

Report to the Minister for Energy on the Australian Energy Market Operator's compliance 2018/19

Wholesale Electricity Market Rules
Gas Services Information Rules

30 December 2019

Economic Regulation Authority

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Executive summary

The Economic Regulation Authority has prepared its 2018/19 report to the Minister for Energy on the Australian Energy Market Operator's (AEMO) compliance with the Wholesale Electricity Market Rules and the Gas Services Information Rules.

The ERA's report contains AEMO's latest audit reports, together with the ERA's investigations of AEMO non-compliances for the period 1 July 2018 to 30 June 2019.

The auditor stated that AEMO had a strong compliance culture where self-reporting of non-compliances was encouraged. AEMO also practiced proactive compliance risk management. This corresponded with a significant reduction in AEMO's compliance risks in 2018/19.

The auditor reported 32 individual non-compliances for 2018/19, compared to 30 grouped matters in 2017/18. There was a change in method for counting non-compliances, whereby similar non-compliances were no longer grouped but rather counted individually. This change could have led to a significant rise in the number of non-compliances, had there been no change in the level of AEMO's compliance from 2017/18. The ERA's analysis confirmed that this was not the case, with the number of individual non-compliances in 2018/19 reducing by at least one third compared to 2017/18.

The auditor issued a qualified opinion on AEMO's compliance with the Market Rules because of two material matters. The first matter concerned payments for System Restart Services. AEMO contracts generators to provide System Restart Services in the case of a system-wide blackout. Payments under these contracts are dependent on the availability of the facilities to perform the service. There were some instances where AEMO did not recover payments for non-performances. Overpayments of \$204,539 were estimated since July 2016. AEMO has implemented improved controls for managing these contracts, including processes to verify payment calculations. Overpayments that occurred in the previous 12 months will be recovered through the settlement adjustments process. AEMO is also considering contractual remedies to recover the remaining overpayments.

The second matter concerned the incorrect charging of market fees since 2006. Market fees are charged to participants for the market and power system services provided by AEMO and the ERA's regulatory functions. The calculation in the settlements software did not comply with the method specified in the Market Rules. This error was not identified when the software was first certified by an independent auditor in 2006. The auditor was engaged by the former Independent Market Operator. AEMO estimated that the maximum amount overcharged to an individual participant was \$242,000 and the maximum amount undercharged was \$907,000. The software error was fixed in October 2019. Only errors that occurred in the 12 months prior to October 2019 can be corrected through the settlement adjustments process.

Most of the 2018/19 non-compliances were caused by human errors in the form of failures to follow process, a lack of training, or gaps in procedures. The high number of human errors could indicate inadequate controls in these areas. The auditor rated many of these matters as medium-risks. Only two were rated as significant risks, both concerning the calculation of payments under ancillary services contracts. AEMO advised that it has taken actions to mitigate the risk of these non-compliances. These include updating procedures, implementing training programs and establishing formal processes to identify training needs.

During 2018/19, the ERA issued its first warning to AEMO under the Market Rules. The ERA investigated AEMO's self-reported non-compliant allocation of Certified Reserve Capacity that occurred in August 2016. AEMO can allocate Certified Reserve Capacity to a participant, only if it has been provided with evidence to support the level of capacity sought for the participant's generation facility. AEMO allocated Certified Reserve Capacity to two participants without having this evidence. The ERA issued a warning because AEMO knowingly breached the Market Rules in circumstances that were avoidable.

1. Introduction

The ERA is responsible for the compliance and enforcement functions in the Wholesale Electricity Market Rules and the Gas Services Information (GSI) Rules.

As part of these functions, the ERA is required to prepare a report to the Minister for Energy on AEMO's compliance.

Clause 2.14.5B of the Market Rules requires the report to contain:

- The audit report on AEMO's compliance with the Market Rules and Market Procedures for the relevant period.
- Any report prepared and published by AEMO in response to the audit report.
- The results of any investigations of AEMO's compliance with the Market Rules and the Market Procedures carried out by the ERA for the relevant period.

Rule 174(5) of the GSI Rules also requires the ERA to provide to the Minister:

- The audit report on AEMO's compliance with the GSI Rules and GSI Procedures for the relevant period.
- Any report prepared published by AEMO in response to the audit report.

This report contains the information required to be provided to the Minister under the Market Rules and GSI Rules, covering the audit period from 1 July 2018 to 30 June 2019. The report also includes investigations completed by the ERA during the same period.

2. 2018/19 audit reports

2.1 Auditor's compliance risk and ratings

Table 1 describes the ratings the auditor used to assess AEMO's compliance.

Table 1: Compliance ratings used by the auditor¹

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

The following risk ratings, set in consultation with AEMO, were used by the auditor to assess the findings:

- **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.
- **Significant:** 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.

2.2 Market Rules

The Market Rules require AEMO to ensure that the auditor carries out audits of:

- The compliance of AEMO's internal procedures and business processes with the Market Rules.
- AEMO's compliance with the Market Rules and Market Procedures.
- AEMO's market software systems and processes for software management.²

¹ Refer to pages 90 and 91 of [Independent Assurance Report on AEMO's compliance with the WEM Rules and Market Procedures](#).

² See clause 2.14.3 of the WEM Rules.

The results of the 2018/19 audit are documented in the auditor’s Independent Assurance Report (Appendix 1). The report was published on AEMO’s website in October 2019.³

2.3 Market Rules audit report – Summary of findings

A summary of the audit findings by compliance and risk rating is provided in Table 2.

Table 2: Summary of 2018/19 audit findings

	Low-risk	Medium-risk	High-risk	Total
Compliance rating 1 (Non-compliance)	14	12	6	32
Compliance rating 2 (Compliance risk)	2	1	0	3
Total	16	13	6	35

There was a change in the method for counting non-compliances in 2018/19. The change meant that individual non-compliance matters (Compliance rating 1) were counted as single events in 2018/19, rather than being grouped into common non-compliances as in previous years. AEMO explained that the change was made to provide a more accurate representation of its compliance.

Despite the change, there was a material reduction in the total number of matters identified by the auditor, falling from 50 matters in 2017/18 to 35 matters in 2018/19. The number of compliance risks (Compliance rating 2) also fell, from 18 risks in 2017/18 to three risks in 2018/19.

The auditor reported 32 individual non-compliances (Compliance rating 1) for 2018/19, slightly more than the 30 grouped matters in 2017/18. While the change in counting method needs to be considered when comparing the periods, the ERA’s analysis confirms that there has been a reduction in the number of individual AEMO non-compliances in 2018/19.

The auditor found AEMO to be compliant with the Market Rules but qualified the audit opinion due to two material non-compliances discussed in section 2.4 of this report.

AEMO has addressed 26 of the 35 audit findings. The auditor reported these matters as closed. The remaining nine findings include two high-risk matters, discussed in section 2.4 and five medium-risk matters discussed in section 2.5. The remaining two open matters were low-risk.

2.4 Market Rules audit report – Significant risks

The auditor identified six high-risk matters. All of these were non-compliances (Compliance rating 1). Three of these matters concerned AEMO not dispatching from the latest Balancing Merit Order. This could result in the use of generation plant that is not the least-cost plant at the time, triggering unnecessary out-of-merit payments and resulting in higher costs to electricity customers. These types of non-compliances have also appeared in prior audits.

The ERA’s 2017/18 Report to the Minister on AEMO’s compliance stated that it had concluded its own investigation of these types of events in October 2018. The investigation reviewed 74

³ Refer to [Independent Assurance Report on AEMO’s compliance with the WEM Rules and Market Procedures](#).

information technology failures over the period January 2017 to July 2018. AEMO was non-compliant on 32 occasions for failing to dispatch from the latest Balancing Merit Order. The ERA's investigation did not identify any material consequences to the market or participants.

At that time, the ERA requested AEMO to provide an explanation of its plans to manage this ongoing compliance risk.

AEMO responded that some of the non-compliances were one-off events and it did not expect them to be repeated. AEMO stated that work was ongoing to address information technology failures through remedial actions. AEMO said that it reduced the number of information technology incidents in 2018/19, compared to 2017/18.

The ERA agrees that there have been fewer information technology failures. The ERA will continue to monitor AEMO's performance in this area.

Two high-risk matters concerned the calculation of ancillary services payments for contracted services. In the first matter, AEMO did not recover System Restart contract payments totalling over \$200,000 when the facilities were not available to perform the contracted services. There were also errors in the annual indexation of payments under these contracts. The auditor considered the System Restart Services non-compliances to be sufficiently material to qualify the audit opinion.

The auditor recommended that AEMO implement controls to ensure that payments for the System Restart and Spinning Reserve Services accurately reflect contract terms. AEMO has reviewed the contracts for these services and defined the contract terms into operational requirements for the contracted facilities. Measures have also been put in place to verify the accuracy of the cost calculations. Work instructions for these processes are under development and expected to be completed by the end of 2019.

The second high-risk matter concerned the incorrect calculation of market fees. The auditor reported that the incorrect calculations have been occurring since the commencement of the market in 2006. Again, the auditor considered this non-compliance to be sufficiently material to qualify the audit opinion.

Market fees are charged to participants for the market and power system services provided by AEMO and the ERA's regulatory functions. These fees are calculated by AEMO's settlement information technology systems. The fees are charged to participants according to their monthly load and generation. The rules require the use of absolute load and generation values at an early point in the calculations. AEMO's software, which was transferred to it from the former Independent Market Operator, applies absolute values at a later point in the calculations than required under the rules. This error has resulted in some participants being overcharged and others undercharged. The auditor did not identify this non-compliance in earlier audits. The error was also not identified when the software was first certified for compliance in 2006.

AEMO reported that the maximum amount overcharged to a single participant was \$242,000 and the maximum amount undercharged was \$907,000. The software was corrected in October 2019.

Some of the fee errors will be corrected through the market settlement adjustment process resulting in recoveries from, or reimbursements to, participants. However, there is a 12-month time limit in the Market Rules for settlement adjustments, meaning that most of the errors will not be corrected. The ERA plans to undertake its own investigation into this non-compliance to determine why the fee error was not identified in earlier audits or software certification processes carried out under the Market Rules. The ERA's investigation will consider whether there were inadequacies in the effectiveness of these compliance assurance processes.

2.5 Market Rules audit report – Other matters

Nearly 40 per cent of the matters considered by the auditor for 2018/19 were medium-risk. This means the non-compliance or risk could have a moderate impact on the market or power system. Most of these medium-risk matters (12 events) were non-compliances (Compliance rating 1), with only one matter being a compliance risk with no non-compliance (Compliance rating 2). This contrasts with 2017/18, where only two of the 12 medium-risk matters were non-compliances (Compliance rating 1).

