect to AEMO's software management systems and controls; this provides the compliance criteria for the review of processes for software management.

1.3.2 Scope

Given the regulatory context above, the purpose of the market audit is to assess:

- How AEMO implements its obligations under the WEM Rules.
- How AEMO manages non-compliance risk with respect to the obligations above.
- Instances of non-compliance by AEMO during the Audit Period.
- AEMO's market software systems and its processes for software management, and specifically, AEMO's compliance with clause 2.36.1 of the WEM Rules. It includes an assessment of whether:
  - AEMO maintains appropriate records.
  - The software used by AEMO to implement its obligations under WEM Rules is compliant with the underlying mathematical formulations and the rules themselves.
  - AEMO has been compliant with its market systems certification obligations.
  - AEMO can reproduce past results.

The market audit includes AEMO's role as both market and system operator and includes the following work streams within scope:

- Compliance Assessment of:
  - Areas where we have noted breaches or non-compliance risk during past audits.
  - Areas that have changed or been introduced in the past Audit Period (e.g. in terms of rule changes, system changes, operational practice changes.
  - AEMO's self-reported instances of non-compliance with the WEM Rules.
- Procedures Assessment of Market Procedures and Internal Procedures that have changed during the Audit Period.
- Software Compliance Assessment. Our audit team has tested and certified updates to WEMS and settlements systems on an ad-hoc basis throughout the year (prior to implementation). Hence the Software Compliance Assessment does not include certification testing but does include:
  - A review of AEMO's change logs for WEMS, settlements, SPARTA, RTDE and SOCCUI
  - A review of rule changes and release notes to determine whether all rule changes have been reflected in software
  - Testing compliance of MR 2.36.1(b) in respect of the results of the RCM Settlements run outputs for January 2019 as produced from AEMO production systems in March 2019 to check whether AEMO can recreate system outputs

1.4 AUDIT CRITERIA

1.4.1 Criteria for determining operational and procedural compliance

The criterion we have used for determining the compliance of AEMO's Market Procedures (referred to as the *Market Procedures*) is the Wholesale Electricity Market Rules dated 30 March 2020 (referred to as the *WEM Rules*).

The criteria we have used for determining AEMO's operational compliance and the compliance of AEMO's Internal Procedures are the WEM Rules and the Market Procedures.

1.4.2 Criteria for determining control application

When assessing whether AEMO has applied effective controls during the Audit Period we have used relevant Internal Procedure and Confluence Work Instruction documentation as our audit criteria. These are summarised below.

Table 7: Procedures reviewed to assess control application

AEMO functional area	Procedures against which control application has been assessed
Market Operations	Settlements and Daily Operations Procedure and related Confluence work instructions
Reserve Capacity	Certification of Facilities Procedure, Reserve Capacity Testing Procedure, Relevant Demand and CDA Procedure, and related Confluence work instructions
Finance	WEM GSI Procedure Internal Procedure: Fees
System Management Operations Governance and Integration	Dispatch Advisory Guidelines, Daily System Management Operations Procedure, Weekly Ad-hoc Market Operations Procedure, SCADA Cleansing Guidelines;
System Management - System Operations	AEMO Perth Central Park Control Centre Business Continuity Plan, AEMO WA RTO Reclassifying Contingency Events Guideline, Electronic Logbook - Assumptions Process, Electronic Logbook - Dispatch Controller, Electronic Logbook - Security Controller, Dispatch Advisory Issuance Guideline
System Management - Planning	Weekly/Ad-Hoc System Management Operations Procedure (ST PASA), Internal Procedure – generator Planned Outages, Operations Planning Engineer Tasklist
Risk & Compliance	AEMO Data Breach Response Plan

Where AEMO does not have documented controls or procedures relating to a business process under review we have used best practice criteria for a prudent market and system operator. This includes:

- The use of automated/semi-automated tools to reduce risk of errors.
- Use of automated alerts or calendar reminders.
- Approval and authorisation processes.
- Issue escalation processes.
- Validation and review processes.
- Exception reporting.
- Practices at other system and market operators with which we are familiar.

1.5 APPROACH

1.5.1 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*'.

- We provide reasonable assurance under this standard with respect to our review of the compliance of AEMO's market software and Market Procedures with the WEM Rules.
- We provide limited assurance under this standard with respect to our review of:
  - AEMO's compliance with the WEM Rules and Market Procedures
  - AEMO's software management processes and controls.

1.5.2 Risk ratings and materiality

Compliance and risk ratings

Audit findings are categorised as follows:

Table 8: Compliance and risk ratings

Compliance rating
1: Instances of non-compliance with the WEM Rules
2: Findings that are not an instance of non-compliance, but pose compliance risk
3: Findings related to areas for improvement that do not affect compliance risk

Risk Rating
Critical: Potential for catastrophic impact on market or system operations or other market outcomes if not addressed immediately. Requires executive actions and monitoring at board level.
High: Potential for major impact on market or system operations 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 market or system operations or other market outcomes if not addressed within a reasonable timeframe. Requires management attention with regular monitoring.
Low: Potential for minor impact on market or system operations or other market outcomes if not addressed in the future. Requires team level attention with regular monitoring.

Risk rating descriptors for audit findings are based on AEMO's corporate risk matrix. The only difference from AEMO's internal ratings is that we assess the financial impact to market participants in addition to AEMO.

Please refer to Section 15.1 for more information.

Materiality (qualification of audit opinion)

In determining whether to qualify our opinion on whether AEMO has complied "in all material respects", 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 Market Participants
- The number of Market 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).

1.5.3 Audit activities

We have undertaken a combination of:

- Reviewing self-reported incidents of AEMO non-compliance with the WEM Rules and Market 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
- Reviewing AEMO's Market Procedures, Internal Procedures[9] and IT Procedures to ensure WEM Rules changes and other changes (e.g. processes, systems, etc.) have been reflected in the procedures
- Compliance testing to audit AEMO's operational compliance with the WEM Rules and Market Procedures and to determine the effectiveness of operating controls. In doing so, we have sourced information from all AEMO (WA) teams.

The first three activities were conducted through interviews and business process walkthroughs via teleconferencing[10]. Remaining activities have been undertaken via desktop analyses

Compliance testing and business process walkthroughs were focussed on a subset of functional areas based on residual compliance risk, materiality, and rule changes occurring in the Audit Period. These areas include:

- Electricity Market Operations
  - Settlement and verification (including preparing meter data for settlement)
  - Review of Consumption Deviation Applications affecting NTDL applications and Relevant Demand
  - Daily market operations activities (procedure review)
  - Certification of reserve capacity (2019 cycle)
  - Reserve Capacity Testing
  - Preparation of WEM budget and market fees
- Electricity System Operations

[9] In some cases, we have reviewed draft versions of Internal Procedures that had not been formally approved as at the time of the review.

10 Covid-19 restrictions meant that a site visit was not possible for this audit.

- System Management Operations:
  - Daily operations processes
  - Weekly operations processes
  - Issuance of retrospective Operating Instructions
- Dispatch, including:
  - Control room operations, including use of Malaga backup site
  - Control room staff rostering
  - Event logging
  - Dispatch advisories
  - Ancillary Service enablement
  - High-risk and Emergency operating states
  - GIA dispatch
- Dispatch planning, including:
  - Accuracy of load forecasts/use of alternate forecasts
  - Preparation of PASA reports

1.5.4 Inherent limitations

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 AEMO's compliance with the WEM Rules and Market Procedures is therefore subject to the following caveats:

- 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. No such findings have been made during this audit.
- 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.

1.6 Structure of this report

The remainder of this report is structured as follows:

- Chapters 2 to 13 present our audit findings relating to the Compliance Assessment and Procedures Assessment work streams on an WEM Rule chapter by chapter basis.
- Chapter 14 presents findings relating to AEMO's electricity market software.

1.7 Acknowledgments

RBP would like to thank managers and staff from AEMO who willingly provided information and shared in discussions with us while we carried out this audit.

2 WEM Rules Chapter 1 - Introduction

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

2.1 Rule amendments

Changes to Chapter 1 are summarised below.

Rule change	Nature of changes
Transitional changes for WEM reform	Transitional rules requiring AEMO to provide information to the Minister (irrespective of confidentiality assigned) at any time before 1 July 2021
RCM Pricing changes	• Transitional rules pertaining to DSM Reserve Capacity Security • Transitional provisions pertaining to RCM Pricing changes for 2021 Capacity Year
RC_2015_01	Minor changes pertaining to replace references to specific Market Procedures with a generic reference

2.2 AEMO procedures

AEMO's Internal Procedures are compliant with Chapter 1 of the WEM Rules in all material respects.

2.3 Compliance with Chapter 1

We have conducted to audit procedures pertaining to Chapter 1.

There have been no self-reported instances of non-compliance with Chapter 1 of the WEM Rules.

3 WEM Rules Chapter 2 - Administration

Chapter 2 of the WEM 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 Rule amendments

Changes to Chapter 2 are summarised below.

Rule change	Nature of changes
RC_2014_06	Minor consequential administrative changes arising as a result of the removal of Resource Plans and Dispatchable Loads
RC_2014_07	Correction of minor administrative and typographical errors
RC_2015_01	Amendment of head of power clauses for Market Procedures to allow AEMO to consolidate certain Market Procedures to streamline the documentation with respect to related processes
RC_2015_03	Minor changes to enable AEMO to charge application fees to fund Consumption Deviation Applications
RC_2018_06	Cosmetic change to clause 2.30.7A relabelling spinning reserve cost shares to align with terminology in Appendix 2
RC_2013_15	Cosmetic consequential change to clause 2.34.4 arising as a result of outage process refinements

3.2 AEMO PROCEDURES

AEMO's Internal Procedures are compliant with Chapter 2 of the WEM Rules in all material respects.

3.3 OPERATIONAL COMPLIANCE WITH CHAPTER 2

3.3.1 Audit activities

- We have reviewed self-reported instances of non-compliance with Chapter 2 of the WEM Rules
- We have conducted compliance testing to:
  - Review whether standing data request changes pertaining to Temperature Dependence Curve (TDC) changes were processed and updated within the timeframes required under Section 2.34 of the WEM Rules.
  - Review whether WEM Market Fees for the 2019/20 Financial Year were calculated correctly.
- We have conducted (retrospective) business process walkthroughs to:
  - Assess whether Finance employs appropriate controls to meet their budget and market fee preparation and publication obligations. This included a review of AEMO's centralised budget planning tool to ensure AEMO's 2020/21 budget is aligned to the relevant allowable revenue submission and consistent with what has been published.
  - Assess whether System Management employs appropriate controls when reviewing TDC change requests and updating their system with those changes.
- We have performed sample control testing to audit whether controls documented in the Weekly Ad Hoc Internal Procedure were applied in practice when processing TDC changes.

3.3.2 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 2 of the WEM Rules are summarised in the table below.

Table 9: Operational compliance findings associated with Chapter 2 of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.34	Issue Type RBP reported compliance risk Obligation 2.22A, 2.24, 2.43	Risk Rating Low Compliance Rating 2	Lack of formalised business processes and controls relating to WEM and GSI obligations The Finance team has no formalised processes in place to meet their obligations under the WEM and GSI Rules. The existing process documentation is extremely high level and reiterates WEM/GSI rule mandated timelines and selected obligations. While our interview with the Finance team indicated that there is some level of checking that occurs (e.g. to ensure that published outputs are correct), we only have the team's verbal assertion with no evidence that this occurs in practice. Likewise, there are no formal controls in place to ensure that publication deadlines are met (e.g. calendar reminders). We further note that there has been a further breach of the requirement to publish historic WEM and GSI	No further action required.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			reports this year (see 19GSI1.04 and 19WEM1.23). This breach is a recurring one. During our interviews the Finance team appeared to be unfamiliar with the term "Declared Market Project "and "GSI Project": this indicates that AEMO has no process in place to determine whether a project should be classified as a Declared Market Project or a GSI Project in accordance with the Rules. We recommend: 1. Calendar alerts be instituted for key publication/submission deadlines such as budget, fees, historic financial reports, and allowable revenue submissions as well as reminders for monthly interest payments. 2. The process for the above functions be documented including specification of key controls. As indicated above, a process for determining Declared Market Projects and GSI projects should be included in the budget/Allowable Revenue process description. See Example controls for finance worksheet for examples of controls we expect to see in this area. Finding is closed. AEMO has provided us evidence of controls being applied for 19/20 budget cycle in the form of: a) Documented key dates to manage statutory timelines	

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			b) Generic AEMO wide budgeting (accounting) guidelines c) Evidence that market fee calculations were conducted correctly – see findings related to risks in this process below. d) Checks were undertaken to ensure the 19/20 budget was aligned with the relevant allowable revenue submission.	
19WEM1.40	**Issue Type** RBP reported compliance risk **Obligation** 2.34	**Risk Rating** Low **Compliance Rating** 2	**No formalised process for second-stage validation by Principal Engineer (PE) for TDC updates** SM Ops' weekly ad-hoc procedure indicates that the PE must review TDC changes and indicate whether there are any issues. However, we have noted: • In all four TDC changes submitted during the audit period, there was no evidence of any checks being performed. For 47329 and 47330, there was an email from the PE dated 6 Mar 2019 indicating approval to proceed, but there was no evidence of what checks had been performed. For 47481 and 47482, there was an email from the PE dated 27 March 2019 indicating that they need to discuss with Western Power the ability of the facility to meet Technical Requirements. However, there was no evidence that any checks were ever completed. • It is unclear what checks the PE performs. SM Ops has advised they will be providing us a description the checks to be performed by the PE. We have not been	No further action required.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			provided a description yet, but note that there is still no evidence that these checks occur. 2019 Recommendation: We recommend SM formally document the checks that are to be performed when reviewing TDC changes. We also recommend SM institute a more robust audit trail with respect to these checks (e.g. email containing detail of what checks were performed and the results). The process has now been changed so that Market Ops liaises directly with the SM Planning and Reserve Capacity.	
20WEM1.20	**Issue Type** AEMO reported non-compliance **Obligation** 2.37.4(c) and Section 2.2 of Market Procedure: Prudential Requirements	**Risk Rating** Low **Compliance Rating** 1	**Balancing segment of Credit Limit calculation inconsistent with Prudential Requirements Market Procedure** Clause 2.37.4 © of the WEM Rules requires AEMO to determine a Credit Limit for a Market Participant in accordance with the Market Procedure: Prudential Requirements. Section 2.2 of this Market Procedures describes the methodology used to determine the Credit Limit for a Market Participant with at least three full months of Non-STEM Settlement data available. This section explains that, for the calculation of the maximum 70-day exposure, every monthly settlement segment amount has to be aggregated and then the total amount must be divided by the number of days in the month, n. During a review of the Prudential Requirements Market Procedure, it was identified that AEMO has calculated the	No further action. AEMO has addressed the issue, and operational practice is now aligned with the Rules and the Market Procedure

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			Credit Limit using a different interpretation of monthly average of the Balancing Settlement segment since 30 November 2015 (and before that, the Independent Market Operator (IMO) since 2014). Specifically, AEMO's tool has used the actual daily amount from Balancing Settlements, rather than a monthly average. AEMO's approach resulted in an approximate 3% increase in the calculated Credit Limits across all Market Participants (approximately $1,900,000 in aggregate). We note that AEMO's approach of using daily Balancing Settlement amounts are, in fact, a more accurate and preferable approach to determining Credit Limits. AEMO has since completed a Procedure Change Proposal (AEPC_2019_11) to align the methodology in the Prudential Requirements Market Procedure with AEMO's practices. AEMO's process for determining Credit Limits is now compliant with the latest version (version 7) of the Prudential Requirements Market Procedure.	
20WEM1.48	**Issue Type** RBP reported compliance risk **Obligation** 2.24.4	**Risk Rating** Low **Compliance Rating** 2	**Process for calculating Market Fees Rate has potential for errors** Clause 2.24.4 requires AEMO to calculate Market Fee Rates, System Management Fee Rates and Regulator Fee Rates at a level that AEMO estimates will earn revenue equal to the relevant revenue estimated determined under clause 2.24.3.	We recommend that AEMO: • Properly document the market fee rate calculations in an internal procedure. The methodology should ensure: ◆ the market fee rate calculations are expressed

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			Clause 9.13 of the Rules (Market Fee Settlement) applies these rates to the Metered Schedules of Market Generators and Market Customers for cost recovery purposes (note that the Metered Schedules represent loss-adjusted generation or consumption, where the loss adjustment is relative to the reference node (Muja)). AEMO's process for calculating the market fee rate can be improved, as the process is not well documented, and the spreadsheet tool used to calculate the fee rate has scope for error due to the nature of manual inputs. In particular: • The methodology for deriving the market fee rates is not well documented and could be misinterpreted and applied incorrectly by an inexperienced staff member. • The nature of the inputs used to derive the market fee rates are not well specified. For example, it is unclear which ESOO demand forecast is to be used. Likewise, it is unclear what data is used to convert the ESOO forecast from sent-out to loss adjusted to the Muja reference node. • The spreadsheet requires significant manual input. For example, variables that should be derived via a formula (e.g. the loss adjusted forecast that the revenue requirement is divided by) is hard coded as a value multiple times in the spreadsheet.	explicitly as a formula to avoid misinterpretation ◆ input data required is specified clearly. For example, the procedure should note that the ESOO Operational Demand Forecast for the expected demand scenario developed under clause 4.5.10(a) is the correct forecast to use. Likewise, the procedure should explicitly state what information is required to convert the sent out ESOO forecast to a loss-adjusted value. • Improve the market fee rate calculation tool to minimise hard coding of variables where formulae can be used.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			The combination of the vague documentation and manual spreadsheet tool increases the risk of the market fee rates being calculated incorrectly.	

4 WEM Rules Chapter 3 – Power System Security and Reliability

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

4.1 Rule amendment

Changes to Chapter 3 are summarised below.

Rule change	Nature of changes
RC_2015_01	Amendment of head of power clauses for Market Procedures to allow AEMO to consolidate certain Market Procedures to streamline the documentation with respect to related processes
RC_2013_15	Outage process refinements. • Clarification of participant facility outage obligations. • Clarification of Equipment List content • Clarifications and refinements to the outage planning process
RCM Pricing changes	Minor change to clause 3.16.4 to clarify interpretation

4.2 AEMO procedures

AEMO's Internal Procedures are compliant with Chapter 3 of the WEM Rules in all material respects.

4.3 Operational compliance with Chapter 3

4.3.1 Audit activities

We have:

- Reviewed instances of non-compliance with Chapter 3
- Conducted business process observation and walkthroughs to determine whether AEMO has complied with the WEM Rules and its Internal Procedures and whether AEMO has applied appropriate controls in the following areas:
  - Real-Time control room operations
  - Outage assessment process
  - ST PASA report process
- Conducted compliance testing on:
  - Ancillary service activation for SR and LFAS
  - Control room staffing rosters vs. fatigue management guidelines and availability of relief
  - Forecast accuracy and use of alternate forecasts
  - Consistency and accuracy of control room logs
  - Issuance of Dispatch Advisories for constrained facilities
- Reviewed BCP exercise reports

4.3.2 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 3 of the WEM Rules are summarised in the table below.