The 12 medium-risk non-compliances reported in the 2018/19 audit were:

- Four dispatch matters, two of which concerned AEMO incorrectly constraining facilities to levels different to their cleared merit order positions. This may have resulted in out-of-merit dispatch payments to these facilities. The third matter concerned AEMO allowing a facility to synchronise without a corresponding dispatch instruction. The final dispatch matter was a failure to issue retrospective dispatch instructions to match verbal instructions that had been given earlier.
- Three settlement matters, including the failure to add a new participant in metering calculations, the use of an incorrect facility identification number in settlement data and the failure to calculate dispatch volumes that are used in settlement calculations for non-scheduled generators.
- Four matters concerning Dispatch Advisories. Dispatch Advisories are released to the market to provide transparency on information that may affect a participant's dispatch or may influence a participant's bidding and dispatch decisions. In two matters, Dispatch Advisories were not issued to inform the market of the dispatch of out-of-merit generation. A further matter concerned an advisory that was not withdrawn, when the event the subject of the advisory had finished. In the fourth matter, AEMO incorrectly declared the operating state to be a high-risk, rather than an emergency state, in the advisory.
- One matter where AEMO sent the dispatch plan for the Balancing Portfolio to Synergy over 90 minutes late due to an email system error.

There were also several low-risk non-compliances (Compliance rating 1) including six matters where information required under different areas of the Market Rules was published late or not at all. There were four low-risk matters concerning Opportunistic Maintenance outages. The ERA was concerned that these outage matters were repeat breaches, with each case involving Opportunistic Maintenance that was granted in circumstances that did not meet the criteria under the Market Rules.

Most of the medium and low-risk matters were a result of human errors, such as failures to follow process, a lack of training, gaps in procedures and typographical errors. The ERA requested further information from AEMO on the controls that it has put in place to prevent these types of errors. AEMO advised, and the ERA agrees, that there will always be human error risks in non-automated tasks. AEMO has implemented training programs, updated relevant procedures and guidelines and undertaken *ad hoc* and regular formalised education sessions, including with its compliance and legal teams.

AEMO informed the ERA that it is also seeking to improve training and knowledge for its control room personnel. A dedicated learning and development professional has been employed. AEMO also advised that is planning other initiatives including the establishment of

a formal steering committee to oversee improvement areas and monitor the implementation of improvement initiatives.

For the Opportunistic Maintenance non-compliances, AEMO advised that it provided training to all control room staff to reinforce the correct requirements for determining whether to approve these outages. AEMO has also developed a guideline on Opportunistic Maintenance.

2.6 Gas Services Information Rules audit report

The GSI Rules⁴ require AEMO to ensure that the auditor carries out audits of:

- The compliance of AEMO's internal procedures and business processes with the GSI Rules.
- AEMO's compliance with the GSI Rules and GSI Procedures.
- AEMO's software systems for the Gas Bulletin Board and the calculation of GSI fees and processes for software management.

The results of the audit are documented in the auditor's Independent Assurance Report on AEMO's compliance with the GSI Rules and GSI Procedures (Appendix 2). The report was published on AEMO's website in October 2019.⁵

The auditor reported the following main themes and findings:

- AEMO uses automated software to implement most of its obligations. The 2018/19 non-compliances concern AEMO's manual activities and were all self-reported.
- AEMO has a strong compliance culture where self-reporting of matters is encouraged and the approach to compliance risk management is proactive.

A summary of the audit findings by compliance and risk rating is provided in Table 3 below.

Table 3: Summary of 2018/19 audit findings

	Low-risk	Medium-risk	Significant-risk	Total
Compliance rating 1 (non-compliance)	4	0	0	4
Compliance rating 2 (compliance risk)	1	0	0	1
Total	5	0	0	5

The 2018/19 report contained a total of five audit findings. The level of GSI non-compliance continues to be low and is the same as reported in the 2017/18 audit.

All five matters were low-risk. The most notable of these were incorrect amounts in GSI invoices. These errors affected invoices that were issued in November 2018. Corrected invoices were re-issued in the same month ahead of any payments being collected so there

⁴ See rule 174(2) of the GSI Rules.

⁵ Refer to [Independent Assurance Report on AEMO's compliance with the GSI Rules and GSI Procedures](#).

were no financial consequences from the errors in the original invoices. AEMO has since corrected these errors through invoice adjustments. Other non-compliances included the late submission of AEMO's allowable revenue proposal to the ERA and the late publication of financial reports.

2.7 AEMO's response to the audits

AEMO stated it accepted the audit findings that were reported at the conclusion of both audits. AEMO published its response to the audits on its [website](#).

3. ERA investigations in 2018/19

3.1 Market Rules investigations

The ERA is required to include the results of any investigations it has carried out on AEMO's compliance with the Market Rules and Market Procedures in this report.

Between 1 July 2018 and 30 June 2019, the ERA completed eight investigations of alleged breaches of the Market Rules and/or Market Procedures by AEMO. While most of these matters were self-disclosed by AEMO and were minor, there were two material matters investigated by the ERA concerning AEMO's allocation of Certified Reserve Capacity.

On 22 July 2019 the ERA published a notice stating that AEMO breached the Market Rules when allocating Certified Reserve Capacity to two Market Participants. AEMO self-reported these breaches to the ERA in February and May 2018.

The ERA's investigation confirmed that AEMO knowingly breached the Market Rules when it allocated the capacity to the two participants. At the time, AEMO believed its actions would better serve the market objectives.

The ERA completed its investigation and issued a formal warning to AEMO because the breaches were intentional and avoidable. AEMO has notified the ERA that it has implemented revised processes and controls for assigning Certified Reserve Capacity to prevent future non-compliances.

These matters are summarised in Table 4.

Table 4: 2018/19 Summary of AEMO investigations

Primary Rule reference	Description	Investigation determination	Investigation outcome ⁶
10.2.4	Provided market information to a party not permitted to receive it in March 2016.	Breach	No further action
4.28.9	Incorrectly accepted a load as a Non-Temperature Dependent Load in March 2016.	No breach	No further action
7.6.1C	Failed to dispatch from the latest Balancing Merit Order for 32 events between January 2017 and July 2018.	Breach	Education
3.18.2(c)	Published an Equipment List that did not contain the correct market names of individual Registered Facilities in September 2017.	Breach	No further action
7.2.1	Delayed preparation Load Forecast files for 13 September 2017 and 20 October 2017 Trading Days by the 7.30am deadline.	Breach	Education

⁶ Table 1 in the ERA's [Monitoring Protocol](#) provides guidance on the different types of investigation outcomes and the circumstances in which these may be applicable.

Primary Rule reference	Description	Investigation determination	Investigation outcome ⁶
6.3A.2(a)	Incorrect calculation of Maximum Supply Capability for two Market Participants on 23 and 24 May 2016.	Breach	No further action
4.11.1	Incorrect allocation of Certified Reserve Capacity to two Facilities on 19 August 2016.	Breach	Warning
4.11.2(b)	Incorrect allocation of Certified Reserve Capacity to eight non-scheduled generators on 6 September 2016.	Breach	No further action

3.2 GSI investigations

While the GSI Rules do not require this report to include the results of any investigations carried out by the ERA on AEMO's compliance with the GSI Rules and GSI Procedures, this section has been included in this report for completeness.

During 2018/19 the ERA did not investigate any alleged breaches of the GSI Rules or GSI Procedures by AEMO.

4. Conclusion

AEMO continues to demonstrate a compliance culture that encourages the self-reporting of breaches. AEMO's compliance risk management is also proactive, and this has been demonstrated by a significant reduction in its compliance risks in 2018/19.

There were two material non-compliance matters that resulted in the auditor providing a qualified audit opinion on AEMO's compliance. A remedy for one of these matters has been implemented. Controls for the second matter concerning payments for System Restart contracts are under development. The ERA recommends that AEMO keep it informed of AEMO's progress with implementing adequate contract management processes for these contracted services.

Appendix 1 Independent Assurance Report on AEMO's compliance with the WEM Rules and Market Procedures



ROBINSON BOWMAKER PAUL



AUSTRALIAN ENERGY MARKET OPERATOR

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

13 SEPTEMBER 2019

Prepared by: Richard Bowmaker, Sue Paul
Document version: 2.4 FINAL

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EXECUTIVE SUMMARY

This independent assurance report sets out the results of the market audit by Robinson Bowmaker Paul (RBP) assessing AEMO’s compliance with the Wholesale Electricity Market Rules (WEM Rules) and Market Procedures.

AUDITED ENTITY

The audited entity for this report is AEMO.

AUDIT PERIOD

The Audit Period is 1 July 2018 to 30 June 2019, both dates inclusive.

REGULATORY CONTEXT AND SCOPE

Regulatory context

The regulatory context for the audit is summarised in the table below.

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: <ul style="list-style-type: none">• 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.

AUDIT CRITERIA

Criteria for determining operational and procedural compliance

The criterion we have used for determining the compliance of AEMO's Market Procedures is the WEM Rules dated 11 January 2019.

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.

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.

Table 2: Procedures reviewed to assess control application

AEMO functional area	Procedures against which control application has been assessed
Market Operations	Energy Price Limits Procedure, IRCR and CC Allocation Procedure, Settlements Procedure and Confluence work instructions relating to these procedures
Reserve Capacity	Certification of Facilities Procedure and related Confluence work instructions on Relevant Level calculation and review of access arrangements
Finance	WEM GSI Procedure
System Management Operations Governance and Integration	Daily System Management Operations Contingency and Backup Procedure, Dispatch Advisory Guidelines, Internal Procedure - Internal WEM Rule Compliance, Internal Procedure – Tolerance Ranges, Daily System Management Operations Procedure, Weekly Ad-hoc Market Operations Procedure, SCADA Cleansing Guidelines; Internal Procedure – Monitor Rule Participant Compliance, Internal Guideline – Equipment List
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, Internal Procedure - Manage Real-Time Dispatch, Internal Procedure - Manage Real-Time System Security, FAQ for Dispatch, Internal Guideline – Generator Synchronisation, Internal Guideline – Dispatch of Demand Side Programmes,
System Management - Planning	FAQ for Commissioning, Internal Guideline – Generator Planned Outages, Internal Procedure - Operational Forecasting, Internal Procedure - Plan and Procure Ancillary Service Quantities, Internal procedure – Synergy Dispatch Planning, Internal procedure – Transmission Network Planned Outages
IT	IT Change Management Policy, Incident Management Policy, Problem Management Policy, Software Configuration Management 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 market operators with which we are familiar.

APPROACH

Assurance

This 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 with the WEM Rules and Market Procedures
- 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

Compliance and risk ratings

Table 3: Compliance and risk rating definitions

Compliance rating	Risk Rating
1: Instances of non-compliance with the WEM Rules	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.
2: Findings that are not an instance of non-compliance, but pose compliance risk	Significant: 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.

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 an issue is systemic
- Whether an issue is recurring (from previous audits).

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
- Reviewing AEMO’s Market Procedures, Internal Procedures¹ 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 controls².

The first two activities were conducted as part of our field visits in May 2019 and July 2019.

Remaining activities (including review of self-reported incidents arising after our field visit) have been undertaken remotely.

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:

¹ In some instances, we have reviewed draft versions of Internal Procedures that had not been formally approved as at the time of the audit.

² In doing so, we have sourced information from all AEMO (WA) teams.