Table 10: Operational compliance findings associated with Chapter 3 of the WEM Rules

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.18	Issue Type AEMO reported non-compliance Obligation 3.5.1(f)	Risk Rating Medium Compliance Rating 1	Incorrect operating state in dispatch advisory during loss of SCADA visibility System Management issued a Dispatch Advisory (DA) with the wrong Operating State (High Risk as opposed to Emergency) during a loss of SCADA visibility which forced power system control away from its primary control centre. The cause of this breach was confusion as to who has frequency control of the system during the relocation to the East Perth backup site. Recommendations from the incident report for this event are: • Assign a single point of contact during a relocation event • Develop a script to be followed to ensure that Western Power have frequency control 2019 recommendations were: • Ensure that the above recommendations are implemented • Conduct a BCP exercise using the above single point of contact and script.	No further action required

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			These actions have now been completed	
19WEM1.26	Issue Type RBP reported area for improvement Obligation Ch. 3	Risk Rating Medium Compliance Rating 3	Initiatives to address threats to system stability caused by increased DER uptake may not be sufficient or delivered in time. Several metrics showing the impact of increased levels of intermittent and uncontrollable DER (particularly PV) are getting worse: - Increased use of alternate forecasts, and for longer (see 19WEM1.25) - Increased use of HROS to enable dispatch out of merit - Increased use of backup LFAS Initiatives to address these issues are to a large extent held up waiting for PSO/SMST project or market reform. Given continued rapid uptake of rooftop PV, it is not clear whether these initiatives will be sufficient or delivered in time to prevent a system that is uncontrollable to an extent that system security cannot be maintained. 2019 Recommendation: Continue to proactively monitor and review whether current controls (e.g. backup LFAS, out of merit dispatch under HROS) are adequate to maintain system security until market reform is implemented. Inertia tool has been implemented in control room, and proactive monitoring is in place.	No further action required
19WEM1.32	Issue Type RBP reported area for improvement Obligation Ch. 3	Risk Rating Low Compliance Rating 3	No backup controllers on standby, so no guarantee that replacement controllers would be available if rostered controller unavailable For any given control room shift, a minimum of two controllers are rostered on. Controllers are not consistently rostered to be on call as emergency substitutes. Therefore, if a rostered controller became unavailable, e.g. due to	No further action required

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			accident or illness, there is no guarantee that there will be another available qualified controller who is willing, close enough and in a suitable state to take over the shift. It is therefore possible that either a controller role will go vacant for an extended period of time, or the previously rostered controller will have to perform an excessively long shift. Either outcome is a risk to power system security. The AEMO Enterprise Agreement allows for staff to be rostered on "Day Work" to provide relief coverage, however a review of the roster data supplied to us shows that this is not consistently applied, with many days having no staff rostered on Day Work. The Enterprise Agreement also contemplates "Emergency Call-In" in which all shift employees are provided with a mobile phone allowance to ensure they are contactable outside of their rostered shifts. 2019 Recommendation: Formalize staff availability in the context of the Enterprise Agreement so that a consistent roster of controllers to be on relief coverage is implemented. The Roster Administration Guideline has been updated to formalise the call out arrangements for Real Time Operations	
19WEM1.48	Issue Type RBP reported area for improvement Obligation Ch. 3	Risk Rating Low Compliance Rating 3	Fatigue management guidelines not being followed Fatigue management guidelines are an important control against the risk of poor decisions being made by fatigued controllers. This is particularly important in the WEM due to the very manual nature of the dispatch decision making and management of the system. However, during the deep dive	No further action required

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			sessions, it was revealed to us that the guidelines were being followed "as best we can" and were being breached when controllers were also involved in project work. We have reviewed roster data supplied to us covering 11/03/2019 – 25/10/2020 and checked this against the Fatigue Management Guidelines as documented in the Roster Administration Procedure. Some violations of the guidelines were found: - BG working 4 consecutive night shifts up to 22/05/2019 (Maximum is 2 nights, or 3 nights with special approval and staff consultation) - AM doing day work on second day following night shift on 02/05/2019 (Need 48 hours no work after last night shift) - AM doing day shift on second day following night shift on 13/05/2019 (Need 48 hours no work after last night shift) - AM doing night shift on second day following night shift on 13/05/2020 (Need 48 hours no work after last night shift) - LI doing day work on two days following night shift on 24-25/05/2020 (Need 48 hours no work after last night shift, and no stretch of work greater than 17 hours) 2020 Audit Update: Review of current rosters shows that there were still violations of the guidelines in the roster through most of the 2019-2020 audit year, but there are no further violations from May 2020 onwards. Retained as a finding for this year but closed with no further action.	
19WEM1.50	Issue Type RBP reported area for	Risk Rating Low	Lack of controls regarding the classification of credible contingencies	No further action required

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
	improvement **Obligation** 3.4.1	**Compliance Rating** 3	Credible contingencies are a trigger for a High Risk Operating State if they can cause an overload, under voltage or threaten system stability. It is therefore important that there are controls in place to ensure that credible contingencies are consistently and reliably identified and acted upon. During the deep dive sessions, it was revealed that there are no policies, procedures or guidelines regarding the classification of credible contingencies; historical events are not recorded, and there is a lack of good quality information available to controllers to identify credible contingencies. A guideline document ""Reclassifying Contingency Events"" was been created, but is in a Draft state, with numerous items to be completed or confirmed, since 27/10/2017. 2019 recommendations were: • Complete, approve and implement the guideline document • Train control room staff in the application of this document. These actions have now been completed.	
19WEM1.61	**Issue Type** RBP reported area for improvement **Obligation** Ch. 3	**Risk Rating** Low **Compliance Rating** 3	**More room for improvement in logbook consistency and review process** Control room logbooks are an important control in managing SM Operations risks. Electronic logbooks have been implemented, and guideline documents have been created to ensure effective and consistent logging. The improved logbooks and guidelines have been cited as a control to address multiple findings from previous audits. However, a review of a sample of logbooks has found multiple issues with inconsistent and incomplete application of the logging guidelines, including:	• Create a more complete audit trail for the review of logbooks. Record the methodology employed, the types of issues that were found and follow-up actions • Improve the electronic logbook guidelines to

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			- Required events not being logged - Required information not included in logbook entries - Long periods of time with no entries - Inconsistent entries - i.e. the same type of event recorded in different ways on different occasions, or multiple identifiers used for the same facility - Rare and inconsistent use of the Event Type field Consistent logging is important, as implementing some obligations currently requires manual searches through the logbooks - e.g. calculation of dispatch volumes for curtailed facilities (See finding 19WEM1.19 for a breach that was caused by logbook entry being missed). Inconsistent entries make such tasks much more time-consuming and error prone. Consistent logging would enable some automation to be applied, reducing the risk of errors. In response to these concerns being raised previously, System Management has undertaken a regular review process in which a sample of logbooks are reviewed, and feedback is given to the control room staff. However, the evidence of these reviews provided to us is insufficient to assess the effectiveness of these reviews in addressing these issues. The evidence does not specify which issues the reviewer was looking for or what specific issues were found. There is no indication of a methodology for detecting missing entries being applied. The electronic logbook guidelines could be improved to achieve greater consistency - for example, specifying a specific format for the entry for each event type, and ensuring that the Event Type field is always filled in.	specify consistent entry formats for each event type • Improve electronic logbook templates to ensure consistent entries AEMO have indicated that this finding will be risk accepted and transferred to the AEMO Risk Register.

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			Finally, the electronic logbook templates could be improved to enforce greater consistency, while at the same time saving time in creating entries. For example: - Using drop-down lists in the Participant field to ensure consistent identification of facilities - Using pop-up forms to prompt for the required information for particular event types and then automatically create the entry in a consistent format. This would also make it possible to quickly capture information this is currently not captured, such as whether Synergy dispatch in in merit or not. 2020 Audit Update: A review of a sample of this year's logbooks shows an improvement, but there are still many instances of the above issues. There are long-term initiatives to review decision-making tools (including logging) AEMO-wide, and provision to move to the Miami tool in the 3-year budget. Neither of these will be delivered this audit year, so this issue remains open. AEMO have accepted this risk and have entered it into their risk register.	
20WEM1.01	Issue Type RBP reported non-compliance Obligation 3.18.11(a)	Risk Rating Low Compliance Rating 1	DSM availability not taken into account when assessing outages Clauses 3.18.11 and 3.19.6 require 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 issue was previously raised (as issue 17WEM2.04) but closed in the 2019 audit as the PASA Enhancement Plan specified that DSM was to be included as part of the PASA enhancement project. This was expected to be delivered	Complete PASA enhancement project and make this a focus area of the 2020/21 WEM audit.

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			during this audit year, and the outcomes of the project were to be a focus area of this audit. However, the PASA enhancement project has been delayed, and will not be delivered in time for us to assess its outcomes as part of this year's audit. Therefore, we are reopening this issue, as it remains unaddressed this audit year.	
20WEM1.02	**Issue Type** RBP reported non-compliance **Obligation** 3.17.9(f)	**Risk Rating** Medium **Compliance Rating** 1	**Forecast transmission capacity between potentially constrained regions is not included in ST PASA report** WEM Rule clause 3.17.9(f) requires that System Management must include "transmission outages of which System Management is aware, forecast transmission capacity between potentially constrained regions, and any constraints that are likely" in the ST PASA report. From our review of ST PASA reports, and walkthrough of the ST PASA report creation process, we have found that the forecast transmission capacity between potentially constrained regions information is not included, as there is no system or procedure to insert this information. The report contains relevant fields (INTERREGIONCAPACITY,INTERREGIONLIMIT and GENERATION_CONSTRAINED_QTY), but these are left as 'NA'. This is therefore a breach of rule 3.17.9(f).	Implement systems and/or procedures to insert this information in the ST PASA report.
20WEM1.22	**Issue Type** AEMO reported non-compliance	**Risk Rating** Low **Compliance**	**On the day opportunistic maintenance incorrectly granted** Clause 3.19.2(b) of the WEM Rules allows Market Participants and Network	No further action required

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
	Obligation 3.19.2(b)	Rating 1	Operators to request that System Management approve opportunistic maintenance at any time on the relevant trading day. On the 24th of September 2019, AEMO incorrectly granted on the day opportunistic maintenance to a participant 15 minutes prior to the commencement of the Trading Day. Rule Change RC 2013_15 commenced on 1 Feb 2020, removing the breached requirement. The matter was also included in controller training.	
20WEM1.30	Issue Type AEMO reported non-compliance Obligation 3.21A.9	Risk Rating Low Compliance Rating 1	Failure to advise Market Participant of Commissioning Test Plan Clause 3.21A.9 of the WEM Rules requires System Management to notify a Market Participant as to whether it has approved a Commissioning Test Plan no later than 8:00am on the Scheduling Day for which the Commissioning Test Plan would apply. At 13:05 on 6/11/2019, MWF_MUMBIDA_WF1 submitted a new Commissioning Test Plan to start Commissioning from 10:00 on 08/11/2019. AEMO failed to advise MUMBIDA of approval of the Commissioning Test Plan until 18:06 on 7/11/2019 The standard process for approvals of CTPs take place between System Management Operations and System Management Planning. Operations will send the CTP to Planning and schedule a calendar request with the team requesting their approval. This specific instance required feedback from the planning team, as operations questioned the validity of the application. The planning team did not respond to operations until prompted (when it was already too late).	No further action required

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			In order to prevent future occurrences AEMO sent a reminder to planners on the importance of reviewing Commission Test Plans on time and conducted a review of how planners manage their common mailbox.	
20WEM1.43	Issue Type RBP reported compliance risk Obligation 3.19	Risk Rating Medium Compliance Rating 2	When assessing outage applications, process for ensuring sufficient Ancillary Services capacity has high risk of human error. When assessing outage applications, the process for ensuring that there is sufficient remaining capacity for each of the ancillary services is not implemented at all in the PASA tool. The process is a visual check across a grid of outages presented by the PASA tool by the SM Planning staff member, is dependent on that staff member knowing which facilities provide each service (and how much where applicable), and requires that staff member to perform a mental assessment of the outage vs AS requirements. This process is prone to human error and provides no audit trail of the AS assessment.	As part of ongoing PASA enhancement, include systematic check for sufficient AS
20WEM1.45	Issue Type RBP reported compliance risk Obligation Ch. 3	Risk Rating High Compliance Rating 2	Design of GIA constraint implementation threatens power system security GIA constraints have been implemented by the Western Power GIA Tool, which applies the constraints after SM's dispatch decisions. There has been no implementation of GIA constraints in SOCCUI or XA, so SM controllers have no visibility of the impact of GIA constraints before they are applied. Therefore, increasing the dispatch of one facility (to follow an increase in system load) can result in another facility being curtailed, meaning that the increase in generation required to maintain system balance is not achieved. In some cases, a significant deficit of generation could result. For example,	Continue to work with Western Power to reduce the risk associated with the GIA constraint implementation.

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			starting one of the thermal Facilities results in the complete curtailment of a large wind farm. SM Controllers are learning of the impacts of GIA constraints by experience but given the complex nature of the GIA constraint set, this is not a reliable control. A change has been implemented in January 2020 in which the GIA constraint is not applied if the system frequency is outside of a +/-0.2 Hz band around 50Hz. This may address some of the risk, but then leaves the physical constraint that the GIA constraint was intended to address unresolved, which is in itself a risk to system security. AEMO have responded that the GIA tool is a Western Power system, and therefore out of their control. AEMO have been working with Western Power to reduce this risk. We acknowledge that this issue will not exist once the planned market reforms are implemented.	
20WEM1.54	Issue Type RBP reported area for improvement Obligation 3.11.4	Risk Rating Low Compliance Rating 3	Worsening Spinning Reserves shortfall situation System management's weekly SWIS System Performance Monitoring reports show that in every week during the audit year, there have been shortfalls in Spinning Reserves Ancillary Service (SRAS) and violations (in which SRAS dropped below a level 12% under the requirement). From analysing the data from these reports, we found a gradual worsening trend in all three metrics that we analysed: total weekly violation minutes, longest weekly shortfall minutes and maximum shortfall (%). During the audit year, there were 13 instances of a shortfall lasting longer than 30 minutes.	Investigate the causes of these trends and develop controls to mitigate the identified causes.

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			As SRAS is an essential service for maintaining system reliability, these worsening trends are a concern.	
20WEM1.55	Issue Type RBP reported compliance risk Obligation 3.11.4	Risk Rating Low Compliance Rating 2	Long periods of insufficient LFAS Down Load Following Ancillary Service (LFAS) is an essential service for maintaining system stability. As noted in System management's weekly SWIS System Performance Monitoring reports, LFAS is " is designed to be used, and therefore, is meant to go above and below the requirement. There may only be cause for concern if we fail to meet requirements for extended periods of time." In our analysis of the data contained in the weekly reports, we found multiple instances of LFAS Down going below the requirement for continuous stretches of several hours. While we accept that LFAS gets used up within each trading period, we would expect it to be replenished at the start of each period. With increasing levels of intermittent and uncontrollable generation in the system (Non-scheduled generation reaching 46.13% of total demand this audit year), it is increasingly important to maintain LFAS down levels, even when system demand is increasing.	Investigate the causes of long periods of LFAS Down shortfall and develop controls to mitigate the identified causes.

5 WEM Rules Chapter 4 – Reserve Capacity Rules

Chapter 4 of the WEM 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 Rule amendments

Changes to Chapter 4 are summarised below.

Rule change	Nature of changes
RC_2014_06	Consequential changes arising as a result of the removal of Resource Plans and Dispatchable Loads
RC_2015_01	Amendment of head of power clauses for Market Procedures to allow AEMO to consolidate certain Market Procedures to streamline the documentation with respect to related processes
RC_2015_03	Minor changes to formalise process for dealing with Consumption Deviation Applications (maintenance applications)
RCM Pricing changes	Reserve capacity pricing rule changes (including DSM Reserve Capacity Security changes).

5.2 AEMO procedures

AEMO's Internal Procedures are compliant with Chapter 4 of the WEM Rules in all material respects.

5.3 Operational compliance with Chapter 4

5.3.1 Audit activities

We have:

- Reviewed self-reported instances of non-compliance with Chapter 4 of the WEM Rules.
- We have performed (retrospective) business process walkthroughs of the certification process, selecting a diverse sample of facility types.
- We have performed sample control testing to audit whether controls documented in the Certification of Facilities Internal Procedure were applied in practice for a diverse sample of facility types during the deferred 2019/20 Reserve Capacity Cycle.
- We have performed (retrospective) business process walkthroughs of the Consumption Deviation Application (CDA) process, and reviewed samples of CDAs processed during the audit year to determine if AEMO has processed these in compliance with the WEM Rules, and if AEMO has applied documented controls. We have reviewed CDAs pertaining to both Relevant Demand and Non-Temperature Dependent Load (NTDL) applications.
- We have reviewed the results of Reserve Capacity Tests conducted during the audit year confirming that:
  - Where a facility failed both tests its Capacity Credits were reduced in accordance with the WEM Rules and Reserve Capacity Testing Market Procedure
  - Where a facility failed the first test, but not the second test, AEMO has correctly concluded that the second test was a pass.
- Changes pertaining to new arrangements for Reserve Capacity pricing have been covered via software certification (see section 14.1.2 for details on software certifications).

5.3.2 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 4 of the WEM Rules are summarised in the table below.