Table 4: Audit focus areas

Workstream	Proposed focus area
Electricity Market Operations	Settlement and verification (including preparing meter data for settlement)
	Review of prepayment application tool
	Certification of Constrained Access Facilities (including derivation of Relevant Level)
	Energy Price Limits review
	Preparation of WEM budget and market fees
	Application of interest on prudential security
Electricity System Operations	Ancillary Services Dispatch
	Use of latest BMO in dispatch
	Support and currency of control room software tools
	Dispatch of Synergy plant
	Control room business continuity plans
	Dispatch of facilities under NCS contracts
	System Management internal procedures
	Systems Operations inputs into settlement processes

AUDIT THEMES AND FINDINGS

Comment

Strong compliance culture and accountability prevalent across AEMO

AEMO teams generally have a strong culture of compliance where self-reporting of issues 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. There are no opening findings from last year’s audit and more than half of all findings from the current Audit Period have already been closed. Additionally, notwithstanding the findings with respect to compliance risk associated with ancillary services settlement information, AEMO has

implemented improvements to their tool suite which should decrease the frequency of settlement errors. The closed findings include many long-standing issues from System Management.

- The majority of WEM Rules breaches are self-reported by AEMO staff.
- Our site visits have indicated that AEMO teams maintain and apply effective controls to manage compliance risk in most cases. The quality of controls in settlement, market operations and reserve capacity are particularly robust.

Significant increase in uncontrollable distributed generation having an increasing impact on system operations

The SWIS is continuing to see rapid installation of uncontrollable distributed energy resources (DER) – especially rooftop photovoltaics. This has a number of impacts on the system, including:

- Days with multiple large and sudden load variations (e.g. partially cloudy days)
- Low minimum demand periods
- Increasingly rapid load variations during the evening ramp

This is having a major impact on the management of the system by the System Management controllers. In particular, we have observed the following trends:

- The standard Metrix load forecasts are becoming increasingly inaccurate, resulting in increased use of alternate 'Similar day' forecasts, with periods of switching between multiple alternate forecast methodologies
- An increased use of the High Risk Operating State to maintain system security
- An increase in the number of trading periods in which the standard LFAS provision is insufficient, so Backup LFAS being used.

These measures are the tools that AEMO currently have available to manage system security given the increase in uncontrollable generation, and to date these measures have been sufficient. However, given the continued rapid installation of DER – of the order of several hundred MW per year – at some point in the future the system will reach a state in which these measures are insufficient. Projects are planned, such as the development of an inertia tool, to address these issues but are held up to a large extent by the SMST and PSO projects, and the wider market reform process.

This situation will require careful monitoring to ensure that AEMO has the tools required to manage situation at the time that they are required.

Further opportunity to improve controls associated with preparing ancillary services settlement information

A recurring theme from past audits has been the manual nature of processes (and resulting compliance risk) associated with System Management's preparation of monthly ancillary services cost information which is passed an input to settlement. There have been recurring breaches in this area for multiple past audits. System Management has improved the quality of the tools used to calculate spinning reserve payments; these improvements should reduce the frequency of settlement errors pertaining to spinning reserve inputs to settlement. However, we have noted the following:

- When calculating System Restart Service (SRS) costs, there has been no formal process in place to claw back payments due to non-performance. As a result, SRS providers have been overpaid an estimated \$204,539 since at least July 2016.
- There is no formal process in place to ensure that the ancillary service cost calculations are aligned with the respective service provider contracts.
- There is opportunity to improve validation controls when preparing ancillary services inputs to settlement. For example:
 - In 19WEM1.44, the erroneously pro-rated monthly SRS payment input was applied incorrectly for seven months resulting in underpayment of \$990K to the SRS provider; while SM's internal procedures indicated a second-stage validation occurs prior to the costs being sent to settlement, it is evident that the quality of this validation was not robust enough to detect the error.
 - During our controls testing, AEMO was unable to provide evidence that second-stage validation occurred when preparing ancillary services inputs to settlement.

Hence, there is opportunity to improve the robustness of the process used by System Management to prepare ancillary services cost information for settlement purposes.

Occasional IT issues preventing dispatch according to the latest Balancing Merit Order reduced in frequency but remain an issue

This has been a long-standing problem, with several instances of the problem being self-reported by AEMO each year. AEMO has been working with Western power to address the underlying causes with some success. This year, fewer instances were self-reported than previously (2 vs. 6 in the previous audit year); however, our compliance testing revealed that there were more instances of

not using the latest BMO than were self-reported, due to planned or unplanned WEMS outages. In each of these cases, there had been no changes to the BMO, so the BMO used for Balancing Market dispatch was still correct and therefore no WEM rule breach had occurred.

AEMO IT systems remain complex, and are set to become increasingly complex

We have previously reported on the complexity of AEMO's IT environment. This complexity exists both in the large number of systems and tools used to implement AEMO's obligations, and the large and diverse stack of technologies used to implement these systems and tools. This year, we identified 39 discrete technologies used to implement AEMO's current technologies.

This complexity is set to increase with the transfer of Western Power systems into AEMO with the SMST project, which will introduce another 9 technologies to this stack.

It therefore remains critical that AEMO continue to modernise and refresh systems to reduce this complexity, with clear options to address the legacy issues and systems, even if they are dependent on the path taken in ongoing market reform.

Summary

Table 5 below summarises the total number of audit issues (broken down by risk rating) reported during the 2017/18 and 2018/19 Audit Periods. Table 6, Table 7, and **Error! Reference source not found.** further break these numbers down by compliance rating.

Each issue corresponds to one non-compliance, risk on non-compliance, or an area with potential for improvement.

The overall number of issues has decreased from 50 in the 2017/18 audit year to 35 in the 2018/19 audit year. However, the number of high risk rated issues has increased significantly from 2 in the 2017/18 audit year to 6 in the 2018/19 audit year. 4 of the high risk issues relate to System Management; 2 are to Market Operations.

It should be noted that some of the increases in numbers of findings from the 2017/18 audit year to the 2018/19 audit year are attributable to a change in reporting practice: In previous years, multiple instances of similar breaches were aggregated into a single finding, whereas this year, each individual breach has been reported as a separate finding.

Table 5: Audit issue summary by risk rating and open/closed status, 2017/18 and 2018/19.

	2017/18 Issues	2018/19 Issues				
Risk Rating	Total	Total	Closed		Open	
			AEMO	RBP	AEMO	RBP
High	2	6	4	0	0	2
Medium	12	13	8	0	4	1
Low	36	16	13	1	0	2
Totals	50	35	25	1	4	5
			26		9	

Table 6: Audit issue summary by risk rating and open/closed status, compliance rating 1 issues.

	Compliance Rating 1				
Risk Rating	Total	Closed		Open	
		AEMO	RBP	AEMO	RBP
High	6	4	0	0	2
Medium	12	8	0	4	0
Low	14	13	1	0	0
Totals	32	25	1	4	2
		26		6	

Table 7: Audit issue summary by risk rating and open/closed status, compliance rating 2 issues.

	Compliance Rating 2				
Risk Rating	Total	Closed		Open	
		AEMO	RBP	AEMO	RBP
High	0	0	0	0	0
Medium	1	0	0	0	1
Low	2	0	0	0	2
Totals	3	0	0	0	3
		0		3	

Table 8: Summary of audit issues

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.01	<p>Issue Type AEMO reported non-compliance</p> <p>Process SM - Power System Operations</p>	<p>Risk Rating Medium</p> <p>Compliance Rating 1</p>	Incorrectly constraining a Market Participant to a level greater than that of their Balancing Merit Order position	<p>No further action.</p> <p>AEMO has addressed the issue.</p>
19WEM1.02	<p>Issue Type AEMO reported non-compliance</p> <p>Process SM - Power System Operations</p>	<p>Risk Rating Medium</p> <p>Compliance Rating 1</p>	Incorrectly granting permission for a facility to synchronize which was not in line with the Facility's Dispatch Instruction	Ensure that this situation is included in controller training, and that all controllers receive this training.
19WEM1.03	<p>Issue Type AEMO reported non-compliance</p> <p>Process</p>	<p>Risk Rating High</p> <p>Compliance Rating 1</p>	Not using latest BMO due to denial of service cyber attack in 3 rd party IT system.	<p>No further action.</p> <p>AEMO has addressed the issue.</p>

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
	SM - Operations, Governance and Integration			
19WEM1.04	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Medium Compliance Rating 1	Incorrectly constraining a facility to a level lower than that of their Balancing Submission	No further action. AEMO has addressed the issue.
19WEM1.05	Issue Type AEMO reported non-compliance Process SM - Operations, Governance and Integration	Risk Rating High Compliance Rating 1	Not using the latest BMO due to WP IT issues	No further action. AEMO has addressed the issue.
19WEM1.06	Issue Type AEMO reported non-	Risk Rating Low	Incorrectly calculating refund amount to facility on approved planned outage	No further action. AEMO has addressed this issue.

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
	compliance Process Market operations	Compliance Rating 1		
19WEM1.07	Issue Type AEMO reported non-compliance Process SM - Operations, Governance and Integration	Risk Rating Low Compliance Rating 1	Failure to publish aggregate forecast output of non-scheduled generators by deadline	No further action. AEMO has addressed the issue.
19WEM1.08	Issue Type AEMO reported non-compliance Process SM - Planning	Risk Rating Low Compliance Rating 1	Incorrectly granting opportunistic maintenance on two consecutive days	No further action. AEMO has addressed the issue.
19WEM1.09	Issue Type AEMO reported non-compliance Process	Risk Rating Medium Compliance Rating 1	Incorrect settlements caused by failure to add new participant to metering calculation	No further action. We are satisfied AEMO has adequate controls in place to manage issues for which recommendations are still being implemented.

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
	Market operations			
19WEM1.10	Issue Type AEMO reported non-compliance Process Market operations	Risk Rating Low Compliance Rating 1	Failure to publish new distribution loss factors by deadline	No further action. AEMO has addressed the issue.
19WEM1.11	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Medium Compliance Rating 1	Failure to issue Dispatch Advisory for out of merit generation	No further action. AEMO has addressed the issue.
19WEM1.12	Issue Type AEMO reported non-compliance Process SM - Planning	Risk Rating Low Compliance Rating 1	Incorrectly approving day-ahead opportunistic maintenance to run over more than one trading day	No further action. AEMO has addressed the issue.
19WEM1.13	Issue Type AEMO reported non-	Risk Rating Medium Compliance	Failure to issue Dispatch Advisory for out of merit generation	No further action. AEMO has addressed the issue.

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
	compliance Process SM - Power System Operations	Rating 1		
19WEM1.14	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Low Compliance Rating 1	Incorrectly granting on the day opportunistic maintenance within an hour of commencement	No further action. AEMO has addressed the issue.
19WEM1.15	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Low Compliance Rating 1	Incorrectly granting on the day opportunistic maintenance within an hour of commencement	No further action. AEMO has addressed the issue.
19WEM1.16	Issue Type AEMO reported non-compliance	Risk Rating Medium Compliance Rating 1	Failure to send Synergy dispatch plan by deadline	No further action. AEMO has addressed the issue.

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
	Process SM - Planning			
19WEM1.17	Issue Type AEMO reported non-compliance Process SM - Operations, Governance and Integration	Risk Rating Medium Compliance Rating 1	Incorrect Resource ID in settlement data	No further action. AEMO has addressed the issue.
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	<ul style="list-style-type: none"> • Ensure that the recommendations from the incident report are implemented • Conduct a BCP exercise using the above single point of contact and script.
19WEM1.19	Issue Type AEMO reported non-compliance Process SM -	Risk Rating Medium Compliance Rating 1	Failure to calculate dispatch volumes for curtailed facility	No further action. AEMO has addressed the issue.

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
	Operations, Governance and Integration			
19WEM1.20	Issue Type AEMO reported non-compliance Process SM - Power System Operations	Risk Rating Medium Compliance Rating 1	Failure to withdraw DA when situation was resolved.	No further actions. AEMO has addressed the issue.
19WEM1.21	Issue Type AEMO 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 in finding is documented in the appropriate procedure
19WEM1.23	Issue Type RBP reported non-compliance Process Finance	Risk Rating Low Compliance Rating	Failure to publish historic financial report for financial year ending 2018	No further action recommended. However, see related finding 19WEM1.34 relating to general lack of finance controls.

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
		1		
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 obligations	We recommend: <ul style="list-style-type: none"> • Calendar alerts be instituted for key publication/submission deadlines such as budget, fees, historic financial reports and allowable revenue submissions. <p>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.</p>
19WEM1.36	Issue Type RBP reported non-compliance Process Market operations	Risk Rating High Compliance Rating 1	Multiple instances of latest updated BMO not being used created due to WEMS outages	<ul style="list-style-type: none"> • Ensure that all instances of not using or creating an up to date BMO are investigated and reported as self-reported breaches where appropriate, so that progress in resolving these issues can be monitored. • Review incident management process to ensure that all potential incidents are investigated, and refresh process to SM Market Operations team

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
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	<ul style="list-style-type: none"> 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).
19WEM1.43	Issue Type RBP reported compliance risk Process SM - Planning	Risk Rating Medium Compliance Rating 2	Potential risk areas still exist in AS monthly data preparation	<p>We recommend:</p> <ol style="list-style-type: none"> 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). 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

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
				<p>(similar to what is used by the settlements team to track key events during a cycle)).</p> <p>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.</p>
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 payments	<p>We further recommend that SM develop and document (in their internal procedures) a robust process to calculate SRS payments. The process should include controls to ensure:</p> <ol style="list-style-type: none"> 1. Contractual arrangements are accurately reflected in payments (a legal review of the compliance of SM's process with the contractual arrangements should be undertaken, and repeated whenever a contract is renegotiated) 2. Clawback payments are accurately calculated

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
				3. Annual indexation calculations are performed correctly, and that the base monthly value is updated if a pro-rated value is used to reflect indexation occurring part way through a month.
19WEM1.52	Issue Type AEMO reported non-compliance Process SM - Operations, Governance and Integration	Risk Rating High Compliance Rating 1	Incorrect calculation Contracted Spinning Reserve quantity	No further action - see recommendations for finding 19WEM1.43.
19WEM1.54	Issue Type AEMO reported non-compliance Process SM - Operations, Governance and Integration	Risk Rating Low Compliance Rating 1	Erroneous TES calculation and constraint payments (plus potentially RC refunds and Relevant Level) due to erroneous upload of ex-post outage file.	No further action. AEMO has addressed the issue.

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.55	Issue Type AEMO reported non-compliance Process Reserve Capacity	Risk Rating Low Compliance Rating 1	Reserve capacity testing report published 53 days late	No further action. AEMO has addressed this issue.
19WEM1.56	Issue Type AEMO reported non-compliance Process Market operations	Risk Rating Low Compliance Rating 1	Incorrect constraint payment calculations for two facilities since October 2017 due to error in Settlement Tolerance import	No further action. AEMO has addressed the issue
19WEM1.57	Issue Type AEMO reported non-compliance Process Market operations	Risk Rating Low Compliance Rating 1	September 2018 IRCR published late	No further action. AEMO has robust controls in place to mitigate recurrence.
19WEM1.58	Issue Type AEMO reported non-compliance Process	Risk Rating Low Compliance	Market Advisory not issued for WEMS FTP issue.	No further action. AEMO has addressed the issue.

Ref	Type & Process	Risk & Compliance Ratings	Finding	Recommendation
	Market operations	Rating 1		
19WEM1.59	Issue Type AEMO reported non-compliance Process SM - Planning	Risk Rating Low Compliance Rating 1	Confidential participant data sent to Synergy with Dispatch Plan	No further action. AEMO has addressed the issue.
19WEM1.60	Issue Type AEMO reported non-compliance Process Market operations	Risk Rating High Compliance Rating 1	Historic error in Market Fee calculation	No further action. However, the issue will remain open until the defect has been fixed.

OPINION

Qualifications

We have noted 2 instances of material non-compliance with the WEM Rules; our definition of materiality is set out on page 7:

- **19WEM1.44:** Historic and systemic errors in System Restart Cost calculations have led to over-recovery of costs from participants since at least July 2016.
- **19WEM1.60:** Software defect has led to erroneous market fee calculations since market start; market fees will continue to be incorrect until AEMO's vendor is able to address the issue³.

Conclusion

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

Subject to the inherent limitations set out in Section 1.5.4 and with the exception of the instances set out above, based on the audit procedures we have performed and the evidence we have examined, nothing has come to our attention that causes us to believe 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 Section 1.5.4, 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 Section 1.5.4, 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.

³ Due to the complexity of the metering and settlement systems, a manual workaround is impracticable.

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1 INTRODUCTION

This chapter sets out the regulatory context for the Electricity Compliance 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 2018 to 30 June 2019, 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 Electricity Compliance 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 9: 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: <ul style="list-style-type: none">• 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 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:
 - 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.
 - Areas of potential risk identified by the Settlement Risk Review undertaken in December 2018.
- **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 October 2017 initial NSTEM settlement run 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 11 January 2019 (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 10: Procedures reviewed to assess control application

AEMO functional area	Procedures against which control application has been assessed
Market Operations	Energy Price Limits Procedure, IRCR and CC Allocation Procedure, Settlements Procedure and Confluence work instructions relating to these procedures
Reserve Capacity	Certification of Facilities Procedure and related Confluence work instructions on Relevant Level calculation and review of access arrangements
Finance	WEM GSI Procedure
System Management Operations Governance and Integration	Daily System Management Operations Contingency and Backup Procedure, Dispatch Advisory Guidelines, Internal Procedure - Internal WEM Rule Compliance, Internal Procedure – Tolerance Ranges, Daily System Management Operations Procedure, Weekly Ad-hoc Market Operations Procedure, SCADA Cleansing Guidelines; Internal Procedure – Monitor Rule Participant Compliance, Internal Guideline – Equipment List
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, Internal Procedure - Manage Real-Time Dispatch, Internal Procedure - Manage Real-Time System

AEMO functional area	Procedures against which control application has been assessed
	Security, FAQ for Dispatch, Internal Guideline – Generator Synchronisation, Internal Guideline – Dispatch of Demand Side Programmes,
System Management - Planning	FAQ for Commissioning, Internal Guideline – Generator Planned Outages, Internal Procedure - Operational Forecasting, Internal Procedure - Plan and Procure Ancillary Service Quantities, Internal procedure – Synergy Dispatch Planning, Internal procedure – Transmission Network Planned Outages
IT	IT Change Management Policy, Incident Management Policy, Problem Management Policy, Software Configuration Management 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 with the WEM Rules and Market Procedures
- 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 11: Compliance and risk ratings

Compliance rating	Risk Rating
1: Instances of non-compliance with the WEM Rules	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.
2: Findings that are not an instance of non-compliance, but pose compliance risk	Significant: 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.
3: Findings related to areas for improvement that do not affect compliance risk	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 Procedures⁴ 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 two activities were conducted as part of our field visits in May 2019 and July 2019. Remaining activities (including review of self-reported incidents arising after our field visit) have been undertaken remotely.

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 prepayment application tool
 - Certification of Constrained Access Facilities (including derivation of Relevant Level)
 - Energy Price Limits review
 - Preparation of WEM budget and market fees

⁴ In some cases we have reviewed draft versions of Internal Procedures that had not been formally approved as at the time of the review.

- Application of interest on prudential security
- Electricity System Operations
 - Preparation of System Operations inputs into settlement. This includes:
 - Ancillary services cost information
 - SCADA cleansing
 - Review and updating of changes to Temperature Dependence Curves
 - Dispatch, including:
 - Out of merit dispatch/use of latest BMO
 - Control room operations
 - Control room staff rostering
 - Event logging
 - Dispatch advisories
 - Ancillary Service enablement
 - High-risk operating states
 - GIA dispatch
 - Dispatch planning, including:
 - Accuracy of load forecasts/use of alternate forecasts

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

There have been transitional changes to Chapter 1 of the WEM Rules to reflect:

- Transitional functions for AEMO to prepare for WEM reform
- Transitional calculation of Individual Reserve Capacity Requirements and the Capacity Credit Allocation Process relating to the Reduction of Prudential Exposure (ROPE) project.

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 reviewed AEMO's compliance with transitional rule clause 1.26.4 to verify that AEMO published the 12 Peak Intervals within 5 Business Days of 1 May 2019. We have confirmed that AEMO published the 12 Peak Intervals in accordance with clause 1.26.4.

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

There have been minor cosmetic changes to the Registration Process (Section 2.33) of Chapter 2 to enhance clarity.

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.
 - Xx
- 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
 - 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.

Note, we were unable to perform control testing on Finance's budget and market fee processes due to the lack of audit trail.

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

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.10	<p>Issue Type</p> <p>AEMO reported non-compliance</p> <p>Obligation</p> <p>2.27.10</p>	<p>Risk Rating</p> <p>Low</p> <p>Compliance Rating</p> <p>1</p>	<p>Failure to publish new distribution loss factors by deadline</p> <p>On 26 September 2018, AEMO received details of two new Distribution Loss Factors which AEMO is required to published within two business days from receiving it. The New Distribution Loss Factors were not published on the AEMO WEM website until 31 October 2018 and therefore a breach of MR2.27.11.</p> <p>The loss factors in question were received outside the annual process (1 June); at the time no controls existed to ensure they were published and as such were missed due to human error. The impact was immaterial as only publication was affected (published one month late).</p> <p>The correct loss factors were picked up by metering system as part of standing data delivery from Western Power.</p> <p>To prevent recurrence, AEMO has developed a new work instruction for receiving loss factors outside annual review period. We have sighted this work instruction and confirm that a formal process now exists to manage loss factors submitted outside the annual process.</p>	<p>No further action.</p> <p>AEMO has addressed the issue.</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.23	<p>Issue Type</p> <p>RBP reported non-compliance (Recurring issue)</p> <p>Obligation</p> <p>2.22A.5</p>	<p>Risk Rating</p> <p>Low</p> <p>Compliance Rating</p> <p>1</p>	<p>Failure to publish historic financial report for financial year ending 2018</p> <p>WEM Rule 2.22A.5 requires AEMO to publish a historic financial report by 31 October showing AEMO's actual financial performance against budgeted financial performance for the previous financial year. AEMO published the historic financial report for the financial year ending 30 June 2018 six months late on 7 May 2019 (due to be published 31 October 2018). This is a recurring breach.</p>	<p>No further action recommended. However, see related finding 19WEM1.34 relating to general lack of finance controls.</p>
19WEM1.34	<p>Issue Type</p> <p>RBP reported compliance risk</p> <p>Obligation</p> <p>2.22A, 2.24, 2.43</p>	<p>Risk Rating</p> <p>Low</p> <p>Compliance Rating</p> <p>2</p>	<p>Lack of formalised business processes and controls relating to WEM obligations</p> <p>The Finance team has no formalised processes in place to meet their obligations under the WEM Rules. The existing process documentation is extremely high level and reiterates WEM rule mandated timelines and selected obligations.</p> <p>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.</p> <p>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 reports this year (see 19WEM1.23). This breach is a recurring one.</p> <p>During our interviews the Finance team also appeared to be unfamiliar with the term "Declared Market Project". This indicates that AEMO has no</p>	<p>We recommend:</p> <ul style="list-style-type: none"> • Calendar alerts be instituted for key publication/submission deadlines such as budget, fees, historic financial reports and allowable revenue submissions. <p>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</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			process in place to determine whether a project should be classified as a Declared Market Project in accordance with the WEM Rules.	budget/Allowable Revenue process description.
19WEM1.40	<p>Issue Type</p> <p>RBP reported compliance risk</p> <p>Obligation</p> <p>2.34</p>	<p>Risk Rating</p> <p>Low</p> <p>Compliance Rating</p> <p>2</p>	<p>No formalised process for second-stage validation by Principal Engineer (PE) for TDC updates</p> <p>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:</p> <ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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).