Table 11: Operational compliance findings associated with Chapter 4 of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.45	**Issue Type** RBP reported area for improvement **Obligation** Clause 4.25(a)(ii)	**Risk Rating** Low **Compliance Rating** 3	**Reserve Capacity Testing Market Procedure is inconsistent with WEM Rules** Clause 4.25.2(a)(ii) states that AEMO can test a generation facility by conducting a test in which the facility is deemed to have passed if it is able to perform at or above its Required Level for not less than two Trading Intervals. However, Section 1.8.6 of the RC Testing Market Procedure states that a generation facility is deemed to have passed a test conducted under clause 4.25.2(a)(ii) if its output is at or above its Required Level on average for two consecutive Trading Intervals. The WEM Rules imply that the facility should be able to sustain its output at or above its Required Level for two consecutive intervals (although the term consecutive is not used in the rules). The Market Procedure implies that a facility could have an output below its required level in one Trading Interval, but above in the next so that the average output is at or above the Required Level. This is not consistent with the intent of clause 4.25.2(a)(ii). AEMO initiated the procedure change process (APEC_2020_04) to address this finding; the consultation for the procedure change proposal has now closed and	We recommend that the Market Procedure be updated for consistency with the WEM rules and (b) clause 4.25.2(a)(ii)

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			AEMO is currently incorporating the feedback with a view to promulgating the updated Market Procedure by 31 July 2020.	
20WEM1.05	**Issue Type** RBP reported area for improvement **Obligation** 4.26, 4.28, CDA Market Procedure Section 3.2.3	**Risk Rating** Low **Compliance Rating** 3	**Opportunity to improve audit trails in Consumption Deviation Application (CDA) process for Demand Side Programmes (DSP)** Section 3.2.3(a) of the Consumption Deviation Applications Procedure, requires AEMO to conduct the following checks when processing an application submitted under clause 4.26.2CB: *(a) comparing the level of consumption in the nominated Trading Interval(s) to the level of consumption:* *(i) immediately prior to, and after the specified event(s) and/or similar events;* *(ii) in the equivalent Trading Interval(s) on adjacent days;* *(iii) in the equivalent Trading Interval(s) on the same weekday in adjacent weeks and/or months; and* *(iv) in the equivalent Trading Interval(s) on days of similar temperature and/or weather.* As part of our audit activities, we reviewed AEMO's process for processing CDA applications for DSPs. We sampled applications from two DSPs to check whether AEMO conducted the checks above but were unable to find evidence. AEMO has advised us that these checks were performed as follows: • 3.2.3(a)(i) - Trading intervals on either side of the proposed CDA intervals were considered by visually reviewing the data. CDA intervals were often consequential, therefore intervals at the beginnings/ends of runs of maintenance were also considered.	Improve the audit trail of the DSP CDA process so that AEMO's basis for accepting an application (via the checks required under Section 3.2.3(a)) is clearer.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			• 3.2.3(a)(ii) - Equivalent Trading Intervals (s) on adjacent days were considered by graphing the meter data and looking for any deviations and visually examining the data. • 3.2.3(a)(iii) - Equivalent Trading Intervals (s) on the same weekday in adjacent weeks were considered by graphing the meter data and looking for any deviations. The local copy was not saved. • 3.2.3(a)(iv) - AEMO considered Trading Intervals enveloping the CDA intervals and those within the same month to be intervals with similar temperatures/weather conditions. Data was graphed so any deviations/patterns would become apparent. The local copy was not saved. We accept AEMO's verbal assertion and note that the above checks were acceptable. However, we note opportunity for improving the audit trail of the CDA process so that AEMO's basis for accepting an application (via the checks required under Section 3.2.3(a)) is clearer.	
20WEM1.10	**Issue Type** AEMO reported non-compliance **Obligation** 4.26.1A (a) ii	**Risk Rating** Low **Compliance Rating** 1	**Incorrect Capacity Provider Payment and Reserve Credit Refund calculations due to system defect** Clause 4.26.1A(a) of the WEM Rules requires AEMO to calculate the Reserve Capacity Deficit Refund for Intermittent Generators differently depending on whether the facility is in Commercial Operation or not.	No further action required.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			Between October 2018 and November 2018, AEMO incorrectly calculated the Reserve Capacity Deficit Refund for a generator as if it were in Commercial Operation when it was not over that time; particularly AEMO systems assumed the Facility Registration date to be the same as the Commercial Operation date. This defect was uncovered while investigating the defect which led to breach 20WEM1.09. As a result, the facility was paid $41,098.51 in Capacity Credits and charged -$17,996.69 in Refunds, resulting in a net $23,101.82 payment from AEMO; without the defect the facility should have received $41,098.51 in Capacity Credits and have been charged -$41,185.51 in Refunds, resulting in a net -$87.00 payment to AEMO (i.e. the overall magnitude of the error was $23,188,82). This issue was fixed in RCM Settlements in the third adjustment for October 2018 in October 2019.	
20WEM1.15	Issue Type AEMO reported non-compliance Obligation 4.1.11(b), 4.9.1(a), 4.9.3(a), 4.10.1(e)(v)(2), and 4.11.1(a)	Risk Rating Low Compliance Rating 1	Certified Reserve Capacity (CRC) assignment based off incomplete application Clauses 4.1.11, 4.9.1(a) of the WEM Rules requires AEMO to cease accepting lodgement of applications for certification of Reserve Capacity from 1 July of Year for Reserve Capacity Cycles from 2011 onwards. Clauses 4.9.3(a) and 4.10.1(e)(v)(2) set out the requirement for applicants to provide details and supporting evidence acceptable to AEMO of firm and non-firm fuel supplies. On 27 February 2019, AEMO received an application for Certified Reserve Capacity from a Market Participant for the (deferred) 2018 Reserve Capacity Cycle (for Reserve Capacity obligations taking effect 1 October 2020). At 17:00 on 28 February 2019, the window for Certified Reserve Capacity (CRC) applications for the 2018 Reserve Capacity Cycle closed. The relevant participant's application was submitted without sufficient fuel evidence in relation to the facility's fuel supply. AEMO's understanding of the rules at the time was that the participant	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			could provide supplementary information after an application deadline, and Certification could then proceed. Once the evidence was received, AEMO assigned the participant Certified Reserve Capacity for the 2018 Reserve Capacity cycle (equivalent to $4M of capacity payments starting 1 October 2020). During the 2019 Reserve Capacity Cycle, the participant again submitted an application for Certified Reserve Capacity with insufficient fuel supply evidence. AEMO sought legal advice regarding the validity of the application, resulting in the view that the participant's applications for Certified Reserve Capacity in the 2018 and 2019 Reserve Capacity Cycle were invalid as a result of containing insufficient evidence ***before*** the application deadlines. AEMO subsequently rejected the participant's application for Certified Reserve Capacity in the 2019 Reserve Capacity Cycle. However, for the 2018 cycle, AEMO had incorrectly assigned the participant Certified Reserve Capacity off an invalid application (due to the incomplete fuel supply information). We have verified with AEMO that the delayed fuel supply information to support the 2018 cycle application was complete, and if it had been submitted prior to the closure of the CRC window, then this breach would not have occurred. AEMO has implemented changes to the Market Procedure: Certification of Facilities (via AEPC_2020_02) to clarify that no supporting documentation can be submitted after the CRC window has closed. The new Market Procedure was published on 15 June 2020.	
20WEM1.26	Issue Type AEMO reported non-compliance Obligation 4.28.B4	Risk Rating Low Compliance Rating 1	Capacity credits assigned to small generator based off technically invalid application A Market Participant may apply for Capacity Credits for a Small Generator under Clause 4.28B.2 of the WEM Rules, after the Facility becomes a Registered Facility.	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			Clause 4.28B.4 requires AEMO to determine Certified Reserve Capacity, Capacity Credit and Reserve Capacity Obligations for a Facility specified in an application submitted under clause 4.28B.2. The wording of clauses 4.28B.2 and 4.28B.4 taken together imply, that AEMO must only assign Capacity Credits in respect of applications submitted for Registered Facilities. During the 2016 Reserve Capacity cycle (for obligations taking effect from 1 October 2018), AEMO assigned Capacity Credits to a small generator specified in an invalid application, due to the Facility not being registered at the time of application submission. On 04/09/2018, the Market Participant associated with the small generator submitted an application for Capacity Credits, which AEMO rejected due to the Facility not yet being registered (noting to the participant on multiple occasions that AEMO can only accept applications for Registered Facilities, and that an application would have to be made post-registration). On 21/09/2018, AEMO approved the registration of the generator with registration effective as at 26/09/2018. On the same day, AEMO assigned the Facility Capacity Credits based on the Facility's application dated 04/09/2018 (submitted prior to the Facility's registration). To be compliant with the WEM Rules, AEMO should have assigned Capacity Credits for an application submitted on or after 26 September 2018 (i.e. after the Facility's registration was effective). Note that this is a technical breach, as AEMO's actions were consistent with the intent of Section 4.28B; the breach could have been averted if the Market Participant had provided a verbal confirmation post-registration, for AEMO to process the application dated 04/09/2018. AEMO is unable to correct this breach ex-post (as Capacity Credit assignments cannot be reversed). We note that AEMO already has a documented process and	

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			associated controls for processing small generators under Section 4.28B; this particular error was a technical one (as noted above), and was the result of human error exacerbated by the tight timeframe within which AEMO was operating to facilitate the Market Participant's participation in the Reserve Capacity Mechanism.	

6 WEM Rules Chapter 5 – Network Control Services

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

Until this audit year, there were no contracts for NCS, so AEMO had no active obligations under Chapter 5 of the WEM Rules.

Now, the new Generator Interim Access regime has used NCS contracts as a mechanism to implement constrained network access for new generation facilities.

As of May 2019, there was only one facility operating under NCS.

6.1 Rule amendment

There have been no amendments to Chapter 5 of the WEM Rules.

6.2 AEMO Procedures

AEMO's Internal Procedures are compliant with Chapter 5 of the WEM Rules in all material respects.

6.3 Operational compliance with Chapter 5

We have conducted compliance testing on dispatch of GIA-constrained facilities.

We note that GIA constraints are applied as a post-process after the real-Time Dispatch Engine (RTDE). If a GIA constraint is binding, RTDE is not re-run with the constraint applied as an input. Therefore, the energy shortfall arising from the curtailment of the GIA generator will not necessarily come from the next generator in the BMO, but rather from the Synergy portfolio. This is not an ideal outcome, but one that is strictly in compliance with the rules given the use of NCS to implement the GIA constraints.

Furthermore, the dispatch of one facility can cause a GIA constraint to constrain off another facility, potentially causing a significant shortfall in energy. This is addressed in finding 20WEM1.45 in section 4.3.2.

7 WEM Rules Chapter 6 – The Energy Market

Chapter 6 of the WEM 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 Rule amendments

Changes to Chapter 6 are summarised below.

Rule change	Nature of changes
RC_2014_06	Consequential changes arising as a result of the removal of Resource Plans and Dispatchable Loads including: • Extension of STEM submission window by one hour • Clarification of STEM submission parameter update process • Removal of the obligation for Market Participants to access STEM Auction results • Removal of requirement for AEMO to provide System Management with Fuel Declarations derived from STEM Submissions • Reinstatement of AEMO's Power to Extend the STEM due to Issues with the Ancillary Services Data • Introduction of Provisions for AEMO to repeat Scheduling Day Steps to Rectify Errors
RC_2015_01	Amendment of head of power clauses for Market Procedures to allow AEMO to consolidate certain Market Procedures to streamline the documentation with respect to related processes
RCM Pricing changes	Minor cosmetic changes

7.2 AEMO PROCEDURES

AEMO's Internal Procedures are compliant with Chapter 6 of the WEM Rules in all material respects.

7.3 OPERATIONAL COMPLIANCE WITH CHAPTER 6

7.3.1 Audit activities

Changes in chapter 6 relate to activities automated in AEMO's market software, which is covered by in-year testing and certification activities.

7.3.2 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 6 are summarised in the table below.

Table 12: Operational compliance findings associated with Chapter 6 of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.08	**Issue Type** AEMO reported non-compliance **Obligation** 6.16B.1; 6.17.5(e)	**Risk Rating** Low **Compliance Rating** **1**	**Incorrect calculation of out of merit generation and constraint quantities due to system defect** Clauses 6.16B.1 and 6.17.5(e) of the WEM Rules require AEMO to calculate the Portfolio Upwards Out of Market Generation and Portfolio Constrained on Quantities taking into account the Spinning Reserve Response and Load Rejection Reserve. Specifically: • A facility's Upwards Out of Merit Generation may be set to zero if they have been activated for Spinning Reserve (clause 6.16B.1(b)(2)(iii)). • A facility's Downwards Out of Merit Generation may be set to zero if they have been activated for Load Rejection Reserve (clause 6.16B.2(b)(2)(iii)). As a result of a software defect, the Independent Market Operator (IMO) and subsequently AEMO have not included Spinning Reserve Response Quantities and Load Rejection Response Quantities in the settlements calculation of Balancing Portfolio Out of Merit, as data recorded in the WEMS database has not flowed through to POMAX settlement. This has led to an estimated overpayment from the Constrained Payments Cost (recovered from Market Customers) to Market Generators of $8,723.07 from Balancing Market Start; $2,264.10 was overpaid from July 2018 to March 2019. The defect was uncovered by AEMO while performing system testing to support the implementation of RC_2018_07. The defect was fixed in the release of	No further action required.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			WEMS 3.3.1. The $2,264.10 worth over over-payments made between July 2018 and March 2019 have been recovered through adjustments for July 2018 to Mar 2019. The remaining overpayments are outside the adjustment period and cannot be recovered. Given that the conditions in clauses 6.16B.1(b)(2)(iii) and 6.16B.2(b)(2)(iii) are likely to bind rarely (as SR and LRR activation occurs infrequently), the severity of this defect was minor as evidenced by the immaterial financial impact during the audit year. For this reason, we have not requested AEMO to provide us with an estimate of financial impact since Balancing Market start.	

8 WEM Rules Chapter 7 – Dispatch

Chapter 7 of the WEM 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 Rule amendments

Changes to Chapter 7 are summarised below.

Rule change	Nature of changes
RC_2014_06	Consequential changes arising as a result of the removal of Resource Plans and Dispatchable Loads including: Removal of the requirement for System Management and Synergy to meet monthly
RC_2018_07	Removal of constrained off compensation for Outages of network equipment
RC_2015_01	Amendment of head of power clauses for Market Procedures to allow AEMO to consolidate certain Market Procedures to streamline the documentation with respect to related processes
RCM Pricing changes	Minor cosmetic changes

8.2 AEMO procedures

AEMO's Internal Procedures are compliant with Chapter 7 of the WEM Rules in all material respects.

8.3 Operational compliance with Chapter 7

8.3.1 Audit activities

We have:

- Reviewed instances of non-compliance with Chapter 7.
- Conducted compliance testing on:
  - Dispatch of GIA-constrained facilities
  - Issuance of Dispatch Advisories
  - Issuance of retrospective Operating Instructions.

8.3.2 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 7 of the WEM Rules are summarised in the table below.