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

There has been a minor typographical change to the definition of Emergency Operating State (clause 3.5.1).

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
- 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 13: Operational compliance findings associated with Chapter 3 of the WEM Rules

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.08	<p>Issue Type AEMO reported non-compliance</p> <p>Obligation 3.19.2A(b)</p>	<p>Risk Rating Low</p> <p>Compliance Rating 1</p>	<p>Incorrectly granting opportunistic maintenance on two consecutive days</p> <p>On 6 November 2018 System Management incorrectly granted Opportunistic Maintenance to a facility. The SM controller approved On-the-day Opportunistic Maintenance but had not been informed that SM planning had approved Day-Ahead Opportunistic Maintenance for the following day. This resulted in Opportunistic Maintenance being granted for two consecutive trading days, which is not allowed under the rules.</p> <p>This was dealt with and resolved as an isolated incident caused by human error.</p>	<p>No further action.</p> <p>AEMO has addressed the issue.</p>
19WEM1.12	<p>Issue Type AEMO reported non-compliance</p> <p>Obligation 3.19.2(a)</p>	<p>Risk Rating Low</p> <p>Compliance Rating 1</p>	<p>Incorrectly approving day-ahead opportunistic maintenance to run over more than one trading day</p> <p>On 16 January 2019, System Management incorrectly approved a Day Ahead Opportunistic Maintenance (DAOM) for a facility, after the Network Provider changed the dates on a previously rejected request.</p> <p>The cause was human error on the part of the SM Planning staff member,</p>	<p>No further action.</p> <p>AEMO has addressed the issue.</p>

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
			assuming that the Network Provider would follow an agreed procedure.	
19WEM1.14	Issue Type AEMO reported non-compliance Obligation 3.19.2(b)	Risk Rating Low Compliance Rating 1	Incorrectly granting on the day opportunistic maintenance within an hour of commencement On 2 January 2019, System Management granted a Market Participant approval for an "On the Day Opportunistic Maintenance" within an hour of the pre-outage commencement. The request was made at 08:00 for an outage at 09:00. Note that the request could not have been made prior to 08:00, as that would have been the previous trading day. Thus, requesting ODOM at 08:00 for and 09:00 is a borderline case, but it has been AEMO's interpretation to disallow these since September 2018. The controller on duty was not aware of this and has now been informed.	No further action. AEMO has addressed the issue.
19WEM1.15	Issue Type AEMO reported non-compliance Obligation 3.19.2(b)	Risk Rating Low Compliance Rating 1	Incorrectly granting on the day opportunistic maintenance within an hour of commencement On 14 November 2018, System Management granted a Market Participant approval for an "On the Day Opportunistic Maintenance" within an hour of the pre-outage commencement. Similarly to 19WEM1.15, the request was made at 08:01 for an outage at 09:00.	No further action. AEMO has addressed the issue.

Ref	Issue type & obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.18	<p>Issue Type AEMO reported non-compliance</p> <p>Obligation 3.5.1(f)</p>	<p>Risk Rating Medium</p> <p>Compliance Rating 1</p>	<p>Incorrect operating state in dispatch advisory during loss of SCADA visibility</p> <p>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.</p> <p>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.</p> <p>Recommendations from the incident report for this event are:</p> <ul style="list-style-type: none"> - Assign a single point of contact during a relocation event - Develop a script to be followed to ensure that Western Power have frequency control 	<ul style="list-style-type: none"> • Ensure that the recommendations from the incident report are implemented • Conduct a BCP exercise using the above single point of contact and script.

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

Appendix 5 (Step 5A) was amended to reflect changes pertaining to RC_2018_01 to remove a manifest error in the calculation of New Notional Wholesale Meters in the IRCR calculation.

There has also been a small number of minor cosmetic changes to the wording of rules relating to the Long-Term PASA (Section 4.5) and Reserve Capacity Performance Monitoring (Section 4.27) to enhance clarity.

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, focussing on the certification of constrained access facilities.
- We have performed sample control testing to audit whether controls documented in the Certification of Facilities Internal Procedure were applied in practice during the deferred 2018/19 Reserve Capacity Cycle.

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

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.06	<p>Issue Type</p> <p>AEMO reported non-compliance</p> <p>Obligation</p> <p>4.26.1A(a)(ii)(1)</p>	<p>Risk Rating</p> <p>Low</p> <p>Compliance Rating</p> <p>1</p>	<p>Incorrectly calculating refund amount to facility on approved planned outage</p> <p>The settlements system incorrectly calculated a refund amount applicable to a Synergy Scheduled Generator during the period 12/02/2018 to 15/11/2018 when the facility was on an approved planned outage.</p> <p>This breach was the result of a software defect which led to the RCM Settlement system failing to identify that the Refund Exempt Planned Outage Count (REPOC) had exceeded the threshold specified under WEM Rule 4.26.1C (8,400MW calculated over the preceding 1,000 Trading Intervals). The defect caused the system to pull the wrong date range from the RCM Operations system and to calculate the REPOC parameter over a single day, instead of 1,000 Trading Intervals.</p> <p>As a result, Refund Exempt Planned Outages were not initially identified for facility over a nine-month period from February 2018 to November 2018, and the affected participant did not pay refunds of approximately \$244K).</p> <p>A fix has been deployed to the system to rectify the issue and the error is to be washed up in the adjustment process.</p>	<p>No further action.</p> <p>AEMO has addressed this issue.</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.55	<p>Issue Type</p> <p>AEMO reported non-compliance</p> <p>Obligation</p> <p>4.25.11</p>	<p>Risk Rating</p> <p>Low</p> <p>Compliance Rating</p> <p>1</p>	<p>Reserve capacity testing report published 53 days late</p> <p>Clause 4.25.11 requires AEMO to publish details of reserve capacity tests every three months. The Reserve Capacity Testing Internal Procedure is consistent with this rule and requires quarterly publication of the above reports within 10BD of 31 March, 30 June, 30 September and 31 December. The reserve capacity tests conducted in the quarter October - December 2018 should have been published in mid-January (according to the internal procedure) but, due to human error, were instead published late on 3 April 2019.</p> <p>We note that market participants can access their testing results any time via the new RCM portal (hence inability to access the report would not have had any market impact).</p> <p>AEMO has since implemented calendar reminders to prevent recurrence of this breach.</p>	<p>No further action.</p> <p>AEMO has addressed this issue.</p>
19WEM1.57	<p>Issue Type</p> <p>AEMO reported non-compliance</p> <p>Obligation</p> <p>4.1.28(b)</p>	<p>Risk Rating</p> <p>Low</p> <p>Compliance Rating</p> <p>1</p>	<p>September 2018 IRCR published late</p> <p>In accordance with clause 4.1.28 of the WEM Rules, the IRCR for September 2018 was required to be published on 25 July 2018.</p> <p>As a result of human error, the IRCR for September 2018 was not published to Participant Information Reports (PIR) by 25 July 2018.</p> <p>On 30 July 2018, a market participant alerted AEMO that the IRCR was not visible on the PIR. Market Operations subsequently published the PIRs in WEMS MPI on 30 July 2018.</p>	<p>No further action.</p> <p>AEMO has robust controls in place to mitigate recurrence.</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<p>The impact is low as the IRCR was published soon after the deadline and it is unlikely that there would have been any material market impact due to this delay.</p> <p>We note that a robust process for publishing the IRCR to PIRs exists already and that the error occurred as a result of the staff member not following the procedure instructions to completion. AEMO's remedial action was to remind staff members of the importance of completing procedural steps.</p>	

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.

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

A There have been no amendments to Chapter 6 of the WEM Rules.

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.

We have additionally:

- Performed compliance testing to assess whether AEMO has met its obligations with respect to performing the annual review of Energy Price Limits (EPL) required under clause 6.20.6
- Reviewed procedures to assess whether AEMO has appropriate controls to manage the EPL review.

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

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.09	<p>Issue Type</p> <p>AEMO reported non-compliance</p> <p>Obligation</p> <p>6.17.2, 9.3.7, 3.14.1, 9.13.1</p>	<p>Risk Rating</p> <p>Medium</p> <p>Compliance Rating</p> <p>1</p>	<p>Incorrect settlements caused by failure to add new participant to metering calculation</p> <p>Due to a process error, AEMO failed to add a new participant to the POMAX metering aggregation query in May 2016 to reflect their initial metered consumption values. As a result, for the March 2016 invoice period onward the balancing market quantities for the market participant did not take into account their energy consumption and has therefore been incorrect; the amount that would have been payable by the participant has been incorrectly attributed to Synergy via the Notional Wholesale Meter instead.</p> <p>This error was discovered in September 2018 when customer churn led to the affected participant acquiring a large number of customer NMIs, and AEMO's routine validation procedures noted the discrepancy. This error led to a number of breaches⁵:</p> <ul style="list-style-type: none"> • Clause 6.17.2 – incorrect Balancing Metered Quantities • Clause 9.3.7 – incorrect Consumption Share • Clause 3.14.1 – incorrect LF_Share • Clause 9.13.1 – incorrect Monthly Participant Load. 	<p>No further action.</p> <p>We are satisfied AEMO has adequate controls in place to manage issues for which recommendations are still being implemented.</p>

⁵ This breach is reported only with respect to Chapter 6 as it was a single underlying issue which caused multiple breaches.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<p>AEMO has since:</p> <ul style="list-style-type: none"> • Instituted controls to ensure the error does not recur when new participants join the market • Commissioned an independent settlement risk review to evaluate residual risk associated with settlement processes • Implemented the majority of the recommendations arising from the risk review above. The outstanding recommendations requiring closure are in progress awaiting implementation. 	
19WEM1.56	<p>Issue Type</p> <p>AEMO reported non-compliance</p> <p>Obligation</p> <p>6.17.9(a)</p>	<p>Risk Rating</p> <p>Low</p> <p>Compliance Rating</p> <p>1</p>	<p>Incorrect constraint payment calculations for two facilities since October 2017 due to error in Settlement Tolerance import</p> <p>Settlement Tolerances are used to determine constraint payments. In general, if the difference between ‘intended’ generation and actual generation are different by an amount greater than the tolerance, then the facility is eligible for constraint payments.</p> <p>In 2017, SM updated the Settlement Tolerance value for two facilities. Market Operations uploaded the new values to Brady Settlement; however, this upload failed, and the settlement system continued to use the outdated tolerance value. As a result, the affected facilities were paid out constraint payments in some instances where they should not have (resulting in over-recovery from Market Customers). In total, \$9,905 of constraint payments were erroneously over-recovered from market customers (\$298 of which are outside the adjustment window and cannot be corrected). \$9,606.16 of the over-recovery has been corrected via adjustments.</p> <p>Remedial actions have included:</p> <ul style="list-style-type: none"> • Correction of infrastructure and system configuration issues, including changing the file storage location and software configuration to access storage location • Upload of correct values 	<p>No further action.</p> <p>AEMO has addressed the issue</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<ul style="list-style-type: none"> Improvement of Work Instructions to clarify process to update and verify settlement tolerance values. <p>We have reviewed the updated Work Instruction, which is sufficient to mitigate recurrence.</p>	

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

There have been no amendments to Chapter 7 of the WEM Rules.

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 business process walkthroughs to:
 - Assess whether System Management employs appropriate controls when preparing SCADA data for settlement
 - Review Real-Time control room operations
- Conducted compliance testing on:
 - Dispatch of GIA-constrained facilities
 - Consistency and accuracy of control room logs
 - Issuance of Dispatch Advisories for constrained facilities

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

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.01	<p>Issue Type AEMO reported non-compliance Obligation 7.6.1D</p>	<p>Risk Rating Medium Compliance Rating 1</p>	<p>Incorrectly constraining a Market Participant to a level greater than that of their Balancing Merit Order position</p> <p>On 31 May 2018, AEMO System Management incorrectly constrained a Market Participant to a level greater than that of their Balancing Merit Order position. This occurred when the facility was islanded due to a weather-related safety concern.</p> <p>The constraint was not compliant with rule 7.6.1D as there was no actual or threatened High Risk Operating State at the time.</p> <p>Subsequent to this event, AEMO have liaised with the participant to agree on how the islanding of the facility should be represented in BMO, however the main cause was human error by the controller.</p> <p>No further action.</p>	<p>No further action.</p> <p>AEMO has addressed the issue.</p>
19WEM1.02	<p>Issue Type AEMO reported non-compliance</p>	<p>Risk Rating Medium Compliance</p>	<p>Incorrectly granting permission for a facility to synchronize which was not in line with the Facility's Dispatch Instruction</p> <p>On 6 April 2018, AEMO System Management incorrectly granted permission</p>	<p>Ensure that this situation is included in controller training, and that all controllers receive this training.</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
	Obligation 7.9.4(a)	Rating 1	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.	
19WEM1.03	Issue Type AEMO reported non-compliance Obligation 7.6.1C	Risk Rating High Compliance Rating 1	Not using latest BMO due to denial of service cyber attack in 3rd party IT system. On 30 July 2018 and 31 July 2018, Western Power's IT Services experienced a cyberattack resulting in a total network failure. This caused several Balancing Merit Order files (BMO's) not being uploaded and the potential for Out of Merit Dispatch. The root cause of the potential out of merit dispatch was the cyber attack on Western Power, and we are satisfied that WP and AEMO have taken appropriate steps as a result.	No further action. AEMO has addressed the issue.
19WEM1.04	Issue Type AEMO reported non-compliance Obligation 7.6.1D	Risk Rating Medium Compliance Rating 1	Incorrectly constraining a facility to a level lower than that of their Balancing Submission On 28 July 2018, AEMO System Management incorrectly constrained a facility to a level lower than that of their Balancing Submission after the facility returned from an extended outage. As corrective actions from this breach, AEMO have improved the Electronic	No further action. AEMO has addressed the issue.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			Logbook guidelines to request the generated value from the Market Participant when constraining the facility, and added a note to the Dispatch FAQs regarding the use of generated values with the SOCC_UI.	
19WEM1.05	Issue Type AEMO reported non-compliance Obligation 7.6.1C	Risk Rating High Compliance Rating 1	Not using the latest BMO due to WP IT issues On 15 August 2018, Western Power's IT services experienced a failure of a Security Device, which led to an inability of files transfer to WP. As a result, six Balancing Merit Order (BMO) files were not uploaded. As System Management were not using the latest BMO for Dispatch, there was the potential for Out of Merit Dispatch to Occur.	No further action. AEMO has addressed the issue.
19WEM1.07	Issue Type AEMO reported non-compliance Obligation 7.6A.2(e)	Risk Rating Low Compliance Rating 1	Failure to publish aggregate forecast output of non-scheduled generators by deadline On 5/10/2018 System Management failed to determine by 4.00pm on the Scheduling Day associated with a Trading Day the aggregate forecast output of all Non-scheduled Generators for the Trading day. The file was sent at 4.06pm and not the required 4.00pm deadline, after AEMO Market Operations advised SM Operations that the file had not been sent. As a preventative action, AEMO have implemented a MOSMI alert at 3pm to ensure that the file is sent on time.	No further action. AEMO has addressed the issue.
19WEM1.11	Issue Type AEMO	Risk Rating Medium	Failure to issue Dispatch Advisory for out of merit generation	No further action.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
	reported non-compliance Obligation 7.11.5(g)	Compliance Rating 1	On 3 December 2018, System Management failed to issue a Dispatch Advisory for potential Out of Merit Generation after a facility was constrained for Security Reasons. The cause was human error - not following the Dispatch Advisory Guidelines.	AEMO has addressed the issue.
19WEM1.13	Issue Type AEMO reported non-compliance Obligation 7.11.5(g)	Risk Rating Medium Compliance Rating 1	Failure to issue Dispatch Advisory for out of merit generation On 8 February 2019, System Management failed to issue a Dispatch Advisory for a potential Out of Merit Generation after a facility was constrained following a trip of approximately 116MW and a DI of 165MW. The cause was human error - not following the Dispatch Advisory Guidelines.	No further action. AEMO has addressed the issue.
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.	No further action. AEMO has addressed the issue.
19WEM1.17	Issue Type AEMO reported non-compliance	Risk Rating Medium Compliance	Incorrect Resource ID in settlement data System Management included the wrong Resource ID within the AS_ACTIVATION_INSTRUCTIONS data for ALINTA_PNJ_U2 who were	No further action. AEMO has addressed the issue.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
	Obligation 7.13.1 (e); 7.13.1(eC)	Rating 1	recently certified for LFAS and added to the existing reporting tool. The cause of the error was a typographical error when updating the reporting tool to add the two recently certified Alinta Pinjara facilities. The error was picked up and raised by AEMO Market Operations, and the error was corrected. The reporting tool has since been updated to obtain the resource IDs from SMITTS, rather than using manual entry.	
19WEM1.19	Issue Type AEMO reported non-compliance Obligation 7.5.5B	Risk Rating Medium Compliance Rating 1	Failure to calculate dispatch volumes for curtailed facility GREENOUGH_RIVER_PV1 was curtailed for a Network line outage on 19/01/2019. System Management did not calculate and provide Dispatch Volumes for the period of curtailment as required by MR 7.7.5B. The cause of the error was the SM Operations staff member missing the control room log entry that specified the curtailment. As a preventative measure, the importance of thoroughly checking the control room logs has been reinforced with the SM Operations staff. More consistent application of electronic logbook guidelines would also reduce the risk of this kind of error - see finding 19WEM1.61	No further action. AEMO has addressed the issue.
19WEM1.20	Issue Type AEMO reported non-compliance Obligation 7.11.4	Risk Rating Medium Compliance Rating 1	Failure to withdraw DA when situation was resolved. System Management issued a Dispatch Advisory (DA) and failed to withdraw the DA once the situation was resolved. On 17/03/2019 at 00:06 a DA was issued in relation to a trip of a major unit which occurred at 23:31 on 16/03/2019 and briefly brought the Operating	No further actions. AEMO has addressed the issue.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<p>State into a High Risk Operating State (the frequency dropped below 49.68Hz for around one minute according to data and the "Details" within the DA). The DA did not contain an End Date, End Hour or End Interval. The DA was only withdrawn before 7:00am following System Management Operations morning shift noticing that the DA did not have an End Date/Time or was withdrawn. As such WEM Rule 7.11.4 was breached due to not withdrawing the DA as soon as practicable.</p> <p>The cause of the error was a lack of education, as the controllers assumed the End Date, End Hour and End Interval fields were optional. The Dispatch Advisory Guidelines have been re-sent to all control room staff.</p>	
19WEM1.21	<p>Issue Type AEMO reported non-compliance</p> <p>Obligation 7.13.1 (c); 7.13.1(eF)</p>	<p>Risk Rating Medium</p> <p>Compliance Rating 1</p>	<p>Failure to issue retrospective dispatch instructions on time</p> <p>Due to a Western Power line outage System Management constrained two Facilities on via the SOCCUI setpoint on 21/03/2019m 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.</p> <p>As a preventative action, monitoring of control room logs will be performed to look for events for the two affected facilities.</p>	<p>Ensure that the monitoring of control room logs as specified in finding is documented in the appropriate procedure</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.36	Issue Type RBP reported non-compliance Obligation 7A.3.6	Risk Rating High Compliance Rating 1	Multiple instances of updated BMO not being created due to WEMS outages There are multiple instances during the audit year of not creating 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. For planned WEM outages, AEMO manages noncompliance risk by blocking participant access to WEMS, so that participants cannot make submissions that would make the BMO used for dispatch out of date.	<ul style="list-style-type: none"> • Ensure that all instances of not using or creating an up to date BMO are investigated and reported as self-reported breaches where appropriate, so that progress in resolving these issues can be monitored. • Review incident management process to ensure that all potential incidents are investigated, and refresh process to SM Market Operations team
19WEM1.54	Issue Type AEMO reported non-compliance Obligation 7.13.1A(b) and consequentially 6.15.3, upcoming 9.19.1, potentially 4.26.1(e),	Risk Rating Low Compliance Rating 1	Erroneous TES calculation and constraint payments (plus potentially RC refunds and Relevant Level) due to erroneous upload of ex-post outage file. Clause 7.13.1A(b) requires SM to record a schedule of planned, forced and consequential outages for each trading interval of each trading day by noon of the 15th business day following the relevant trading day. On 18 December 2018, SM created an ex-post outage file under clause 7.13.1A(b) for trade day 29 November 2018. The ex-post outage file was first created on SM systems, then extracted as an XML to be sent via FTP to the settlement systems. The ex-post outages contained in this XML file are used to : (a) calculate the Theoretical Energy Schedule (TES) under clause 6.15.3 so that constraint payments can be calculated	No further action. AEMO has addressed the issue.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
	4.26.1C, 4.26.2, 4.26.6		<p>(b) calculate Reserve Capacity refunds</p> <p>(c) publish outage information to the AEMO website.</p> <p>Due to human error, the XML extraction process was interrupted and the resulting XML file which contained the ex-post outages had incomplete information (i.e. outages were missing for some facilities). This incomplete XML file was used for settlement as a result of which:</p> <p>(a) The TES calculation for a particular facility for trading day 29 November 2018 was incorrect, and they were incorrectly assigned a constrained-off payment of \$14,931 (breach of clause 6.15.3). This is to be corrected via adjustments.</p> <p>(b) Reserve capacity refunds of \$270 was incorrectly applied to a facility (denoting a breach of clause 4.26.1).</p> <p>(c) The Facility Capacity Rebate was determined from the incorrect outages leading to some generators incorrectly receiving a Facility Capacity Rebate (breach of clause 4.26.6). This has been corrected in adjustments.</p> <p>(c) There were minor consequential breaches with no impact including: incorrect classification of outages as refund exempt or payable (clause 4.26.1C); incorrect publication of the Refund Exempt Planned Outage (REPO) count (clause 10.5.1(z)); incorrect Net STEM Shortfall calculation based off incorrect outage information (clause 4.26.2).</p> <p>Market Operations proposes to address the constraint payment error through an adjustment which will be a technical breach of clause 9.19.1⁶.</p>	