Table 13: Operational compliance findings associated with Chapter 7 of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.02	**Issue Type** AEMO reported non-compliance **Obligation** 7.9.4(a)	**Risk Rating** Medium **Compliance Rating** 1	**Incorrectly granting permission for a facility to synchronize which was not in line with the Facility's Dispatch Instruction** On 6 April 2018, AEMO System Management incorrectly granted permission for a facility to synchronise (after it had been offline due to operational issues) which was not in line with the Facility's Dispatch Instruction. This is recorded as a systems deficiency in AEMO's compliance log, but this is mainly human error by the AEMO controller, as permissions were incorrectly given by phone. The compliance log also suggests that the rules are unclear on AEMO's obligations in this situation, however 7.9.4(a) is clear that the permission to synchronise should not be granted if not in accordance with the dispatch instruction. AEMO's resolution of this issue is based on the lessons learnt being captured in the RTO Confluence. However, on examination of the supplied RTO Confluence pages, we found that the 'Lessons Learned' and 'Resolution' for this issue were blank. Therefore, we cannot accept that this issue had been adequately addressed.	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			The 2019 audit recommendation was to complete the RTO Confluence entry for this issue. this has now been completed.	
19WEM1.16	**Issue Type** AEMO reported non-compliance **Obligation** 7.6A.2(c)	**Risk Rating** Medium **Compliance Rating** 1	**Failure to send Synergy dispatch plan by deadline** On 23 February 2019, System Management did not provide a Market Participant a required file (The Dispatch Plan, forecast of energy requirements for the Balancing Portfolio and forecast of ancillary service requirements) by the scheduled 4.00pm deadline. The file was sent at 5.39pm. The cause was an isolated error in the email system, which did not deliver the email after the AEMO staff member sent it. We note that the compliance log has not been filled out correctly for this breach, with very little information provided. 2019 Recommendation: Ensure that the Compliance Breach Form is filled out correctly for this incident. This has been completed.	No further action required
19WEM1.21	**Issue Type** RBP reported non-compliance **Obligation** 7.13.1 (c); 7.13.1(eF)	**Risk Rating** Medium **Compliance Rating** 1	**Failure to issue retrospective dispatch instructions on time** Due to a Western Power line outage System Management constrained two Facilities on via the SOCCUI setpoint on 21/03/2019, 23/03/2019 and 24/03/2019. A retrospective Dispatch Instruction was not issued until 27/03/2019. The two facilities in question do not respond to constraints applied via the SOCCUI; the controllers must manually change the set point for these facilities. Then SM Operations need to issue retrospective DIs to reflect the setpoint changes. This was overlooked, and not done until several days later when the Market Participant alerted AEMO.	Ensure that the monitoring of control room logs as specified above is documented in the appropriate procedure.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			As a preventative action, monitoring of control room logs will be performed to look for events for the two affected facilities. AEMO's resolution of this issue is that control room guidelines has been amended to cover retrospective DIs. The control room guidelines we reviewed only covered the format of logging retrospective DIs, not when to issue retrospective DIs, nor procedures to ensure monitoring of control room logs that ensures that retrospective DIs are issued. We were then pointed to sections 2.9.4 and 2.17 of the Weekly Ad Hoc System Management Operations Procedure, but neither of these sections cover these points.	
20WEM1.11	**Issue Type** AEMO reported non-compliance **Obligation** 7.13.1 (cC)	**Risk Rating** Low **Compliance Rating** 1	**Failure to issue retrospective OI on time** Clause 7.13.1(cC) of the WEM Rules requires System Management to issue a schedule of all Operating Instructions for each Trading Interval, by Market Participant and Facility, by noon on the first Business Day, following the day on which the trading interval ends. At 11:04 on 28/06/2019 WP requested that System Management apply a constraint on a Facility as this unit was constrained to 0MW under the GIA. There was a risk that the unit would be allowed to run, as WP was restarting the GIA tool. System management issued the dispatch instruction #38914 at 11:15 and at 15:06 WP contacted System Management to advise that the restart of the GIA tool was completed and the constraint was lifted at 15:07. When preparing the System Management Operations daily Market files on 29/06/2019 it was not noticed that Dispatch Instruction #389814 was the current Instruction for the unit from 11:20 until the next Operating Instruction for 0MW was issued from 12:51. This was due to a defect in the	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			Dispatch Volume tool for the Facility, and no retrospective Operating Instruction was issued to replace this Dispatch Instruction. A retrospective Operating Instruction for 0MW was issued at 07:12 on 04/07/2019 for 11:20 to 12:51 on 28/06/2019. This was after noon on the first Business Day following the day on which the Trading Day ends as required under Market Rule 7.13.1(cC). This had no impacts outside of reporting. System management has made the following remediations: -Issue retrospective Operating Instruction to the Facility for the period they should have otherwise been constrained by GIA and prepare and send revised Market Files to reflect the changes. -Fix defect in Dispatch Volume tool to alert System Management Operations to instances when a GIA unit is constrained outside of GIA tools. -Controller Education to treat the restart of the GIA tool as an instruction manager failure -Further discussions with Western Power to ensure proper use of GIA tool and back up processes The above actions are appropriate for this issue.	
20WEM1.21	Issue Type AEMO reported non-compliance Obligation 7.13.1(e); 7.13.1(eC)	Risk Rating Low Compliance Rating 1	Incorrect LFAS data sent to Synergy Clauses 7.13.1(e) and (eC) of the WEM Rules require AEMO to prepare data on the quantity of any ex-post Upwards or Downwards LFAS Enablement that was being provided at the end of each Trading Interval. For the trade dates 26th and 27th of July 2019, AEMO prepared the daily LFAS data for Synergy which showed a shortfall in Synergy LFAS enablement where no shortfall had taken place. The report was sent to the settlements team for use but was corrected prior to the settlement run being completed.	No further action required.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			The cause of the breach was human error. Conditional formatting has been added to the spreadsheet used to prepare the daily LFAS data for Synergy, to prevent the error in the future.	
20WEM1.23	Issue Type AEMO reported non-compliance Obligation 7.11.5(g)	Risk Rating Low Compliance Rating 1	Failure to issue DA for Power System Security issue Clause 7.11.5(g) of the WEM Rules requires System Management to issue a Dispatch Advisory in the event of, or in anticipation of situation where System Management expects to issue an Out of Merit Dispatch Instruction. At 09:09 on 15/10/2019, a Facility had a Security Constraint applied due to another Facility performing a self-test which required generating above DSOC. The Facility was limited to 3MW and was Out of Merit Generation as it had been curtailed from its cleared Output. AEMO failed to issue a Dispatch Advisory. Preventative measures were training to reinforce knowledge of Dispatch Advisory Guidelines and discussion with the controller concerned.	No further action required.
20WEM1.27	Issue Type AEMO reported non-compliance Obligation 7.11.5(g)	Risk Rating Low Compliance Rating 1	Failure to issue DA for Power System Security issue Clause 7.11.5(g) of the WEM Rules requires System Management to issue a Dispatch Advisory in the event of, or in anticipation of situation where System Management expects to issue an Out of Merit Dispatch Instruction. At 12:20 on 13/10/2019, a Facility was dispatched to 0MW. The Facility did not respond to the Dispatch Instruction and continued to generate 14MW. This continued output is potentially Out of Merit Generation as it impacted the BMO dispatch and differed to the Dispatch Instruction received by the	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			Facility. AEMO failed to issue a Dispatch Advisory. Preventative measures were training to reinforce knowledge of Dispatch Advisory Guidelines and discussion with the controller concerned.	
20WEM1.31	Issue Type AEMO reported non-compliance Obligation 7.6.1C(a)	Risk Rating Low Compliance Rating 1	DI with incorrect quantity issued Clause 7.6.1C(a) requires System Management to issue Dispatch Instruction for the quantities that appear in the BMO (subject to the facility being able to meet that instruction). At 15:08 on 28/11/2019 TIWEST_COG1 was issued a Dispatch Instruction constraining the Facility to a Target MW of 24.1MW (Sent Out) due to it becoming islanded from the SWIS At 15:39, TIWEST updated their balancing submissions with an unavailability declaration so that only 23MW (Sent Out) was available. The Dispatch Instruction was not adjusted down to 23MW and remained until 21:50. This implies that System Management did not correctly dispatch as per the BMO and were in breach of 7.6.1C(a) from 15:39 to 21:50. The Controller on duty was advised of the issue and reminded to ensure that Constraints are removed following updates of Balancing Submissions.	No further action required
20WEM1.34	Issue Type AEMO reported non-compliance	Risk Rating Low Compliance	Failure to issue DA for out of merit dispatch Clause 7.11.5(g) requires System Management to issue a Dispatch Advisory in the event of, or in anticipation of situation where System Management	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
	Obligation 7.11.5(g)	Rating 1	expects to issue an Out of Merit Dispatch Instruction On 03/12/2019 on 18:30 AEMO failed to issue a Dispatch Advisory to inform Market Participants that a Facility was to be dispatched Out of Merit, so that AEMO could maintain fast start reserves. This was a result of confusing the Facility with another facility at the same geographic location, where a Dispatch Advisory was already present for the other Facility and the Facility was only referred to by its location rather than its full name in a phone call between the Control Room and System Management Operations discussing the fast start issue and whether a Dispatch Advisory was necessary. As a preventative action, System Management Operations emailed the Power System Controllers acknowledging fault and requesting facility market names to be explicitly stated for all incidents impacting a facility.	
20WEM1.36	Issue Type AEMO reported non-compliance Obligation 7.11.5(h)	Risk Rating Low Compliance Rating 1	Failure to issue DA for selection of LFAS facilities outside of LFAS Enablement Schedule Clause 7.11.5(g) of the WEM Rules requires System Management to issue a Dispatch Advisory in the event of, or in anticipation of situation where System Management expects use LFAS Facilities other than in accordance with the LFAS Enablement Schedules. At 11:53 on 07/02/2020, a registered Facility tripped resulting in a shortfall in LFAS. AEMO activated additional LFAS from 12:23 to 12:43. No Dispatch Advisory was issued as the operator was unaware that it was required. Preventive action was a discussion with the controller concerned.	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.39	**Issue Type** RBP reported non-compliance **Obligation** 7.11.5(i)	**Risk Rating** Low **Compliance Rating** 1	**Failure to issue Dispatch Advisory for Emergency Operating State** According to control room logs, the system was placed in Emergency Operating State (EOS) at 8:08PM on 10/01/2020, due to a trip of a Facility and resulting drop in system frequency. The state was subsequently downgraded to High Risk Operating State (HROS) once the frequency was restored to above 49.3 Hz. According to the list of issued Dispatch Advisories (DA) we received, a DA was issued at 8:48PM for the HROS, but no DA was issued for the EOS. According to WEM rule clause 7.11.5(i), System Management must release a DA in the event of being in an EOS. We expect that the reason that no DA was issued for the EOS was that by the time the DA was issued, some 40 minutes had passed and the system was no longer in EOS. Clause 7.11.3A allows System Management to issue a DA after the event has occurred, so given the delay, the correct action in this case would have been to issue the DA for the EOS followed by the DA for the HROS. This is important for market transparency so that all market participants are aware that the EOS occurred. Note that subsequent to us identifying this breach, AEMO have also reported it as self-reported breach 612.	Carry out training to ensure that DAs are issued for all instances of EOS
20WEM1.41	**Issue Type** RBP reported non-compliance	**Risk Rating** Low **Compliance Rating** 1	**Constraints due to network outages with no OI issued as per rule change RC_2018_07** According to the new rule clause 7.7.11, introduced under RC_2018_07, if a facility is constrained down due to a network outage, then a retrospective	• Investigate system changes and/or training to ensure OIs are sent in these situations.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
	Obligation 7.7.11		OI must be issued, which will prevent the facility from receiving a constrained off payment for the event. From reviewing a sample of control room logs, we have identified a number of constraints that have been applied due to network outages, that do not have a corresponding OI in the list of OIs that has been provided to us. These would be breaches of the new rules. Upon further investigation, it was found that the facility received no constrained off payment, but this was due to another error by the AEMO team, in that they erroneously considered the outage to be a Consequential outage.	• Update procedure documentation accordingly. • Investigate causes of subsequent error of misclassification as Consequential Outage and apply appropriate corrective actions.
20WEM1.42	**Issue Type** RBP reported non-compliance **Obligation** 7.7.11	**Risk Rating** Medium **Compliance Rating** 1	**Constraints due to network outages with OIs issued as per rule change RC_2018_07 with no audit trail in control room logs**. According to the new rule clause 7.7.11, introduced under RC_2018_07, if a facility is constrained down due to a network outage, then a retrospective OI must be issued, which will prevent the facility from receiving a constrained off payment for the event. From a review of OIs that have been issued, cross-referenced against control room logs, we have identified a number of instances in which OIs have been issued for events that do not have any mention in the control room logs. Because these OIs will have a financial impact via the participants' settlements, it is important that there is an audit trail that provides details of the circumstances behind the OIs. Examples of this issue include OIs issued on 21/11/2019 and 11/3/2020. AEMO have investigated these instances, and have found that in these cases, the OIs should not have been issued, as the circumstances did not	• Investigate impact on participant settlements and take appropriate corrective measures. • Staff training to ensure that all such instances are recorded in the control room logs so that the correct issuance of OIs can be reliably identified. • Proactively review control room logs to ensure that they

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			justify the issuing of OIs under WEM rule 7.7.11. This is therefore a breach, with an impact on the Participants' settlements.	contain all required events and information.

9 WEM Rules Chapter 7A – Balancing Market

Chapter 7A of the WEM Rules sets out obligations relating to the balancing market.

9.1 Rule amendments

Changes to Chapter 7A are summarised below.

Rule change	Nature of changes
RC_2014_06	Consequential changes arising as a result of the removal of Resource Plans and Dispatchable Loads including: • Allowing the update of forecast output quantities for Non-Scheduled Generators past Balancing Gate Closure • Clarification of the interaction between Forecast and Final BMOs and LFAS Merit Orders • Clarification on how plant availability must be reflected in Balancing Submissions
RC_2015_01	Amendment of head of power clauses for Market Procedures to allow AEMO to consolidate certain Market Procedures to streamline the documentation with respect to related processes
RC_2013_15	Outage process refinements. • Clarification of participant facility outage obligations. • Clarification of Equipment List content Clarifications and refinements to the outage planning process

9.2 AEMO PROCEDURES

AEMO's Internal Procedures are compliant with Chapter 7A of the WEM Rules in all material respects.

9.3 OPERATIONAL COMPLIANCE WITH CHAPTER 7A

9.3.1 Audit activities

We have:

- Reviewed instances of non-compliance with Chapter 7
- Conducted business process walkthroughs to:
  - Review Real-Time control room operations relating to Balancing Market Dispatch
- Conducted compliance testing on:
  - Dispatch of GIA-constrained facilities
  - Accuracy of demand forecasting and use of alternate forecasts

9.3.2 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 7A of the WEM Rules are summarised in the table below.

Table 14: Operational compliance findings associated with Chapter 7A of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.25	**Issue Type** RBP reported compliance risk **Obligation** 7A.3.15	**Risk Rating** High **Compliance Rating** 2	**Accuracy of Metrix and Similar Day forecasting methodologies deteriorating given increased PV** Clause 7A.3.15 requires System Management to prepare a forecast of the Relevant Dispatch Quantity (RDQ) for each future Trading Interval, which is then used in preparing the Forecast BMO. 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 published to the market every half hour. However, from time to time, 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). We in last year's audit, we found 8 instances of alternate forecasts being used for more than 2 hours, and no instances of more than 3 hours. In this audit year, there were 64 instances of alternate forecasts being used for more than 2 hours, and incidences occurring up to 6.3 hours. This is a substantial deterioration of the accuracy of the Metrix forecasting system within one year. The 'Similar Day' alternate forecasting methodology is not very satisfactory, as there is no guarantee that either of the 2 similar days will have a suitable value, and controllers frequently have to switch between multiple forecast types to find a suitable value.	• Implement forecasting improvement program - this will be an ongoing program of continuous improvement • Determine and implement methodology for assessing forecast accuracy

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			A project to improve the forecasting methodology is planned, but has not started (waiting for AR5 submission and completion of PSO project).	
19WEM1.36	Issue Type RBP reported non-compliance Obligation 7A.3.6	Risk Rating High Compliance Rating 1	Multiple instances of latest BMO not being used due to WEMS outages There are multiple instances during the audit year of not using an updated BMO for the trading period due to planned or unplanned WEMS outages. SM OGI have asserted these are not breaches as no BMO was created (due to the WEMS outages). However, not creating a BMO for a trading period using the latest balancing submissions is arguably a breach of 7A.3.6. 2019 Recommendations: 1) Ensure that all instances of not using the latest BMO are investigated and reported as self-reported breaches where appropriate, so that progress in resolving these issues can be monitored. 2) Review incident management process to ensure that all potential incidents are investigated, and refresh process to SM Market Operations team A procedure to address the above has been developed, documented in confluence and communicated to the appropriate staff.	No further action required.
20WEM1.04	Issue Type RBP reported non-compliance Obligation 7A.3.15, 7A.3.1(d)	Risk Rating Low Compliance Rating 1	RDQ forecasts published by AEMO do not always reflect best estimate of forecast load Clause 7A.3.15 requires System Management to prepare a forecast of the Relevant Dispatch Quantity (RDQ) for each future Trading Interval, which is then used in preparing the Balancing Forecast. Clause 7A.3.1(d) requires AEMO to publish the Balancing Forecast. 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).	Implement forecasting enhancement project, ensuring that this issue is addressed. This can issue can be considered to be addressed if forecasting is improved to the extent that multi-period overrides are rare or no longer required;

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			System Management uses the Metrix tool to determine the forecast RDQ, which is published to the market every half hour. However, from time to time, the control room operator will over-write the Metrix forecast in real time with an alternative forecast (if they deem the Metrix forecast to not be tracking well against the actual SCADA outputs). As the Metrix tool self-corrects within 15-20 minutes System Management considers that there is limited value in sending the alternative load forecast to the market (as an update under clause 7A.3.15), as the Metrix forecast is still their best forecast for the next trading interval. However, if an alternative forecast is used for a period greater than a dispatch interval, then the published forecast is no longer the best forecast for the next trading interval. In these situations, System Management do not publish the alternative forecast, as under its current systems, there is no mechanism to publish alternate forecasts. This issue was raised in a previous audit (as finding 17WEM2.15) but was closed in the 2019 audit as forecasting enhancements were due to be delivered during this audit year, and the outcomes of this enhancement was to be a focus area of this audit. However, this project has been delayed, and will not be delivered in time to assess its outcomes as part of this audit. In addition, analysis of the use of alternative forecasts shows a significant increase in the use of alternate forecasts during this audit year. Use of alternate forecasts increased from an average of 3.5% of the time during the 2018/19 audit year to 6.5% during the 2019/20 audit year, reaching a peak of 14.8% in March 2020. On one occasion, alternate forecasts were used constantly for more than 28 hours during March 2020. For the above reasons, we are reopening this issue, as it remains unaddressed this audit year, but not as an alleged breach.	Otherwise a mechanism to publish alternate forecasts will still be recommended.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.24	**Issue Type** AEMO reported non-compliance **Obligation** 7A.3.9A & 7A.3.10	**Risk Rating** Low **Compliance Rating** 1	**Five historic instances of AEMO using "non-updated" RDQs to calculate Balancing Price due to process error** Clauses 7A.3.9A and 7A.3.10 of the WEM Rules require AEMO to determine the Pricing BMO using updated estimates of SOI Quantity and EOI Quantity information, including Relevant Dispatch Quantity (RDQ) data. Following communication with the ERA on 8 July 2019, it was identified that there have been five instances since 2012 where WEMS utilised incorrect RDQ values when determining the Balancing Price. These instances appear to be a result of a process error, where the system does not cater for the regeneration of RDQ values during instances where SCADA data quality issues occur. In these instances, WEMS receives both updated and non-updated data and may erroneously choose the non-updated version to use. System Management has updated their process to only send the updated data to WEMS.	No further action required.
20WEM1.28	**Issue Type** AEMO reported non-compliance **Obligation** 7A.3.2 and Section 4 of Balancing Forecast Market Procedure	**Risk Rating** Low **Compliance Rating** 1	**Technically non-compliant tie breaking methodology practiced due to inadvertent removal of required tie breaking methodology from WEM Rules and Balancing Forecast Market Procedure** During an update to both the WEM Market Procedures and the Market rules on 1 July 2019, an update was made to move the tie-breaking methodology of the BMO at the Maximum and Minimum STEM Price from the WEM Rules (Clause 7A.3.3), to the Balancing Market Forecast Market Procedure.	No further action required.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			During the process, details of the tie-breaking methodology were removed from both documents[11]. As a result, the only process documented in both documents is random allocation. Since the WEM Rules and the Market Procedure were updated, AEMO has been conducting the tie-breaking process as was intended (by the predecessor documents). Hence, AEMO is in technical breach of the WEM Rules and the Balancing Market Forecast Market Procedure (but compliant with market objectives). A procedure change to the Balancing Market Forecast Market Procedure (APEC_2020_01) was commenced to resolve the issue and propose updates to the tie-breaker methodology. AEMO has since identified a manifest error with the implementation of the Forecast BMO (see 20WEM1.57) and accordingly APEC_2020_01 is on hold until that issue is resolved. This issue will be progressed to resolution once the issue with Forecast BMO is resolved. This finding will remain open until it is addressed via a Market Procedure change.	
20WEM1.57	Issue Type AEMO reported non-compliance Obligation 7A.3.2(a)	Risk Rating Low Compliance Rating 1	AEMO systems non-compliant with manifestly incorrect clause relating to loss-adjustment of offers submitted at price caps Clause 7A.3.2(a) requires AEMO to determine the BMO by loss adjusted prices in the Balancing Price PQ pairs into Loss-adjusted prices for all facilities other than the Balancing Portfolio. Clause 7A.2.4(c) requires a participant's Balancing Submissions to be within the relevant WEM Price caps.	No further action recommended. This finding will remain open until the manifest error rule change is implemented.

[11] In particular, a multi-step process where tie-breaking was undertaken with preference for clearing generation under certain conditions (e.g. cleared for Upwards LFAS) was inadvertently removed.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			During internal testing for new software deployment (to support the Reduction of Prudential Exposure (ROPE) project), AEMO discovered a defect in WEMS' implementation of clause 7A.3.2(a). Particularly: • Where a facility's offer price is at the floor and the loss factor is greater than 1, WEMS erroneously sets the loss adjusted price at the WEM price floor (instead of using the loss adjusted price which would be greater than the floor). Hence, during Trading Intervals with the incorrect loss factor adjustment at the minimum price, the Balancing Price is understated. Since 2012, AEMO estimates the annual impact of the breach on minimum price events as -$97,459 (occurring in 2019) • Where a facility's offer price is at the cap, and the loss factor is greater than 1, WEMS erroneously sets the loss adjusted price at the WEM price cap (instead of using the loss adjusted price which would be lower than the cap). Hence, during Trading Intervals with the incorrect loss factor adjustment at the maximum price, the defect results in the Balancing Price is overstated. Since 2012, AEMO estimates the annual impact of the breach on maximum price events to have ranged from $31,398 (2019) to $457,906 (2015)[12]. the above issue only manifests for IPPs with loss factors greater than one. While WEMS' behaviour is inconsistent with the current rules, we note that the behaviour of the system is preferable in that any application of price caps should be done after loss adjustment and not at the time of submission (as this can	

[12] AEMO has estimated the impact of the breach on the Balancing Price. The actual impact for each Market Participant will be different due to energy traded through the STEM and bilaterally – only Market Participants exposed to the Balancing Price would be impacted. This analysis assumes the worst case where all energy is traded at the Balancing Price

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			create unintended consequences for facilities providing Ancillary Services who offer at the price floor, and may end up being curtailed/decommitted as a result of their loss factor). As such AEMO has identified a manifest error in the rules, whereby the application of the price limit in the Balancing Market Submission in clause 7A.2.4(c) is erroneous, and that the application of price caps should occur after the prices in the PQ pairs have been adjusted under clause 7A.3.2(a). The proposed change has been presented to the Market Advisory Committee, who have agreed to proceed with a rule change to align the rules with current practice.	

10 WEM Rules Chapter 7B – Load Following Service Market

Chapter 7B of the WEM Rules sets out obligations relating to the load following service market.

10.1 Rule amendments

Changes to Chapter 7B are summarised below.

Rule change	Nature of changes
RC_2014_06	Consequential changes arising as a result of the removal of Resource Plans and Dispatchable Loads including clarification of the interaction between Forecast and Final BMOs and LFAS Merit Orders.
RC_2015_01	Amendment of head of power clauses for Market Procedures to allow AEMO to consolidate certain Market Procedures to streamline the documentation with respect to related processes

10.2 AEMO procedures

AEMO's Internal Procedures are compliant with Chapter 7B of the WEM Rules in all material respects.

10.3 Operational compliance with Chapter 7B

10.3.1 Audit activities

We have:

- Reviewed instances of non-compliance with Chapter 7B.
- Compliance tested whether AEMO has provisioned LFAS in accordance with the requirements set out in Chapter 7B of the WEM Rules.

10.3.2 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 7B of the WEM Rules are summarised in the table below.

Table 15: Operational compliance findings associated with Chapter 7B of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.12	Issue Type AEMO reported non-compliance Obligation 7B.3.6	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS Clause 7B.3.6 of the WEM Rules requires System Management to activate each LFAS Facility in each LFAS Enablement Schedule for its full LFAS enablement. On 09/02/2019 at 19:14 one unit was dropped out of LFAS Base-Full mode when required to meet the LFAS requirement. This led to a shortfall in LFAS Up and Down of 3MW. AEMO took corrective action at 20:04 when this shortfall was recognized and immediately switched the unit back into Base-Full mode. Preventative action includes further training for System Controllers. In addition, SOCCUI version 5.0 will show required LFAS quantities and their sources in order to prevent reoccurrences. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.13	Issue Type AEMO reported non-compliance Obligation 7B.3.6	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS AEMO failed to activate LFAS Facilities for its full LFAS Enablement resulting in various levels of LFAS Up and Down shortfalls over approximately 11 Trading Intervals. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	No further action required
20WEM1.14	Issue Type AEMO reported non-compliance Obligation 7B.3.6	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS AEMO failed to activate LFAS Facilities for its full LFAS Enablement resulting in a shortfall in LFAS Up of 13MW and LFAS Down of 8MW. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	No further action required
20WEM1.16	Issue Type AEMO reported non-compliance Obligation 7B.3.6	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS AEMO failed to activate LFAS Facilities for its full LFAS Enablement resulting in a shortfall in LFAS Up of 3MW and LFAS Down of 3MW. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	
20WEM1.18	Issue Type AEMO reported non-compliance Obligation 7B.3.6	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS AEMO failed to activate LFAS Facilities for its full LFAS Enablement resulting in a shortfall in LFAS Up of 28MW for two Trading Intervals and a shortfall in LFAS Up of 29MW for one Trading Interval. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	No further action required
20WEM1.19	Issue Type AEMO reported non-compliance Obligation 7B.3.6	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS AEMO failed to activate LFAS Facilities for its full LFAS Enablement resulting in a shortfall in LFAS Up and Down between 2-3MW for 16 Trading Intervals, a shortfall in LFAS Up and Down of 5MW for 1 Trading Interval and a shortfall in LFAS Up and Down between 2-4MW for 58 Trading Intervals. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	No further action required
20WEM1.25	Issue Type AEMO reported non-compliance	Risk Rating Low Compliance	Failure to activate sufficient LFAS AEMO failed to activate LFAS Facilities for the full LFAS Enablement resulting in a	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
	Obligation 7B.3.6	Rating 1	shortfall in LFAS Up and LFAS Down of 3MW over two intervals. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	
20WEM1.35	Issue Type AEMO reported non-compliance Obligation 7B.3.6	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS AEMO failed to activate LFAS Facilities for its full LFAS Enablement resulting in a shortfall in LFAS Up for 2 Trading Intervals. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	No further action required
20WEM1.38	Issue Type AEMO reported non-compliance Obligation 7B.3.6	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS AEMO failed to activate LFAS Facilities for the full LFAS Enablement resulting in a shortfall in LFAS Up between 6MW and 11MW for three Trading Intervals and a shortfall in LFAS down of between 1MW and 6MW for two Trading Intervals. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.50	**Issue Type** RBP reported compliance risk **Obligation** 7B.3.6	**Risk Rating** Low **Compliance Rating** 2	**Implemented controls have not sufficiently addressed problem of under-activation of LFAS.** In a number of self-reported breaches, System Management has reported on 10 instances of under-activation of LFAS covering 61 periods (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. Human error following the change from a fixed LFAS requirement to a two-level time-based requirement has also been cited as a contributing factor, however instances of under-activation are still occurring many months after the change. For example, there were 16 periods of under-activation in February 2020.	Investigate causes of LFAS under-activation and develop solutions (systems or processes) to prevent this issue.
20WEM1.53	**Issue Type** AEMO reported non-compliance **Obligation** 7B.3.6	**Risk Rating** Low **Compliance Rating** 1	**Failure to activate sufficient LFAS** AEMO failed to activate LFAS Facilities for its full LFAS Enablement resulting in a shortfall in LFAS Up of 3MW for 1Trading Interval and a shortfall in LFAS Down between 1/3MW for 2 Trading Intervals. It appears the Synergy Facilities were not activated for their full LFAS Enablement as per the enablement schedule. There are 10 similar self-reported breaches (555,556,557,562,564,565,576,595,601,613). Various preventative controls have been cited (training, XA21 alerts, SOCCUI modifications) however these controls do not appear to be effective, as the issue is recurring after the implementation of these controls. This has been addressed under a new audit finding: 20WEM1.50	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.56	Issue Type RBP reported non-compliance Obligation 7B.3, 7B.4, 7.11.5(c)	Risk Rating Low Compliance Rating 1	Failure to issue DAs for insufficient LFAS activation We have found 63 trading periods with greater than 1 MW shortfall in LFAS Up, and 51 trading periods with greater than 1 MW shortfall in LFAS Down in audit year to date. Some of these cases have been reported as self-reported breaches, but there are more cases than have been reported. Nothing is being logged in the control room log sheets regarding these shortfalls. Examples: 24 Feb 2020 07:00 - 08:30 Activated LFAS up = 67 MW Requirement = 85 MW 20 Feb 2020 14:00 - 15:00 Activated LFAS Up = 74 MW Requirement = 85 MW 07 Feb 2020 14:30 - 15:30 Activated LFAS Up = 79 MW Requirement = 85 MW 7.11.5(c) requires that Dispatch Advisories are sent when Ancillary Service requirements will not be fully met, but no DAs have been issued for these events.	Investigate system changes and/or training to mitigate LFAS shortfall occurrences, to prevent the need to issue DAs for insufficient ancillary services.

11 WEM Rules Chapter 8 – Wholesale Market Metering

Chapter 8 of the WEM 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 Rule amendments

Changes to Chapter 8 are summarised below.

Rule change	Nature of changes
RC_2015_01	Minor amendment to clause 8.6.2 to make head of power generic.

11.2 AEMO procedures

AEMO's Internal Procedures are compliant with Chapter 8 of the WEM Rules in all material respects.

11.3 Operational compliance with Chapter 8

AEMO has limited obligations under Chapter 8 of the WEM Rules.

We have conducted no audit activities pertaining to Chapter 8 of the WEM Rules.

We have noted no instances of non-compliance or compliance risk associated with AEMO's obligations under Chapter 8 of the WEM Rules.

11.3.1 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 8 of the WEM Rules are summarised in the table below.

Table 16: Operational compliance findings associated with Chapter 8 of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.29	**Issue Type** AEMO reported non-compliance **Obligation** 8.4.4	**Risk Rating** Low **Compliance Rating** 1	**Technical non-compliance with meter data submission confirmation of receipt requirements** Clause 8.4.4 of the WEM Rules requires AEMO to provide confirmation of receipt of a Meter Data Submission within one hour of receipt. Since market start, AEMO has not confirmed receipt of Meter Data Submissions made by the Meter Data Agent as its metering system does not have this capability. However, AEMO does perform a number of validation activities on meter data prior to settlement to ensure its meter data is consistent with the Meter Data Agent's database and to detect missing or manifestly incorrect meter data. Hence, while AEMO is in technical breach of the WEM Rules, AEMO is complying with the intent of the rules by ensuring it has processes to detect and rectify material meter data errors prior to settlement. AEMO had proposed a rule change (RC_2019_04 - Administrative Improvements to Settlement) which proposed clauses 8.4.4 and 8.4.5 be removed from the WEM Rules and the relevant details of the current validation processes captured in a Market Procedure. The rule proposal was rejected, and the above changes will now be progressed as part of WEM reform activities. Based on the immaterial and technical nature of the breach, AEMO has risk-accepted this finding. We deem this finding to be closed.	No further action required.

12 WEM Rules Chapter 9 - Settlement

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

12.1 Rule amendments

Changes to Chapter 9 are summarised below.

Rule change	Nature of changes
RC_2014_06	Consequential changes arising as a result of the removal of Resource Plans and Dispatchable Loads
RC_2015_01	Amendment of head of power clauses for Market Procedures to allow AEMO to consolidate certain Market Procedures to streamline the documentation with respect to related processes
RC_2018_06	Implementation of full runway allocation of spinning reserve costs
RCM Pricing changes	Minor cosmetic changes

12.2 AEMO procedures

AEMO's Internal Procedures are compliant with Chapter 9 of the WEM Rules in all material respects.

12.3 Operational compliance with Chapter 9

12.3.1 Audit activities

We have:

- Reviewed instances of self-reported non-compliance incidents with AEMO staff.

- Undertaken (real-time) business process walkthroughs of STEM and NSTEM settlement validation activities.
- Undertaken control testing of sample NSTEM Trading Months and STEM Trading Weeks to assess whether controls have been applied. Our sample included billing periods pre- and post-COVID19 working arrangements.
- Undertaken (retrospective) business process walkthroughs of the preparation of spinning reserve and system restart cost inputs into settlement
- Performed compliance and controls testing to audit:
  - Spinning reserve (SR) inputs to settlement were correct and compliant with the WEM Rules and the relevant contracts for provision of that service.
  - System Restart Services (SRS) inputs to settlement were correct and compliant with the WEM Rules and the relevant contracts for provision of that service.

12.3.2 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 9 of the WEM Rules are summarised in the table below.

Table 17: Operational compliance findings associated with Chapter 9 of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.43	Issue Type RBP reported compliance risk Obligation 9.9.2, 9.9.3, 9.9.4	Risk Rating Medium Compliance Rating 2	Potential risk areas still exist in AS monthly data preparation The process for preparing monthly AS inputs has some risk areas that could be improved: a) SM Ops' weekly ad-hoc procedure indicates that the PE must review monthly AS cost calculations performed by the SM Ops team. However, it is unclear what checks the PE performs and AEMO has been unable to provide us any evidence that these checks occurred for the April 2019 calculations. b) There is no formal mechanism for ensuring contractual updates are reflected in any of the tools. For example, some contracts need to be renegotiated while others are updated annually (either based on CPI or a static value) in accordance with the contract. The System Restart payment for the Pinjar facilities are linked to both CPI changes and the payment in the previous 12-month period. Changes typically occur at the start of the financial year; however, there is no control in place to ensure this update occurs in a timely and accurate manner.	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			c) The process for adjusting SRS payments for availability is currently manual (but will be automated in Q3/Q4. At the moment, however, this is prone to error as it is manual and undocumented. We also note that the process for adjusting for outages is not transparent; for example it is unclear as to whether a facility is considered to be completely out if there is a partial forced outage and how ex-post outages which are not available at the time the SRS payments are calculated are dealt with - see finding 19WEM1.44. 2019 recommendations: 1. SM formally document the checks that are to be performed when reviewing monthly AS cost calculations. We also recommend SM institute a more robust audit trail with respect to these checks (e.g. email containing detail of what checks were performed and the results). 2. SM institute formal controls to ensure annual or other contractual changes are reflected in the AS tools (e.g. procedure sets out process to be followed when updating different contracts; calendar alerts based on contract milestones; JIRA entries (similar to what is used by the settlements team to track key events during a cycle)). 3. As per our recommendations in 19WEM1.44, SM should ensure a legal review of contracts is performed to ensure any conditions relating annual fee indexation or clawbacks (due to non-performance) are reflected correctly in the monthly cost calculation process.	

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			The spreadsheets all seem correct and the validations seem good and have been applied.	
19WEM1.44	Issue Type RBP reported non-compliance Obligation Appendix 2, Step 1	Risk Rating High Compliance Rating 1	Systemic and historic errors in SRS payments Clause 9.9.4(a) of the WEM Rules requires AEMO to calculate the monthly payment for each contracted Ancillary Service, which includes System Restart Services (SRS). Due to gaps in the process for calculating SRS monthly costs (see also 19WEM1.43), AEMO has been calculating the total SRS cost payable incorrectly since market start. During the audit we have noted that all facilities currently providing SRS have been paid incorrect amounts as follows: • The first issue has existed at least since July 2016 and resulted in SM omitting clawback payments when contracted facilities failed to meet the performance and technical requirements as specified in their respective contracts. As a result, the relevant participants have been overpaid for providing SRS services since market start. The impact of these overpayments is summarised below for the audit year and for the period 1 July 2016 to 30 June 2018: ◆ The total amount of overpayment in respect of existing contracts during the audit year has been $92,232. ◆ AEMO estimates that the historic level of overpayment since July 2016 (for existing and historic contracts) has been $204,539. AEMO is currently reviewing current and historic contracts to assess the practicality of clawing back overpayments; noting that	No further action required - we have audited AEMO's improved SRS calculated processes and deem this finding to be closed.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			only errors in the past 12 months can be washed up via the adjustments process. • The second issue relates to this audit year only. AEMO underpaid one of the SRS providers by $141K per month from November 2018 to May 2019. The relevant contract has an annual indexation that occurs part way through a month. To reflect this indexation, SM updated their SRS tool with a temporary (lower) pro-rated monthly payment for the last week of October 2018. From November 2018, the full monthly payment should have applied; however, SM failed to update their tool to reflect the full monthly payment. The underpayment of $990K to the participant will be washed up via the adjustment process (to be triggered by the participant lodging a dispute). To prevent recurrence, SM has developed automated tools for each SRS facility that will calculate the payments including clawbacks based on outage data. SM has also improved validation processes to include legal review of contractual requirements.	
20WEM1.06	**Issue Type** RBP reported non-compliance **Obligation** Appendix 2, Step 1	**Risk Rating** Low **Compliance Rating** 1	**Intermittent loads without registered facilities not allocated SR share due to system defect** As per RBP software certificate dated 8 Jan 2020: "*No Spinning Reserve Cost Share is calculated for intermittent loads without a registered generator, regardless of facility import or export levels. This is not compliant with step 1 of Appendix 2. There are two facilities in this category, and as a result, other participants will have slightly higher SR Cost Shares*".	No further actions; this finding will remain open until the fix is deployed.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			AEMO will implement a fix to this defect in upcoming releases of the software. These fixes include: • WEMS-7129 which is targeted for WEMS 3.36 (scheduled 2 September 2020) • STL-3.4.37 which has been developed by Brady to implement the fix from a Pomax side (certification in progress). Only two facilities with intermittent loads fall into the category above: • The first does not generate over 10MW and is not expected to have any funding obligations. • The second generated above 5MWh for 21% of intervals at a range of 10MW to 35MW in the 2018-19 FY, and AEMO has estimated it to fund 0.3% of spinning reserve cost share in the generating intervals, resulting in charges of $3-4 per interval and an annual estimate of ~$13,000 funding obligations. As such we deem this finding to be low risk.	
20WEM1.07	Issue Type AEMO reported non-compliance Obligation 9.9.2(n)	Risk Rating Low Compliance Rating 1	Incorrect LFAS Market Cost Share calculation due to system defect Clause 9.9.2(n) of the WEM Rules calculates the monthly LFAS market cost to be allocated to a Market Participant. This quantity (LF_Market_Cost_Share) is denoted by the sum over all Trading Intervals in a Trading Month of the product of:	No further action required.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			• The monthly LFAS cost share quantity calculated under Clause 3.14.1 (LF_Share which denotes a Market Participant's % share of LFAS cost in a Trading Month); and • The cost of procuring LFAS in a given Trading Interval. The latter quantity is a quantity calculated at Trading Interval granularity, whereas the former is a monthly value (i.e. static for all Trading Intervals in a given month). Due to a defect in AEMO's market systems, the above calculation under-estimated a Market Participant's LFAS cost share if a new participant registered part way through a month. This is because, AEMO's systems, while correctly calculating the monthly LF_Share value under clause 3.14.1, incorrectly applied this value as a Trading Interval value in the calculation under clause 9.9.2(n) (i.e. LF_Market_Cost_Share). Particularly, for all Trading Intervals in which a new Market Participant was as yet unregistered, the LF_Share(p,m) value would be incorrectly applied as zero. Hence, the Market Participant's monthly LFAS cost share would be zero for all Trading Intervals in which they were unregistered, but for which their associated NMIs would have had non-zero Metered Schedules. This defect was identified as part of AEMO's NSTEM settlement validation activities in the April 2019 Trading Month, when a new Market Participant registered part way through a month. AEMO's settlement validation processes uncovered a short-fall, whereby the total LFAS Market Cost calculated under clause 9.9.2(o) (LF_Market_Cost) was greater than the sum of the constituent components of clause 9.9.2(n) summed over all Market Participants	