⁶ While this is a technical breach of the WEM Rules, we note that AEMO’s proposed actions are aligned with the intent of the WEM Rules to mitigate adverse financial impacts on participants.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<p>Since the breach, SM have improved their XML file creation tool to ensure the extraction process cannot be interrupted while running. This will prevent recurrence of similar breaches.</p>	
19WEM1.59	<p>Issue Type AEMO reported non-compliance Obligation 7.6A.2.(c); 10.2.2(b)</p>	<p>Risk Rating Low Compliance Rating 1</p>	<p>Confidential participant data sent to Synergy with Dispatch Plan</p> <p>On 20/03/19, an updated dispatch plan was prepared and sent to Synergy. Due to an erroneous spreadsheet that was used to prepare the dispatch plan, an extra worksheet was included that included a full day of individual participant data, rather than the aggregated data that should have been sent. The specific date of the individual participant data is not known, but it was at least a week old at the time of the incident.</p> <p>The cause of the breach was the incorrect spreadsheet, which had been created for a new dispatch plan creation procedure. The spreadsheet has been corrected, and all other users' templates have been checked for this issue.</p>	<p>No further action.</p> <p>AEMO has addressed the issue.</p>

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

There have no amendments to Chapter 7A of the WEM Rules.

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
 - Use of latest BMO in dispatch

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

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.58	<p>Issue Type AEMO reported non-compliance</p> <p>Obligation 7A.3.6, 6.19.3, 7.6.1C</p>	<p>Risk Rating Low</p> <p>Compliance Rating 1</p>	<p>Market Advisory not issued for WEMS FTP issue.</p> <p>A communications issue between AEMO's WEMS and SMMITS systems between 16:34 and 17:16 on 01/09/2018 caused two BMO files, which had been created by WEMS, not being sent to System Management. As a result, System Management were not dispatching according to the latest BMO during this time. This is a breach of rule 7A.3.6.</p> <p>Rule 6.19.3 requires a Market Advisory to be issued as soon as practicable after AEMO becomes aware of an event that may impact on market operations. No Market Advisory was issued for this event, so rule 6.19.3 was also breached.</p> <p>The cause of the first breach was a configuration error, which has been rectified. The cause of the second breach was oversight by an AEMO staff member. AEMO Market Operations staff have been reminded by email of the requirements under 6.19.3.</p>	<p>No further action.</p> <p>AEMO has addressed the issue.</p>

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

There have been no amendments to Chapter 7B of the WEM Rules.

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 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

We did not observe any instances of non-compliance with Chapter 7B of the WEM Rules.

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

A minor amendment has been made to clause 8.4.5 to remove the requirement for the Meter Data Agent (Western Power) to confirm by telephone that it has not received a Meter Data submission.

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.

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

There have two minor amendments to Chapter 9 of the WEM Rules:

- Minor change to clause 9.4.7 to remove the requirement for AEMO to confirm receipt of a Capacity Credit Allocation by telephone.
- Typographical error removed from clause 9.9.3A.

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 NSTEM metering and settlement validation activities.
- Undertaken (retrospective) business process walkthroughs of the preparation of spinning reserve cost inputs into settlement
- Performed compliance 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 18: Operational compliance findings associated with Chapter 9 of the WEM Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19WEM1.43	<p>Issue Type RBP reported compliance risk</p> <p>Obligation 9.9.2, 9.9.3, 9.9.4</p>	<p>Risk Rating Medium</p> <p>Compliance Rating 2</p>	<p>Potential risk areas still exist in AS monthly data preparation</p> <p>The process for preparing monthly AS inputs has some risk areas that could be improved:</p> <ul style="list-style-type: none"> 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. 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. 	<p>We recommend:</p> <ol style="list-style-type: none"> 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). 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

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<ul style="list-style-type: none"> 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. 	<p>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)).</p> <p>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.</p>
19WEM1.44	<p>Issue Type RBP reported non-compliance</p> <p>Obligation 9.1.3, 9.19.3(b)</p>	<p>Risk Rating High</p> <p>Compliance Rating 1</p>	<p>Systemic and historic errors in SRS payments</p> <p>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).</p> <p>Due to gaps in the process for calculating SRS monthly costs (see also 19WEM1.43), AEMO has been calculating the total SRS</p>	<p>We further recommend that SM develop and document (in their internal procedures) a robust process to calculate SRS payments. The process</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<p>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:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ♦ 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. <p>AEMO is currently reviewing current and historic contracts to assess the practicality of clawing back overpayments; noting that only errors in the past 12 months can be washed up via the adjustments process.</p> <ul style="list-style-type: none"> • 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 	<p>should include controls to ensure:</p> <ol style="list-style-type: none"> 1. Contractual arrangements are accurately reflected in payments (a legal review of the compliance of SM's process with the contractual arrangements should be undertaken, and repeated whenever a contract is renegotiated) 2. Clawback payments are accurately calculated 3. Annual indexation calculations are performed correctly, and that the base monthly value is updated if a pro-rated value is used to reflect indexation occurring part way through a month.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<p>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).</p> <p>To prevent recurrence, SM is developing automated tools for each SRS facility that will calculate the payments including clawbacks based on outage data. These tools will not be ready till at least September 2019; in the interim SM will use a manual workaround to reflect outages.</p>	
19WEM1.52	<p>Issue Type AEMO reported non-compliance</p> <p>Obligation 9.9.2(l), 9.9.2(f), 9.9.2(h) and 9.9.2(i)</p>	<p>Risk Rating High</p> <p>Compliance Rating 1</p>	<p>Incorrect calculation Contracted Spinning Reserve quantity</p> <p>Clause 9.9.2 of the WEM Rules defines the total payments for spinning reserves in a trading interval as well as each market participant's share of the total payment to be a function of (amongst other parameters) the MW amount of spinning reserves procured through contracted services.</p> <p>Due to an error in one of the tools used to derive the spinning reserve payments for reserves procured through contracted services, SM overestimated the amount of spinning reserves provided by two facilities under contracted services. The effect of this was that another participant's facilities were underpaid for the amount of ("uncontracted") spinning reserves provided between July to September 2018 by a total of \$2.2M. There was no impact on the amount paid to facilities providing spinning</p>	<p>No further action - see recommendations for finding 19WEM1.43.</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<p>reserves under contracted services, as these payments amounts were calculated correctly in the SM tool and inputted directly into the settlement system as a "manual line item".</p> <p>The error has been treated as a dispute and washed up as part of the adjustments process.</p> <p>Since the error manifested, SM has improved its suite of tools used to calculate payments for contracted spinning reserves. This includes automated retrieval of input information, automated export of data to SMITTS and cell protection. The improvements should mitigate recurrence to some extent. However, there is still room for improvement as noted our recommendations under finding 19WEM1.43 to improve validation processes used to verify contracted spinning reserves payments.</p>	
19WEM1.60	<p>Issue Type AEMO reported non-compliance Obligation 9.13.1</p>	<p>Risk Rating High Compliance Rating 1</p>	<p>Historic error in Market Fee calculation</p> <p>Market fees are a function of a participant's generation and load across all connections points in a given month.</p> <p>When calculating the load component, WEM Rule 9.13.1 requires that the calculation should sum the absolute value of all metered schedules for dispatchable, non-dispatchable and interruptible loads for a given participant for all trading intervals in a given month. Due to a system defect, the settlement calculation was summing the metered schedules and then taking the absolute values.</p> <p>The defect has two consequences:</p>	<p>No further action.</p> <p>However, the issue will remain open until the defect has been fixed.</p>

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<ul style="list-style-type: none"> • In any given year, some participants will be paid less than they should have been charged while others would have been overcharged. The magnitude of the over and under-recoveries vary year on year. For example, AEMO has estimated that since market start, the maximum amount overcharged has ranged from \$564 to \$220K, while the maximum amount undercharged has ranged from -\$407 to -\$59K. During the audit year, the maximum amount overcharged was \$83K and the maximum amount undercharged was -\$23K. • The nature of the defect means that Market Customers with a higher proportion of non-dispatchable loads with generation would benefit the most (as their metered schedule input would have been underestimated), while Market Customers with a lower proportion of non-dispatchable loads generation would have been overcharged). • AEMO's under-recovery of fees is reflected as an increase in the fee rate in the following year. This means that participants in a given year subsidies those participants that were undercharged in the previous year. <p>AEMO has raised the issue with Brady (system owner) to develop a software fix for AEMO's metering and settlements system in order to rectify the incorrect calculation; however, due to other AEMO projects on Brady's pipeline, it is unclear when the fix will be implemented. Until the fix is implemented, this breach will continue to occur; given the complexity of the</p>	

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<p>metering and settlement systems, a manual workaround is not practicable.</p> <p>After the software is implemented AEMO will issue adjustment settlements to correct settlement amounts which fall within the open Non-STEM settlement period (previous 12 months following software installation).</p> <p>Our risk rating of high indicates moderate impact and almost certain probability of recurrence due to the delay in the system fix and inability to institute a manual work around.</p> <p>Note that this error was not found in the certification testing of the settlement system. The reason it was not found is that the data required to detect this error is not part of the output of the settlements system; Future certification testing should ensure that additional data is requested to detect this type of error.</p>	

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

There have been no amendments to Chapter 10 of the WEM Rules.

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.

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 2017-18 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 15.2.