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			(LF_Market_Cost_Share); that is, AEMO had collected less than it had to pay out to LFAS providers. This issue has since been rectified through a fix to the settlement system, and the error above has been addressed through adjustments. AEMO has advised that the April 2019 error led to a $130 shortfall, which has been recovered via adjustments. AEMO has advised of a further $9 shortfall in August 2018 which is outside the adjustment period. We note that this error was historical, but not previously detected as it would have manifested as an immaterial shortfall during validation which would not have been prioritised for investigation. We further note that the historical impact of this error would have been negligible as it would only manifest when a participant registered as a Market Customer part way through a month and acquired NMIs. We have verified this by requesting information in respect of a sample of such Market Participants who registered part way through a month. AEMO has advised that none of the Market Participants in our sample acquired NMIs in the first month of registration: as such this error would not have impacted on market outcomes.	
20WEM1.09	Issue Type AEMO reported non-compliance Obligation 9.7.1A and 4.26.1A	Risk Rating Low Compliance Rating 1	Incorrect Capacity Provider Payment and Capacity Credit Refund calculations due to system defect Clauses 9.7.1A and 4.26.1A of the WEM Rules require AEMO to calculate the Capacity Provider Payment and Facility Reserve Capacity Deficit Refund from the facility's Capacity Credit obligation date.	No further action required.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			Due to a system defect, between October 2018 and November 2018, AEMO incorrectly calculated Reserve Capacity settlement values for a generator using the facility's registration date instead of its Capacity Credit obligation date. This meant that AEMO did not calculate the correct values for the Capacity Provider Payment and the Capacity Credit refunds for the affected period resulting in an underpayment to the affected generator of approximately $49.26 (plus negligible interest). This issue was fixed in RCM Settlements in the third adjustment for October 2018 in October 2019.	
20WEM1.17	**Issue Type** AEMO reported non-compliance **Obligation** 9.9.2(l), 3.14.2, Appendix 2	**Risk Rating** Low **Compliance Rating** 1	**Incorrect Spinning Reserve share calculation for Intermittent Generators due to system defect** Clause 9.9.2(l) of the WEM Rules specifies the calculation of Spinning Reserve Availability Cost Share by Participant by Month. An input into the calculation is Spinning Reserve Share by interval (SR_Share (p,t)). Spinning Reserve Share is calculated as per 'Appendix 2 Spinning Reserve Cost Allocation' of the WEM Rules. Step 1 of Appendix 2 requires AEMO to calculate the "applicable capacity" of Intermittent Generators for a given Trading Interval as the monthly average Trading Interval value in MW (i.e. an Intermittent Generator has the same applicable capacity for every Trading Interval in a Trading Month; this is the value which is used to rank the generator in the runway in Step 2 of Appendix 2, and subsequently used to calculate the SR_Share(p,t) input in Steps 3 and 4). Step 1, Appendix 2 also requires AEMO to set the applicable	No further action required.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			capacity of a facility to zero in any Trading Interval where the calculated applicable capacity in Step 1 is under 10MW. Hence, the applicable capacity of an Intermittent Generator would only be set to zero if its monthly average Trading Interval Metered Schedule was also below 10MW. Due to a defect, AEMO's settlement software instead set the applicable capacity of Intermittent Generator's to zero when the Metered Schedule in a given Trading Interval was under 10MW. As a result, the Spinning Reserve cost share for Intermittent Generators would be under-estimated in any Trading Interval in which its Metered Schedule indicated an output of under 10MW. This behaviour has been in place since late 2006 and was discovered during system testing to support the RC_2018_06 implementation project and reported in September 2019. AEMO analysis indicates that the error would have led to an approximate under-recovery of $2,950-5,750 from Intermittent Generators (and subsequent over-recovery from other facilities). AEMO has deployed system fixes to rectify this defect in the current system, and to rectify the issue in the previous version of the settlement system (so that historical errors within the adjustment period can be addressed).	
20WEM1.37	Issue Type AEMO reported non-compliance Obligation	Risk Rating Low Compliance Rating 1	Incorrect Spinning Reserve share calculation for Intermittent Generators registering part way through a month due to system defect Clause 9.9.2(l) of the WEM Rules specifies the calculation of Spinning Reserve Availability Cost Share by Participant by Month. An input	No further action required

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
	9.9.2(l), 3.14.2, Appendix 2		into the calculation is Spinning Reserve Share by interval (SR_Share (p,t)). Spinning Reserve Share is calculated as per 'Appendix 2 Spinning Reserve Cost Allocation' of the WEM Rules. Step 1 of Appendix 2 requires AEMO to calculate the "applicable capacity" of Intermittent Generators for a given Trading Interval as the monthly average Trading Interval value in MW (i.e. an Intermittent Generator has the same applicable capacity for every Trading Interval in a Trading Month; this is the value which is used to rank the generator in the runway in Step 2 of Appendix 2, and subsequently used to calculate the SR_Share(p,t) input in Steps 3 and 4). Where an Intermittent Generator registers part way through a month, the calculation of the relevant Spinning Reserve value in AEMO's settlement software uses all Trading Intervals in a month to calculate their monthly average value (to derive applicable capacity). This approach does not take into account the registration date of each facility and incorrectly includes zero values for intervals with no interval meter reading/SCADA data in the denominator for the average, resulting in a lower average value and reduced cost allocation than specified in the rule. This behaviour has been in place since late 2006. This particular self-reported non-compliance pertains to a specific intermittent generator, who were undercharged $4,736.13 for the Trading Month of January 2019 as a result of the defect. We note that this error would only manifest when a large intermittent generator (with a nameplate capacity of at least 10MW) registers part way through a	

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			month. There has only been two such intermittent generators which have registered part way through a month since market start in 2006. As such, the historic impact of this breach is negligible. The defect was discovered as part of systems testing for the RC_2018_06 Implementation Project and reported in February 2020. AEMO deployed a system fix to correct this error in January 2020.	
20WEM1.44	**Issue Type** RBP reported non-compliance **Obligation** 9.9.2(p)	**Risk Rating** Low **Compliance Rating** 1	**Erroneous LF_Capacity_Cost_Share calculation for participants registering part way through a month due to system defect** While certifying the defect fix for Breach 20WEM1.07 above, RBP noted a similar software defect affected AEMO's compliance with clause 9.9.2(p) which calculates the LF_Capacity_Cost_Share of a Market Participant in a given Trading Month. As with the LF_Market_Cost_Share calculation, this quantity is the sum over Trading Intervals of the product of a monthly value (LF_Share calculated under clause 3.14.1) and a Trading Interval value. A similar defect in AEMO's settlement system means that when a Market Participant registers part way through a month, their capacity related LFAS cost share will be zero for all Trading Intervals in which they were unregistered, but for which their associated NMIs would have had non-zero Metered Schedules. As with Breach 20WEM1.07, this would manifest as a shortfall, as the total Load Following Capacity cost calculated under clause 9.9.2(q) would be higher than what was collected from Market Participants under clause 9.9.2(p). As with Breach 20WEM1.07, this error would only manifest when a Market Customer registers part way through a month and acquires	No further action required; finding will remain open till fix is deployed.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			NMIs in that month. Hence, the historical impact of this defect is likely to be negligible. AEMO has commenced the fix required to address this defect, and the vendor has prioritised this for delivery in Q4 2020. AEMO will assess and deploy to production as soon as possible (and no later than 30 June 2021).	

13 WEM Rules Chapter 10 – Market Information

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

13.1 Rule amendments

Changes to Chapter 10 are summarised below.

Rule change	Nature of changes
RC_2014_06	Consequential changes arising as a result of the removal of Resource Plans and Dispatchable Loads
RC_2015_01	Amendment of head of power clauses for Market Procedures to allow AEMO to consolidate certain Market Procedures to streamline the documentation with respect to related processes
RCM Pricing changes	Minor consequential changes pertaining to publication of reserve capacity pricing information Minor cosmetic changes

13.2 AEMO procedures

AEMO's Internal Procedures are compliant with Chapter 10 of the WEM Rules in all material respects.

13.3 Operational compliance with Chapter 10

We have conducted no audit activities pertaining to Chapter 10 of the WEM Rules.

We have noted no instances of non-compliance or compliance risk associated with AEMO's obligations under Chapter 10 of the WEM Rules.

13.3.1 Audit findings

Instances of non-compliance and areas of compliance risk associated with Chapter 10 of the WEM Rules are summarised in the table below.

Table 18: Operational compliance findings associated with Chapter 10 of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.32	**Issue Type** AEMO reported non-compliance **Obligation** 10.2.3(a)	**Risk Rating** Medium **Compliance Rating** 1	**Incorrect dispatch plan sent to Synergy** Clause 10.2.3(a) of the WEM Rules sets out the confidentiality requirements for commercially sensitive information. In particular any commercially sensitive information must not be disclosed to other Rule Participants. At 18:50 on 27 December 2019, AEMO sent Synergy the daily Dispatch Plan. On 02 January 2020, AEMO discovered the Dispatch Plan contained information pertaining Market Participants Balancing Submissions (IPP bid quantities) for Trade Day 28 December 2019. AEMO contacted Synergy and requested deletion of the dispatch plan for all recipients, this was confirmed by Synergy on 13 January at 1:29 PM. AEMO have implemented a preventative measure in creating two separate files, preventing the possibility of the confidential participant's data being attached.	No further action required
20WEM1.33	**Issue Type** AEMO reported non-compliance **Obligation** 10.2.4, 10.2.2(d)	**Risk Rating** Medium **Compliance Rating** 1	**Disclosure of Rule Participant Restricted information to unauthorized person** Clauses 10.2.2(d) and 10.2.4 of the WEM Rules set out the confidentiality requirements for Rule Participant Dispatch Restricted information. This information may not be shared with members of the public.	Complete the specified corrective actions.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			On 02 November 2019, AEMO noticed a Registered Facility was experiencing issues and was not meeting their most recently issued Dispatch Instruction. AEMO attempted to call the Facility three times, using a contact's details in XA/21 and separate contact's details in the BT Phones, however, the contact did not pick up. Approximately 33 minutes later, the contact whose details were in the BT Phone directory returned AEMO's call. The call began with the AEMO employee discussing details surrounding the issues the Facility may be experiencing, what the Facility current output was and what their Dispatch Instruction target had the Facility Dispatched to. The contact then advised they did not work for the Market Participant and had not done so for the last 4 months. The AEMO employee then continued to discuss the Facilities dispatch position and advised they would constrain the Facility. This information is considered Rule Participant Dispatch Restricted information and cannot be shared with the public. The call was discovered by compliance when conducting routine phone call checks prior to issuance to the ERA as part of alleged breach information requests. As a result of this breach, AEMO is planning on taking the following actions: • Conduct a reconciliation of contact records within XA/21, BT phones and WEMS to ensure they are up to dateMove to a single contact repository, whether it be XA/21, BT or WEMS to reduce likelihood of using outdated information • Implement a script, whereby the controller will identify themselves and request the caller identify who they are and what Facility/Market Participant they are from. • Increase the controllers knowledge surrounding confidentiality risks and the requirements under the WEM rules These corrective actions are currently outstanding.	

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
20WEM1.51	**Issue Type** AEMO reported non-compliance **Obligation** **10.7.1(e)**	**Risk Rating** Medium **Compliance Rating** 1	**Confidentiality breach from sending Credit Limit letter to wrong participant** As part of mitigating actions to manage the impacts of Covid19 on participant default, AEMO has increased the frequency of its Credit Limit Reviews to monthly as opposed to six monthly. During the April 2020 Credit Limit Review, AEMO determined new Credit Limits for two participants. AEMO's processes involve sending out a letter to the Market Participants via email detailing the outcome of the review. This email also contains the relevant participant's NSTEM and STEM settlement statements from the previous 12 months. On 28 April 2020, at 15:49, AEMO sent one of the participant's Credit Limit letters to the wrong participant, thereby breaching clause 10.7.1.(e) of the WEM Rules. AEMO took the following immediate corrective steps (which we have verified, with the exception of the attempt to recall the email: we accept AEMO's verbal assertion in this respect): • AEMO realised its mistake two hours after the error (18:09) and attempted to recall the message. • On 29 April 2020 at 11:25, AEMO contacted the participant to whom the letter had been sent in error and requested that they immediately delete it. The participant responded at 12:11 confirming they had done so. • On 11 June 2020, AEMO informed the affected participant of the confidentiality breach. AEMO WA have identified the cause as human error. We have sighted the email that was sent in error and confirm that the nature of information disclosed was aggregate in nature and the disclosure would have negligible commercial impact on the affected participant.	No further actions recommended. This finding will remain open until we have verified the deployment of the Credit Support and Credit Limit Module as part of the ROPE project.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			In addition to the immediate corrective actions AEMO has: • Discussed the confidentiality breach with the individual involved to provide a reminder on required processes and importance of data confidentiality. • Provided a reminder to the WA Market Operations team on importance of processes and data confidentiality. • Included a Credit Support and Credit Limit module in the Reduction of Prudential Exposure (RoPE) project (for deployment in August 2020) that will remove the need to send prudential details by email. We have sighted the release notes for this change. More broadly AEMO has established an Executive Leadership Team led workgroup to further enhance the management of confidential information followed by delivery of updated continuing privacy and confidentiality training We deem this to be a medium risk finding based on a likelihood rating of unlikely (as AEMO has adequate controls in place, and we are satisfied with AEMO's remediating actions) and an impact rating of moderate (based on moderate reputational impacts and minor market impacts). In respect of this particular breach, we note that the responsible staff member realised their error soon after the incident and self-reported, indicating awareness of AEMO's confidentiality obligations and of the strong compliance culture in the team which encourages self-reporting. We have also sighted evidence that AEMO followed its organisation wide Data Breach Response Plan procedures to review and identify the severity of the breach in order to identify next steps.	

14 Market systems and Software management processes

This chapter covers the compliance of AEMO's market software and software management processes with the WEM Rules, in accordance with clause 2.14.3(c) of the WEM Rules.

- Section 14.1 sets out our review of AEMO's market software systems
- Section 14.2 sets out our review of AEMO's general IT controls, including processes for software management.

14.1 Compliance of AEMO software

The software testing and certification process assesses whether the mathematical formulations specified in the WEM Rules and Market Procedures have been correctly implemented by the software.

The software systems covered by this section of the review are:

- WEMS
- POMAX Settlements
- POMAX Metering
- RCM
- RTDE

14.1.1 Approach

Software testing and certification under clause 2.36.1(d) of the WEM Rules is carried out on a release by release basis throughout the year. Hence, at the time of the annual market audit, we rely upon the testing conducted throughout the year and our review of AEMO's software release change log (and other documentation) to determine:

- Whether all changes to market software contemplated by clause 2.36.1(d) have been independently certified, and therefore
- Whether all market software contemplated by clause 2.36.1(d) is still compliant with the WEM Rules and Market Procedures.

14.1.2 Market software certification

Certification of core market systems

The initial versions of AEMO's WA market systems were certified at market start in 2006/7. Since that time, various system changes have been made and certified, as set out in Section 15.3.

For this audit, we reviewed the release notes for all changes made to AEMO's market systems during the Audit Period. Many changes maintained certification without additional testing, as they did not involve changes that would be expected to have material impact on prices or quantities. All releases having material impact on market prices or quantities were independently certified prior to release. The changes are set out in Table 19, along with the certification status of the software version. The list only includes releases implemented in the production environment and does not include versions which were only implemented in a development or test environment.

Table 19: Changes to AEMO market systems in the Audit Period[13]

System	Version number	Release date	Material effect on prices / quantities?	Certification status	Comment
WEMS	3.29-1457-2	01 Apr 2019	No	Maintained	
GBB	1.12 (Build 351)	17 Apr 2019	No	Maintained	
RCM	1.11-2970-14	24 Apr 2019	Yes	Certified	Certified 26 Apr 2019
WEMS	3.30-1459-26	09 May 2019	No	Maintained	
RCM Settlements	1.3-142-3 (1.2.218)	09 May 2019	Yes	Certified	Certified 26 Apr 2019
WEMS	3.31-1478-2	25 Jun 2019	No	Maintained	
POMAX Settlements	STL-3.4.28	05 Jul 2019	Yes	Certified	Certified 22 Jul 2019
WEMS	3.32-1480-1	10 Jul 2019	No	Maintained	
RCM	1.12-2974-1	10 Jul 2019	No	Maintained	

[13] Including releases late in the previous audit period that were not included in the previous audit report

System	Version number	Release date	Material effect on prices / quantities?	Certification status	Comment
RCM Settlements	1.4-149-1 (1.2.220)	10 Jul 2019	Yes	Certified	Certified 24 Jul 2019
GBB	1.13 (Build 352)	28 Aug 2019	No	Maintained	
RCM Settlements	1.5-151-1 (1.2.220)	12 Sep 2019	No	Maintained	
POMAX Settlements	STL-3.4.29	09 Oct 2019	No	Maintained	
WEMS	3.33-1497-3	23 Oct 2019	Yes	Certified	Certified 18 Oct 2019
RCM	1.13-2976-2	23 Oct 2019	Yes	Certified	Certified 17 Oct 2019
POMAX Settlements	STL-3.4.30	29 Oct 2019	Yes	Certified	Certified 30 Oct 2019
POMAX Settlements	STL-3.4.31	29 Oct 2019	Yes	Certified	Certified 30 Oct 2019
POMAX Settlements	STL-3.4.32	30 Oct 2019	Yes	Certified	Certified 30 Oct 2019
POMAX Settlements	STL-3.4.33	22 Nov 2019	Yes	Certified	Certified 19 Nov 2019
POMAX Settlements	STL-3.4.34	08 Jan 2020	Yes	Certified	Certified 08 Jan 2020
WEMS	3.34-1509-1	29 Jan 2020	No	Maintained	
RCM	1.14-2979-1	29 Jan 2020	No	Maintained	
GBB	1.14 (Build 355-1)	19 Feb 2020	No	Maintained	
RCM Settlements	1.6-152-1 (1.2.225)	01 Apr 2020	Yes	Certified	Certified 19 Mar 2020
POMAX Settlements	STL-3.4.36	14 Apr 2020	Yes	Certified	Certified 14 Apr 2020
WEMS	3.35-1513-1	29 Apr 2020	Yes	Certified	Certified 06 Apr 2020

Where the above software is designated 'Certified', it has either been independently tested by RBP, or AEMO testing has been reviewed and accepted by RBP. RBP has then certified that the software complies with the requirements of the WEM Rules.

14.1.3 Compliance of market software with the WEM Rules

We have no audit findings to report with respect to the compliance of the market software with the WEM Rules.

14.2 SOFTWARE MANAGEMENT PROCESSES

Software management processes are also reviewed in the Gas audit. We carried out a single review covering both audits.

14.2.1 Audit activities

We reviewed AEMO's policies and procedures for:

- Business continuity
- Service management (including AEMO/Western Power service management integration workflows, and Western Power service management procedures)

We also requested that AEMO reproduce results from a previous version of RCM Settlements to test their compliance with rule clause 2.36.1(b).

14.2.2 Management of market software

AEMO's obligations in respect of software management processes are specified in clause 2.36.1 of the WEM Rules.

Where AEMO uses software systems to determine Balancing Prices, to determine Non-Balancing Facility Dispatch Instruction Payments, to determine LFAS Prices, in the Reserve Capacity Auction, STEM Auction or settlement processes, it must:

a. maintain a record of which version of software was used in producing each set of results, and maintain records of the details of the differences between each version and the reasons for the changes between versions;
b. maintain each version of the software in a state where results produced with that version can be reproduced for a period of at least 1 year from the release date of the last results produced with that version;
c. ensure that appropriate testing of new software versions is conducted;

d. ensure that any versions of the software used by AEMO have been certified as being in compliance with the Market Rules by an independent auditor; and
e. require vendors of software audited in accordance with clause 2.36.1(d) to make available to Rule Participants explicit documentation of the functionality of the software adequate for the purpose of audit.

Clause 2.36.2 of the WEM Rules defines a 'version' as follows:

A "version" of the software referred to in clause 2.36.1 means any initial software used and any changes to the software that could have a material effect on the prices or quantities resulting from the use of the software

14.2.3 Audit Findings

Compliance of market software

We have reviewed the relevant AEMO IT system change control logs (including release notes, JIRA records, and database logs) and have confirmed that, other than the changes set out in section 14.1.2, the core market systems and the non-core market software referenced in Section 14.1.2 have not been materially changed since the referenced tests were performed.

As such, as at the time of the market audit, we found all market software (contemplated by clause 2.36.1(d) of the WEM Rules) and non-core market software referenced in Section 14.1.2 to be compliant with the WEM Rules and Market Procedures, in all material respects.

Compliance of software management processes with the WEM Rules

AEMO has not demonstrated that they have maintained each version of the software in a state where results previously produced with that version can be reproduced as required by clause 2.36.1(b) of the WEM Rules – see finding 20WEM1.49. There have been no other self-reported or other instances of non-compliance with clause 2.36.1 of the WEM Rules.

Table 20: Comment on AEMO's compliance with clause 2.36.1 of the WEM Rules during the Audit Period

Clause	Comment on compliance
2.36.1(a)	AEMO has maintained a record of all versions of market software used together with their dates in service, details of the differences between each version and the reasons for the changes between versions. These take the form of release notes, JIRA records, ServiceNow records and database entries.
2.36.1(b)	AEMO has **not** demonstrated that they have maintained each version of the software in a state where results previously produced with that version can be reproduced as required by clause 2.36.1(b) of the WEM Rules – see finding 20WEM1.49

Clause	Comment on compliance
2.36.1(c)	AEMO has conducted appropriate testing on all new releases of market software prior to their being placed in service.
2.36.1(d)	AEMO has ensured that all software versions are covered by an independent certification prior to implementation, with the exception of POMAX settlements version 3.4.18 and all subsequent versions to the end of the audit period – see finding 18WEM1.12
2.36.1(e)	AEMO provides documentation to Market Participants covering the functionality of the market software. AEMO also holds release artefacts including detailed release notes for each release, which are available to Market Participants.

General findings

Table 21: Operational compliance findings associated with software management processes

Ref	Issue Type	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.27	Issue Type RBP reported compliance risk	Risk Rating Medium Compliance Rating 2	Diverse set of technologies and recruitment issues threaten ability of IT team to support critical market systems AEMO's market systems employ a very diverse set of technologies (.NET Core 1.1+, .NET Framework, Access, ASP .NET Core 1.0.4+, Bamboo, C#, Coffee Script, CredSSP, CSS, Entity Framework Core 1.0.4+, Excel, Fortran, FTP, Git, HTML, IIS, Java, Java restful web service, JavaScript, Jetty, JMS, Mercurial, Middleman, MS SQL Server Database, NFS Security, Node.js, Oracle Database, Oracle PL/SQL, PowerShell, REST, RESTful API, RSA, SOAP, SVG, Vue.js, WEBMETHODS, Windows Server, WinRM, YAML). This is set to expand when WP systems are brought in-house with the SMST project (including ASP .Net, GlassFish Application Server, ODBC, OLE Objects for Oracle (OO4O), PI Datalink, PowerOn Fusion DMS, RedHat6.7, SAS, Tomcat). Such a diverse set of technologies requires a large IT support and development team to provide the necessary skills to support all these technologies. However, the AEMO WA IT teams is small, and struggles to recruit and retain the required personnel with the appropriate skills and experience. Not having the required skills and experience causes the risk that critical systems cannot be maintained, thereby threatening system stability, rule compliance and the meeting of market objectives.	AEMO have indicated that they may risk accept this finding, so it will transfer to the AEMO Risk Register – in which case no further action.

Ref	Issue Type	Risk & Compliance Ratings	Finding	Recommendation
			We have reviewed email evidence of these difficulties in recruiting and retaining skilled IT staff. 2019 audit recommendations: 1) Assess resources required to maintain existing and new systems, given the associated technologies, and put in place a resourcing plan 2) Ensure that the required resources (as determined in (1) are budgeted for until 2022 3) Redevelop legacy systems to use a common technology stack AEMO has assessed the required resources and is going through the budgeting process. AEMO has company-wide Digital Technology Standards specifying the preferred technology stack. Implementing the redevelopment of legacy systems is a multi-year project.	
20WEM1.49	**Issue Type** RBP reported non-compliance **Obligation** 2.36.1(b)	**Risk Rating** Low **Compliance Rating** 1	**Ability to reproduce past results has not been demonstrated by AEMO** WEM rule 2.36.1(b) requires that AEMO "maintain each version of the software in a state where results produced with that version can be reproduced for a period of at least one year from the release date of the last results produced with that version". In our first information request, submitted on 10 March 2020, we requested that AEMO reproduce the results of the RCM Settlements run outputs for January 2019 as produced from AEMO production systems in March 2019. As of 10 August 2020, this has not been completed by AEMO. AEMO was unable to reproduce the requested results because a required data backup had failed. There was no control to detect and act on the failed backup, so the backup failure was only discovered as the result of the audit information request.	• Resolve the issues that have prevented the reproduction of past results • Implement controls to detect and correct failed data backups • Regularly test the reproduction of past results to ensure that this ability is maintained.

Ref	Issue Type	Risk & Compliance Ratings	Finding	Recommendation
			An alternative method for reproducing the results was considered by AEMO. It may be possible that the data that was missing as a result of the backup failure could be restored by a heavily manual process. This option would have incurred significant market costs and was not pursued. Several other issues also contributed to delays in AEMO's attempts to reproduce the results, including problems retrieving and restoring the required data and running the required software to verify the software re-run. These issues were resolved and did not directly cause the non-compliance finding.	

15 APPENDICES

15.1 SUMMARY OF FINDINGS

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
19WEM1.02	**Issue Type** AEMO reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Medium **Compliance Rating** 1	Incorrectly granting permission for a facility to synchronize which was not in line with the Facility's Dispatch Instruction	No further action required	Accept finding
19WEM1.16	**Issue Type** AEMO reported non-compliance **Process** SM - Planning	**Risk Rating** Medium **Compliance Rating** 1	Failure to send Synergy dispatch plan by deadline	No further action required	Accept finding
19WEM1.18	**Issue Type** AEMO reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Medium **Compliance Rating** 1	Incorrect operating state in dispatch advisory during loss of SCADA visibility	No further action required	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
19WEM1.21	**Issue Type** RBP reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Medium **Compliance Rating** 1	Failure to issue retrospective dispatch instructions on time	Ensure that the monitoring of control room logs as specified above is documented in the appropriate procedure.	Agree with finding and recommendation
19WEM1.25	**Issue Type** RBP reported compliance risk **Process** SM - Power System Operations	**Risk Rating** High **Compliance Rating** 2	Accuracy of Metrix and Similar Day forecasting methodologies deteriorating given increased PV	• Implement forecasting improvement program - this will be an ongoing program of continuous improvement • Determine and implement methodology for assessing forecast accuracy	Agree with finding and recommendation
19WEM1.26	**Issue Type** RBP reported area for improvement **Process** SM - Power System Operations	**Risk Rating** Medium **Compliance Rating** 3	Initiatives to address threats to system stability caused by increased DER uptake may not be sufficient or delivered in time.	No further action required	Accept finding
19WEM1.27	**Issue Type** RBP reported compliance risk **Process** Information technology	**Risk Rating** Medium **Compliance Rating** 2	Diverse set of technologies and recruitment issues threaten ability of IT team to support critical market systems	AEMO have indicated that they may risk accept this finding, so it will transfer to the AEMO Risk Register – in which case no further action.	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
19WEM1.32	**Issue Type** RBP reported area for improvement **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 3	No backup controllers on standby, so no guarantee that replacement controllers would be available if rostered controller unavailable	No further action required	Accept finding
19WEM1.34	**Issue Type** RBP reported compliance risk **Process** Finance	**Risk Rating** Low **Compliance Rating** 2	Lack of formalised business processes and controls relating to WEM and GSI obligations	No further action required	Accept finding
19WEM1.36	**Issue Type** RBP reported non-compliance **Process** Market Operations	**Risk Rating** High **Compliance Rating** 1	Multiple instances of latest BMO not being used due to WEMS outages	No further action required	Accept finding
19WEM1.40	**Issue Type** RBP reported compliance risk **Process** SM - Planning	**Risk Rating** Low **Compliance Rating** 2	No formalised process for second-stage validation by Principal Engineer (PE) for TDC updates	No further action required	Accept finding
19WEM1.43	**Issue Type** RBP reported compliance risk	**Risk Rating** Medium **Compliance**	Potential risk areas still exist in AS monthly data preparation	No further action required	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	Process SM - Planning	**Rating** 2			
19WEM1.44	**Issue Type** RBP reported non-compliance **Process** SM – Operations, Governance and Integration	**Risk Rating** High **Compliance Rating** 1	Systemic and historic errors in SRS payment calculation	No further action required	Accept finding
19WEM1.45	**Issue Type** RBP reported area for improvement **Process** Reserve Capacity	**Risk Rating** Low **Compliance Rating** 3	RC testing Market Procedure is inconsistent with WEM Rules	We recommend that the Market Procedure be updated for consistency with the WEM rules and (b) clause 4.25.2(a)(ii)	Agree with finding and recommendation. The RC Testing Market Procedure has been published effective 1 August 2020.
19WEM1.48	**Issue Type** RBP reported area for improvement **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 3	Fatigue management guidelines not being followed	No further action required	Accept finding
19WEM1.50	**Issue Type** RBP reported area for improvement **Process**	**Risk Rating** Low **Compliance**	Lack of controls regarding the classification of credible contingencies	No further action required	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	SM - Power System Operations	Rating 3			
19WEM1.61	Issue Type RBP reported area for improvement Process SM - Power System Operations	Risk Rating Low Compliance Rating 3	More room for improvement in logbook consistency and review process	• Create a more complete audit trail for the review of logbooks. Record the methodology employed, the types of issues that were found and follow-up actions • Improve the electronic logbook guidelines to specify consistent entry formats for each event type • Improve electronic logbook templates to ensure consistent entries AEMO have indicated that this finding will be risk accepted and transferred to the AEMO Risk Register.	Agree with finding and recommendation. Risk Acceptance completed.
20WEM1.01	Issue Type RBP reported non-compliance Process SM - Planning	Risk Rating Low Compliance Rating 1	DSM availability not taken into account when assessing outages	Complete PASA enhancement project and make this a focus area of the 2020/21 WEM audit.	Agree with finding and recommendation

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
20WEM1.02	**Issue Type** RBP reported non-compliance **Process** SM - Planning	**Risk Rating** Medium **Compliance Rating** 1	Forecast transmission capacity between potentially constrained regions is not included in ST PASA report	Implement systems and/or procedures to insert this information in the ST PASA report.	Agree with finding and recommendation. AEMO will investigate options for including this information into ST PASA report or otherwise consider alternate means to meet the outcome of the recommendation..
20WEM1.04	**Issue Type** RBP reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 1	RDQ forecasts published by AEMO do not always reflect best estimate of forecast load	Implement forecasting enhancement project, ensuring that this issue is addressed. This can issue can be considered to be addressed if forecasting is improved to the extent that multi-period overrides are rare or no longer required; Otherwise a mechanism to publish alternate forecasts will still be recommended.	Agree with finding and recommendation
20WEM1.05	**Issue Type** RBP reported area for improvement **Process** Reserve Capacity	**Risk Rating** Low **Compliance Rating** 3	Opportunity to improve audit trails in CDA process for DSPs	Improve the audit trail of the DSP CDA process so that AEMO's basis for accepting an application (via the checks required under Section 3.2.3(a)) is clearer.	Agree with finding and recommendation. The Internal Procedure has now been amended to reflect these additional

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
					checks under Section 3.2.3 (a)
20WEM1.06	**Issue Type** RBP reported non-compliance **Process** Market operations	**Risk Rating** Low **Compliance Rating** 1	Intermittent loads without registered facilities not allocated SR share	No further actions; this finding will remain open until the fix is deployed.	Agree with finding and recommendation
20WEM1.07	**Issue Type** AEMO reported non-compliance **Process** Market operations	**Risk Rating** Low **Compliance Rating** 1	Incorrect LFAS Market Cost Share calculation due to system defect	No further action required.	Accept finding
20WEM1.08	**Issue Type** AEMO reported non-compliance **Process** Market operations	**Risk Rating** Low **Compliance Rating** 1	Incorrect calculation of out of merit generation and constrained quantity calculations due to system defect	No further action required.	Accept finding
20WEM1.09	**Issue Type** AEMO reported non-compliance **Process** Market operations	**Risk Rating** Low **Compliance Rating** 1	Incorrect Capacity Provider Payment and Capacity Credit Refund calculations due to system defect	No further action required.	Accept finding
20WEM1.10	**Issue Type** AEMO reported non-compliance	**Risk Rating** Low **Compliance**	Incorrect Capacity Provider Payment and Reserve Credit	No further action required.	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	Process Market operations	**Rating** 1	Refund calculations due to system defect		
20WEM1.11	**Issue Type** AEMO reported non-compliance **Process** SM - Operations, Governance and Integration	**Risk Rating** Low **Compliance Rating** 1	Failure to issue retrospective OI on time	No further action required	Accept finding
20WEM1.12	**Issue Type** AEMO reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 1	Failure to activate sufficient LFAS	No further action required	Accept finding
20WEM1.13	**Issue Type** AEMO reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 1	Failure to activate sufficient LFAS	No further action required	Accept finding
20WEM1.14	**Issue Type** AEMO reported non-compliance **Process**	**Risk Rating** Low **Compliance**	Failure to activate sufficient LFAS	No further action required	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	SM - Power System Operations	Rating 1			
20WEM1.15	Issue Type AEMO reported non-compliance Process Reserve Capacity	Risk Rating Low Compliance Rating 1	CRC assignment based off incomplete application	No further action required	Accept finding
20WEM1.16	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS	No further action required	Accept finding
20WEM1.17	Issue Type AEMO reported non-compliance Process Market operations	Risk Rating Low Compliance Rating 1	Incorrect Spinning Reserve share calculation for Intermittent Generators due to system defect	No further action required.	Accept finding
20WEM1.18	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS	No further action required.	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
20WEM1.19	**Issue Type** AEMO reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 1	Failure to activate sufficient LFAS	No further action required	Accept finding
20WEM1.20	**Issue Type** AEMO reported non-compliance **Process** Market operations	**Risk Rating** Low **Compliance Rating** 1	Credit Limit calculation process inconsistent with Prudential Requirements Market Procedure	No further action. AEMO has addressed the issue, and operational practice is now aligned with the Rules and the Market Procedure	Accept finding
20WEM1.21	**Issue Type** AEMO reported non-compliance **Process** SM - Operations, Governance and Integration	**Risk Rating** Low **Compliance Rating** 1	Incorrect LFAS data sent to Synergy	No further action required	Accept finding
20WEM1.22	**Issue Type** AEMO reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 1	On the day opportunistic maintenance incorrectly granted	No further action required	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
20WEM1.23	**Issue Type** AEMO reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 1	Failure to issue DA for Power System Security issue	No further action required	Accept finding
20WEM1.24	**Issue Type** AEMO reported non-compliance **Process** Market operations	**Risk Rating** Low **Compliance Rating** 1	Five historic instances of AEMO using "non-updated" RDQs to calculate Balancing Price due to process error	No further action required.	Accept finding
20WEM1.25	**Issue Type** AEMO reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 1	Failure to activate sufficient LFAS	No further action required	Accept finding
20WEM1.26	**Issue Type** AEMO reported non-compliance **Process** Reserve Capacity	**Risk Rating** Low **Compliance Rating** 1	Capacity credits assigned to small generator based off technically invalid application	No further action required	Accept finding
20WEM1.27	**Issue Type** AEMO reported non-compliance	**Risk Rating** Low **Compliance**	Failure to issue DA for Power System Security issue	No further action required	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	Process SM - Operations, Governance and Integration	**Rating** 1			
20WEM1.28	**Issue Type** AEMO reported non-compliance **Process** Market operations	**Risk Rating** Low **Compliance Rating** 1	Technically non-compliant tie breaking methodology practiced due to inadvertent removal of required tie breaking methodology from WEM Rules and Balancing Forecast Market Procedure	No further action required.	Agree with finding and recommendation
20WEM1.29	**Issue Type** AEMO reported non-compliance **Process** Market operations	**Risk Rating** Low **Compliance Rating** 1	Technical non-compliance with meter data submission confirmation of receipt requirements	No further action required.	Accept finding
20WEM1.30	**Issue Type** AEMO reported non-compliance **Process** SM - Planning	**Risk Rating** Low **Compliance Rating** 1	Failure to advise Market Participant of Commissioning Test Plan	No further action required	Accept finding
20WEM1.31	**Issue Type** AEMO reported non-compliance **Process**	**Risk Rating** Low **Compliance**	DI with incorrect quantity issued	No further action required	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	SM - Operations, Governance and Integration	Rating 1			
20WEM1.32	Issue Type AEMO reported non-compliance Process SM - Planning	Risk Rating Medium Compliance Rating 1	Incorrect dispatch plan sent to Synergy	No further action required	Accept finding
20WEM1.33	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Medium Compliance Rating 1	Disclosure of Rule Participant Restricted information to unauthorised person	Complete the specified corrective actions.	Agree with finding and recommendation
20WEM1.34	Issue Type AEMO reported non-compliance Process SM - Operations, Governance and Integration	Risk Rating Low Compliance Rating 1	Failure to issue DA for out of merit dispatch	No further action required	Accept finding
20WEM1.35	Issue Type AEMO reported non-compliance Process	Risk Rating Low Compliance	Failure to activate sufficient LFAS	No further action required	Accept finding

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	SM - Power System Operations	Rating 1			
20WEM1.36	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Low Compliance Rating 1	Failure to issue DA for selection of LFAS facilities outside of LFAS Enablement Schedule	No further action required	Accept finding
20WEM1.37	Issue Type AEMO reported non-compliance Process Market operations	Risk Rating Low Compliance Rating 1	Incorrect Spinning Reserve share calculation for Intermittent Generators registering part way through a month due to system defect	No further action required	Accept finding
20WEM1.38	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Low Compliance Rating 1	Failure to activate sufficient LFAS	No further action required	Accept finding
20WEM1.39	Issue Type RBP reported non-compliance Process SM - Power System Operations	Risk Rating Low Compliance Rating 1	Failure to issue Dispatch Advisory for Emergency Operating State	Carry out training to ensure that DAs are issued for all instances of EOS	Agree with finding and recommendation

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
20WEM1.41	**Issue Type** RBP reported non-compliance **Process** SM - Operations, Governance and Integration	**Risk Rating** Low **Compliance Rating** 1	Constraints due to network outages with no OI issued as per rule change RC_2018_07	• Investigate system changes and/or training to ensure OIs are sent in these situations. • Update procedure documentation accordingly. • Investigate causes of subsequent error of misclassification as Consequential Outage and apply appropriate corrective actions.	Agree with finding and recommendation
20WEM1.42	**Issue Type** RBP reported non-compliance **Process** SM - Operations, Governance and Integration	**Risk Rating** Medium **Compliance Rating** 1	Constraints due to network outages with OIs issued as per rule change RC_2018_07 with no audit trail in control room logs.	• Investigate impact on participant settlements and take appropriate corrective measures. • Staff training to ensure that all such instances are recorded in the control room logs so that the correct issuance of OIs can be reliably identified. • Proactively review control room logs to ensure that they contain all required events and information.	Agree with finding and recommendation

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
20WEM1.43	**Issue Type** RBP reported compliance risk **Process** SM - Planning	**Risk Rating** Medium **Compliance Rating** 2	When assessing outage applications, process for ensuring sufficient Ancillary Services capacity has high risk of human error.	As part of ongoing PASA enhancement, include systematic check for sufficient AS	Agree with finding and recommendation. AEMO will investigate options for incorporating this check for adequate AS into the PASA enhancement project or otherwise consider alternate means to meet the outcome of the recommendation.
20WEM1.44	**Issue Type** RBP reported non-compliance **Process** Market operations	**Risk Rating** Low **Compliance Rating** 1	Erroneous LF_Capacity_Cost_Share calculation for participants registering part way through a month due to system defect	No further action required; finding will remain open till fix is deployed.	Agree with finding and recommendation
20WEM1.45	**Issue Type** RBP reported compliance risk **Process** SM - Power System Operations	**Risk Rating** High **Compliance Rating** 2	Design of GIA constraint implementation threatens power system security	Continue to work with Western Power to reduce the risk associated with the GIA constraint implementation.	Agree with finding and recommendation
20WEM1.48	**Issue Type** RBP reported compliance risk	**Risk Rating** Low **Compliance**	Process for calculating Market Fees has potential for errors	We recommend that AEMO: • Properly document the market fee rate calculations in an internal procedure to include	Agree with finding and recommendation

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	Process Finance	**Rating** 2		more information of methodology and input data sources. • Improve the market fee calculation tool to minimise hard coding of variables where formulae can be used.	
20WEM1.49	**Issue Type** RBP reported non-compliance **Process** Information technology	**Risk Rating** Low **Compliance Rating** 1	Ability to reproduce past results has not been demonstrated by AEMO	• Resolve the issues that have prevented the reproduction of past results • Implement controls to detect and correct failed data backups • Regularly test the reproduction of past results to ensure that this ability is maintained.	Agree with finding and recommendation
20WEM1.50	**Issue Type** RBP reported compliance risk **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 2	Implemented controls have not sufficiently addressed problem of under-activation of LFAS.	Investigate causes of LFAS under-activation and develop solutions (systems or processes) to prevent this issue.	Agree with finding and recommendation
20WEM1.51	**Issue Type** AEMO reported non-compliance	**Risk Rating** Medium **Compliance**	Confidentiality breach from sending Credit Limit letter to wrong participant	No further actions recommended. This finding will remain open until we have verified the deployment of the Credit Support and Credit	Agree with finding and recommendation

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	Process Market operations	**Rating** 1		Limit Module as part of the ROPE project.	
20WEM1.53	**Issue Type** AEMO reported non-compliance **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 1	Failure to activate sufficient LFAS	No further action required	Accept finding
20WEM1.54	**Issue Type** RBP reported area for improvement **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 3	Worsening Spinning Reserves shortfall situation	Investigate the causes of these trends and develop controls to mitigate the identified causes.	Agree with finding and recommendation
20WEM1.55	**Issue Type** RBP reported compliance risk **Process** SM - Power System Operations	**Risk Rating** Low **Compliance Rating** 2	Long periods of insufficient LFAS Down	Investigate the causes of long periods of LFAS Down shortfall and develop controls to mitigate the identified causes.	Accept finding
20WEM1.56	**Issue Type** RBP reported non-compliance **Process**	**Risk Rating** Low **Compliance Rating** 1	Failure to issue DAs for insufficient LFAS activation	Investigate system changes and/or training to mitigate LFAS shortfall occurrences, to prevent the need to issue DAs for insufficient ancillary services.	Agree with finding and recommendation

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation	Management Response
	SM - Power System Operations				
20WEM1.57	**Issue Type** AEMO reported non-compliance **Process** Market Operations	**Risk Rating** Low **Compliance Rating** 1	AEMO systems non-compliant with manifestly incorrect clause relating to loss-adjustment of offers submitted at price caps	No further action recommended. This finding will remain open until the manifest error rule change is implemented.	Agree with finding and recommendation

15.2 Compliance and Risk Rating information

This appendix contains information on the compliance and risk ratings used to classify audit findings.

15.2.1 Compliance and Risk Ratings

Audit findings are categorised as follows:

Table 22: Compliance ratings

Compliance rating	Description
1	Instances of non-compliance with the WEM Rules
2	Findings that are not an instance of non-compliance, but pose compliance risk
3	Findings related to areas for improvement 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 (including definitions of impact and likelihood).

Table 23: Risk Ratings

Risk Rating	Description
Critical	Potential for catastrophic impact on market or system operations or other market outcomes if not addressed immediately. Requires executive actions and monitoring at board level.
High	Potential for major impact on market or system operations 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 market or system operations or other market outcomes if not addressed within a reasonable timeframe. Requires management attention with regular monitoring.
Low	Potential for minor impact on market or system operations or other market outcomes if not addressed in the future. Requires team level attention with regular monitoring.

Table 24: Risk rating matrix

		CONSEQUENCE				
		Immaterial	*Minor*	*Moderate*	*Major*	*Extreme*
LIKELIHOOD	*Almost Certain*	Medium	Medium	High	Critical	Critical
	Likely	Low	Medium	High	Critical	Critical
	Possible	Low	Medium	High	High	Critical
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Medium	Medium	High

AEMO's definitions of likelihood and consequence are provided in the sections below.

15.2.2 AEMO likelihood ratings

LIKELIHOOD	ANNUAL PROBABILITY	QUALITATIVE DESCRIPTION
Almost Certain	>90%	Will occur in most circumstances; statistical record of several occurrences
Likely	51% - 90%	Can be expected to occur in most circumstances; statistical record of multiple occurrences
Possible	11% - 50%	May occur, but not expected in most circumstances; statistical record of a few occurrence
Unlikely	1% - 10%	Conceivable but unlikely to occur in any given year; statistical record of at least one occurrence
Rare	<1%	Will only occur in exceptional circumstances; no history of occurrence

15.2.3 AEMO impact ratings

AEMO's impact rating matrix is provided below. When assessing the financial impact of non-compliance and risk on market participants, we have used the Financial (AEMO) category below as a guideline to assign risk ratings

Consequence	Reputation and Stakeholders	Financial (AEMO)	Safety	Environment	Market & System Impact	Legal & Compliance
Extreme	• Significant long term damage to stakeholder and public confidence and relationships. • Continued adverse media exposure. • Significant financial impact drives participant(s) towards insolvency.	>$25M	• Single fatality or permanent injury or multiple notifiable injuries.	• Major environmental harm. e.g. major pollution incident causing significant damage or potential to health or the environment; and/or • Fines and prosecution likely.	• Involuntary disruption of supply to a state(s) for any duration. • Market suspension in multiple jurisdictions or markets.	• Corporate fine >$1M. • Imprisonment or fine for personal liability to Officer or Director. • Regulatory action likely. • Litigation involving Class actions.
Major	• Significant short term damage to stakeholder confidence and relationships. Some loss of public confidence. • Short term adverse media exposure. • Significant financial impact on participant(s).	$5M - $25M	• Notifiable injury requiring hospitalisation > 5 days (incapacity beyond 3 months).	• Long term or serious environmental damage; and/or • Multiple complaints received; and/or • Potential for prosecution.	• Involuntary disruption of supply to a large portion of a state, for any duration. • Market suspension in one jurisdiction or market.	• Corporate fine $100K > $1M. • Fine for personal liability to officer or director. • Likely investigation by a Regulator. • Litigation involving protracted Court actions possible.
Moderate	• Some damage to stakeholder confidence and relationships. • Some adverse media exposure. • Adverse financial impact on participant(s).	$500K-$5M	• Injury requiring < 5 days hospitalisation or increased level of medical treatment (6 days to 3 months incapacity).	• Moderate environmental impact; and/or • Will cause complaints; and/or • Possible fine.	• Market(s) operating in administered state, but not suspended.	• Corporate fine with no personal liability to Officer or Director. • Likely to give rise to questions from a Regulator. • Possible dispute resolution process*.
Minor	• Manageable reduction in stakeholder confidence. • Limited media exposure. • Little to no financial impact on participant(s).	$100k - $500K	• Routine medical treatment only (up to 5 days incapacity).	• Minor environmental harm; and/or • Potential for complaints; and/or • Fine unlikely.		• Compliance breach with no penalties. • Regulator attention, litigation or dispute resolution* unlikely.
Immaterial	• No reduction in stakeholder confidence. • No media exposure. • No financial impact on participant(s).	<$100K	• First aid.	• Little or no environmental harm; and/or • No fines or complaints.		• No breach or minor technical breach of compliance obligation. • No reasonable prospect of regulatory attention, litigation or dispute resolution.

15.3 Historical market software certification prior to the 2017-18 Audit Period

15.3.1 Initial software testing

When AEMO notifies us of changes to market software or release of new software we adopt one or both of the following methods:

- Constructing independent models of the specific case. The model may perform a set of calculations (such as pre-processing of data or quantity allocations, as defined by the formulation), or it may include an optimisation procedure designed to replicate a portion of the software's formulation.
- Directly comparing the software results to our understanding of the formulation. This may involve answering questions such as:
  - Are the appropriate constraints binding?
  - Does the set of calculations change as we expect when input values are altered, and the software is re-run?
  - Does the software make optimal trade-offs between alternative resources, given their costs and associated constraints?

In testing AEMO's market software, we use both approaches.

As much of the software tested is embedded in the market systems, RBP specifies the tests to be performed (including input data requirements and output data to be provided) and AEMO staff conducts the tests on the market systems. We then review the test results to determine whether the results are compliant with the requirements of the WEM Rules and Market Procedures.

15.3.2 Assessment of software compliance at time of market audit

Once software has been tested and shown to be compliant, it is not necessary to retest the software unless:

- Changes have been known to be made to the software which render the previous testing no longer valid; or
- It is believed that unapproved changes have been made to the software.

The first circumstance is readily picked up where there is a rigorous software change control process. The second exists where such a change control process is lacking.

As part of the 2006-7 and 2007-8 annual audits of the IMO's market software systems full regression tests were carried out to verify that the market software systems comply with the requirements of the WEM Rules and Market Procedures. Since the 2008-9 year, compliance of the market software has been determined by:

- Examining market software change procedures to ensure that they are robust
- Examining various records of changes made to the market software systems (including change process logs, release notes and system audit trails) to determine whether the changes required independent testing and certification
- Examining WEM Rules and Market Procedure changes and assessing whether corresponding changes to market software have been implemented (where relevant) and
- Carrying out such testing and certification on those software changes as required.

Under this regime, if there are no changes made to the software since the last time it was certified, we may deduce that the software continues to comply with the WEM Rules.

If changes are made to the software, we plan and conduct tests to exercise any new or changed calculations, and other calculations that are likely to have been affected.

This is in line with the approach we use when verifying software compliance in other jurisdictions.

This incremental approach provides a cost-effective means for providing assurance on compliance when changes to the market are incremental in nature, but it becomes less meaningful as time goes on and/or if major changes are introduced to the market.

15.3.3 Summary of historic tests

This section provides a summary of the relevant certification tests previously conducted on the core AEMO market software systems along with the results of those tests. The core market software systems are comprised of:

- WEMS – Wholesale Electricity Market Systems, a software system developed and maintained by AEMO, and incorporating proprietary components provided by ABB
- POMAX Settlements – a software system provided by the vendor Brady Energy
- POMAX Metering – a software system provided by the vendor Brady Energy

WEMS certification relies on the chain of certification testing back to the comprehensive testing conducted in 2007-8. Comprehensive testing of new WEMS components was carried out for the introduction of balancing and load following markets in 2012.

POMAX Settlements certification is based on the chain of certification testing back to the comprehensive testing conducted in 2014 for the new settlements version 3.4.6.

For the 2008-2011 Audit Periods, the information presented is organised around the tests conducted and sets out:

- The features of Market Systems software which have been tested.
- The nature of the tests conducted.

For the 2011-2018 Audit Periods, we set out the specific market software component releases, and their certification status. Releases with certification status of 'maintained' did not require additional testing, as they did not involve changes that would be expected to have material impact on prices or quantities.

System	Subject	Test	Result	Year
Market Systems	STEM	STEM ST1: Two Participants	PASS	2008
		STEM ST2: Multiple Optima Clearing Quantities	PASS	2008
		STEM ST3: Multiple Optima Clearing Prices	PASS	2008
		STEM ST4: Price set at Min-STEM price by default bid	PASS	2008
		STEM ST5: Price set at Alt-Max-STEM price by default bid	PASS	2008
		STEM ST6: Bilateral position outside of Price Curve	PASS	2008
		STEM ST7: Three Participants	PASS	2008

System	Subject	Test	Result	Year
Market Systems	Non-STEM	Prudential Requirements calculation	PASS	2008
Market Systems	STEM	Inclusion of more than 50 participants in STEM auction and dispatch merit order calculations	PASS	2011

System	Version number	Changes to calculations affecting market outcomes?	Certification status
WEMS	2.6.6	No	Maintained
WEMS	2.6.7	Yes	Certified
WEMS	2.6.8	No	Maintained
WEMS	2.7.37	No	Maintained
WEMS	2.7.39	No	Maintained
WEMS	2.7.41	No	Maintained
WEMS	2.8.28	No	Maintained
WEMS	2.8.29	No	Maintained
WEMS	3.0.18	No	Maintained
WEMS	3.0.21	Yes	Certified
WEMS	3.1.36	No	Maintained
WEMS	3.1.41	No	Maintained
WEMS	3.1.43	Yes	Certified
WEMS	3.1.44	Yes	Certified
WEMS	3.1.45	No	Maintained
WEMS	3.2.8	No	Maintained
WEMS	3.3.12	No	Maintained
WEMS	3.4.11	Yes	Certified

System	Version number	Changes to calculations affecting market outcomes?	Certification status
WEMS	3.5.6	Yes	Certified
WEMS	3.6.12	Yes	Certified
WEMS	3.6.13	No	Maintained
WEMS	3.6.15	No	Maintained
WEMS	3.6.16	No	Maintained
WEMS	3.7.9	No	Maintained
WEMS	3.7.12	No	Maintained
WEMS	3.7.13	Yes	Certified
WEMS	3.8.5	No	Maintained
WEMS	3.8.6	No	Maintained
WEMS	3.9.2	Yes	Certified
WEMS	3.9.2 (AS-2456)	Yes	Certified
WEMS	3.10.99-15	Yes	Certified
WEMS	3.10.99-59	No	Maintained
WEMS	3.10-99-63	No	Maintained
WEMS	3.10-99-71	No	Maintained
WEMS	3.11.374-57	No	Maintained
WEMS	3.11.374-63	No	Maintained
WEMS	3.11.374-81	No	Maintained
WEMS	3.11.374-84	No	Maintained
WEMS	3.11.374-94	No	Maintained
WEMS	3.11.374-116	No	Maintained
WEMS	3.11.374-128	No	Maintained
WEMS	3.12-913-9	Yes	Certified
WEMS	3.12-913-35	No	Maintained
WEMS	3.13-981-1	No	Maintained

System	Version number	Changes to calculations affecting market outcomes?	Certification status
WEMS	3.13-981-6	No	Maintained
WEMS	3.14-1016-3	No	Maintained
WEMS	3.14-1016-4	No	Maintained
WEMS	3.16-1105-2	Yes	Certified
WEMS	3.17-1149-11	Yes	Certified
WEMS	3.18-1183-5	No	Maintained
WEMS	3.19-1192-10	No	Maintained
WEMS	3.19-1192-13	No	Maintained
WEMS	3.21-1236-20	No	Maintained
WEMS	3.22-1297-5	Yes	Certified
WEMS	3.23-1336-1	No	Maintained
WEMS	3.24-1356	No	Maintained
Metering	11 update 14	Yes	Certified
Metering	11.0.20	No	Maintained
Metering	11.0.25	No	Maintained
Metering	11.0.27	No	Maintained
Metering	11.0.28	No	Maintained
Metering	11.0.35	Yes	Certified
Settlements	3.4.6	Yes	Certified
Settlements	3.4.7	No	Maintained
Settlements	3.4.8	Yes	Certified
Settlements	3.4.9	No	Maintained
Settlements	3.4.12	No	Maintained
Settlements	3.4.16	Yes	Certified
Settlements	3.4.17	No	Maintained
Settlements	3.4.18	Yes	Not Certified

System	Version number	Changes to calculations affecting market outcomes?	Certification status
Settlements	3.4.22	No	Not Certified
Settlements	3.4.21	No	Not Certified
RTDE	1.27-1	Yes	Certified
RCM	1.0-1803	Yes	Certified
RCM	1.1-2098-8	Yes	Certified
RCM	1.2-2176-5	Yes	Certified
RCM	1.3-2272-1	Yes	Certified
RCM	1.4-2366-2	Yes	Certified
RCM	1.5-2570	No	Maintained
WEMS	3.27-1410-1	No	Maintained
RCM	1.9-2787-2	Yes	Certified
WEMS	3.27-1410-2	No	Maintained
POMAX	3.4.25	No	Maintained
WEMS	3.27-1410-4	No	Maintained
RCM	1.9-2787-4	No	Maintained
POMAX	3.4.26	No	Maintained
WEMS	3.28-1438-2	No	Maintained
RCM	1.10-2842	No	Maintained
RCM	1.10-2871-6	No	Maintained
WEMS	3.28-1438-6	No	Maintained