For this audit, we reviewed the release notes for all changes made to AEMO's market systems during the Audit Period. Most 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

System	Version number	Release date	Material effect on prices / quantities?	Certification status	Comment
WEMS	3.27-1410-1	29/08/2018	No	Maintained	
RCM	1.9-2787-2	29/08/2018	Yes	Certified	Certification date 27/07/2018
WEMS	3.27-1410-2	6/09/2018	No	Maintained	
POMAX	3.4.25	10/09/2018	No	Maintained	
WEMS	3.27-1410-4	25/09/2018	No	Maintained	
RCM	1.9-2787-4	25/09/2018	No	Maintained	
POMAX	3.4.26	25/10/2018	No	Maintained	
WEMS	3.28-1438-2	29/11/2018	No	Maintained	
RCM	1.10-2842	13/11/2018	No	Maintained	
RCM	1.10-2871-6	29/11/2018	No	Maintained	
WEMS	3.28-1438-6	6/12/2018	No	Maintained	

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)

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

There have been no self-reported or other instances of non-compliance with clause 2.36.1 of the WEM Rules.

AEMO's software management processes for the market systems remain sufficient to comply with the market 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 maintained the ability to roll back versions of the market software by restoring previous database versions and re-installing previous versions of the software.
2.36.1(c)	AEMO has conducted appropriate testing on all new releases of market software prior to their being placed in service.

Clause	Comment on compliance
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.

15 APPENDICES

15.1 COMPLIANCE AND RISK RATING INFORMATION

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

15.1.1 Compliance and Risk Ratings

Audit findings are categorised as follows:

Table 21: 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 22: 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 23: Risk rating matrix

		CONSEQUENCE				
		<i>Immaterial</i>	<i>Minor</i>	<i>Moderate</i>	<i>Major</i>	<i>Extreme</i>
LIKELIHOOD	<i>Almost Certain</i>	Medium	Medium	High	Critical	Critical
	<i>Likely</i>	Low	Medium	High	Critical	Critical
	<i>Possible</i>	Low	Medium	High	High	Critical
	<i>Unlikely</i>	Low	Low	Medium	Medium	High
	<i>Rare</i>	Low	Low	Medium	Medium	High

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

15.1.2 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

15.1.3 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

<i>Consequence</i>	<i>Reputation and Stakeholders</i>	<i>Financial (AEMO)</i>	<i>Safety</i>	<i>Environment</i>	<i>Market & System Impact</i>	<i>Legal & Compliance</i>
Extreme	<ul style="list-style-type: none"> Significant long term damage to stakeholder and public confidence and relationships. Continued adverse media exposure. Significant financial impact drives participant(s) towards insolvency. 	> \$25M	<ul style="list-style-type: none"> Single fatality or permanent injury or multiple notifiable injuries. 	<ul style="list-style-type: none"> Major environmental harm. e.g. major pollution incident causing significant damage or potential to health or the environment; and/or Fines and prosecution likely. 	<ul style="list-style-type: none"> Involuntary disruption of supply to a state(s) for any duration. Market suspension in multiple jurisdictions or markets. 	<ul style="list-style-type: none"> Corporate fine > \$1M. Imprisonment or fine for personal liability to Officer or Director. Regulatory action likely. Litigation involving Class actions.
Major	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Notifiable injury requiring hospitalisation > 5 days (incapacity beyond 3 months). 	<ul style="list-style-type: none"> Long term or serious environmental damage; and/or Multiple complaints received; and/or Potential for prosecution. 	<ul style="list-style-type: none"> Involuntary disruption of supply to a large portion of a state, for any duration. Market suspension in one jurisdiction or market. 	<ul style="list-style-type: none"> Corporate fine \$100K > \$1M. Fine for personal liability to officer or director. Likely investigation by a Regulator. Litigation involving protracted Court actions possible.
Moderate	<ul style="list-style-type: none"> Some damage to stakeholder confidence and relationships. Some adverse media exposure. Adverse financial impact on participant(s). 	\$500K- \$5M	<ul style="list-style-type: none"> Injury requiring < 5 days hospitalisation or increased level of medical treatment (6 days to 3 months incapacity). 	<ul style="list-style-type: none"> Moderate environmental impact; and/or Will cause complaints; and/or Possible fine. 	<ul style="list-style-type: none"> Market(s) operating in administered state, but not suspended. 	<ul style="list-style-type: none"> Corporate fine with no personal liability to Officer or Director. Likely to give rise to questions from a Regulator. Possible dispute resolution process*.
Minor	<ul style="list-style-type: none"> Manageable reduction in stakeholder confidence. Limited media exposure. Little to no financial impact on participant(s). 	\$100k - \$500K	<ul style="list-style-type: none"> Routine medical treatment only (up to 5 days incapacity). 	<ul style="list-style-type: none"> Minor environmental harm; and/or Potential for complaints; and/or Fine unlikely. 		<ul style="list-style-type: none"> Compliance breach with no penalties. Regulator attention, litigation or dispute resolution* unlikely.
Immaterial	<ul style="list-style-type: none"> No reduction in stakeholder confidence. No media exposure. No financial impact on participant(s). 	<\$100K	<ul style="list-style-type: none"> First aid. 	<ul style="list-style-type: none"> Little or no environmental harm; and/or No fines or complaints. 		<ul style="list-style-type: none"> No breach or minor technical breach of compliance obligation. No reasonable prospect of regulatory attention, litigation or dispute resolution.

15.2 HISTORICAL MARKET SOFTWARE CERTIFICATION PRIOR TO THE 2017-18 AUDIT PERIOD

15.2.1 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.

15.2.2 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.

15.2.3 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

Appendix 2 Independent Assurance Report on AEMO's compliance with the GSI Rules and GSI Procedures



ROBINSON BOWMAKER PAUL



AUSTRALIAN ENERGY MARKET OPERATOR

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

13 SEPTEMBER 2019

Prepared by: Sue Paul, Richard Bowmaker
Document version: 2.2 FINAL

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EXECUTIVE SUMMARY

This independent assurance report sets out the results of the market audit by Robinson Bowmaker Paul (RBP) assessing AEMO’s compliance with the Gas Services Information (GSI) Rules and GSI Procedures.

AUDITED ENTITY

The audited entity for this report is AEMO.

AUDIT PERIOD

The Audit Period is 1 July 2018 to 30 June 2019, both dates inclusive.

REGULATORY CONTEXT AND SCOPE

Regulatory context

The regulatory context for the audit is summarised in the table below.

Table 1: Regulatory context for the market audit

Rule reference	Comment
174 (1)	Requirement for AEMO to appoint market auditor at least annually
174(2)	Defines the scope of the Audit to include, at minimum: <ul style="list-style-type: none">the compliance of AEMO’s Internal Procedures and business processes with the GSI RulesAEMO’s compliance with the GSI Rules and Procedures AEMO’s software systems for the Gas Bulletin Board (GGB) and the calculation of GSI Fees and processes for software management

Scope

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

- How AEMO implements its obligations under the GSI 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. It includes an assessment of whether:
 - AEMO maintains appropriate records
 - The software used by AEMO to implement its obligations under the GSI Rules is compliant with the underlying mathematical formulations and the GSI Rules themselves.
 - AEMO has been compliant with its market systems certification obligations

The GSI Compliance Audit includes the following work streams:

- Compliance Assessment of AEMO’s operational compliance and application of controls to mitigate compliance risk
- Procedures Assessment of GSI Procedures and Internal Procedures that have changed during the Audit Period
- Software Compliance Assessment

This scope differs from the previous audit in that it does not include audit of general IT controls.

AUDIT CRITERIA

Criteria for determining operational and procedural compliance

The criterion we have used for determining the compliance of AEMO’s GSI Procedures (referred to as the *GSI Procedures*) is the Gas Services Information Rules dated 1 March 2019 (referred to as the *GSI Rules*).

The criteria we have used for determining AEMO’s operational compliance and the compliance of AEMO’s Internal Procedures are the GSI Rules and the GSI Procedures.

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.

This includes the following:

Table 2: Procedures reviewed to assess control application

AEMO functional area	Procedures against which control application have has been assessed
Market Operations	Daily Operations Procedure Work Instructions
Finance	WEM and GSI Procedure
IT	IT Change Management Policy, Software Configuration Management 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 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 market operators with which we are familiar

APPROACH

Assurance

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

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

Risk ratings and materiality

Compliance and risk ratings

Table 3: Compliance and risk rating definitions

Compliance rating	Risk Rating
1: Instances of non-compliance with the GSI Rules	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.
2: Findings that are not an instance of non-compliance, but pose compliance risk	Significant: 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.

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 Gas Market Participants
- The number of Gas Market Participants or other stakeholders affected
- The impact of an issue on market objectives such as transparency, equity and efficiency
- Whether an issue is systemic
- Whether an issue is recurring (from previous audits)

Audit activities

We have undertaken a combination of:

- Reviewing self-reported incidents of AEMO non-compliance with the GSI Rules and GSI Procedures
- Business process walkthroughs and interviews with staff

- Reviewing AEMO’s GSI Procedures and Internal Procedures to ensure GSI 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 GSI Rules and GSI Procedures and to determine the effectiveness of operating controls¹.

The first two activities were conducted as part of our field-visit in July 2019. Remaining activities (including review of self-reported incidents arising since our field visit) have been undertaken remotely.

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

Table 4: Audit focus areas

AEMO functional area	Focus area
Market Operations	Emergency Management Facility GSI fees invoicing
Finance	GSI Budget and fees

AUDIT FINDINGS

Extensive automation means GSI obligations are well-controlled

AEMO uses automated software to implement most of its GSI obligations. The non-compliance issues we have found (and AEMO has self-reported) relate to the remaining manual activities.

Publication of financial information is one such area. In 2017 and 2018, we noted breaches relating to late publication of budget information. This year, we have noted the same issue recurring,

Strong compliance culture and accountability prevalent across AEMO

AEMO teams generally have a strong culture of compliance where self-reporting of issues is encouraged and the approach to compliance risk management is proactive rather than reactive.

¹ In doing so, we have sourced information from all AEMO (WA) teams, with a particular emphasis on the market operations team.

This is supported by the following:

- Audit findings from previous years have been consistently addressed and closed. There are no opening findings from last year’s audit and only one open finding from this year’s audit.
- There have been five findings this year which include:
 - Four instances of minor non-compliance (i.e. compliance rating 1 findings, all of which have a low risk rating and two of which were self-reported) with the GSI Rules and GSI Procedures.
 - One low risk finding pertaining to compliance risk.
- Our site visits have indicated that AEMO teams maintain and apply effective controls to manage compliance risk.

Summary

Table 5 below summarises the total number of audit issues (broken down by risk rating) reported during the 2017/18 and 2018/19 Audit Periods.

Table 5: Audit issue summary by risk rating and open/closed status, 2017/18 and 2018/19.

	2017/18 Issues	2018/19 Issues				
Risk Rating	Total	Total	Closed		Open	
			AEMO	RBP	AEMO	RBP
Significant	0	0	0	0	0	0
Medium	0	0	0	0	0	0
Low	5	5	3	1	0	1
Totals	5	5	3	1	0	1
			4		1	

Table 6: Summary of audit issues

Ref	Issue type & process	Risk & Compliance Rating	Finding	Recommendation
19GSI 1.02	Issue Type AEMO reported non-compliance Process Invoicing	Risk Rating Low Compliance Rating 1	Incorrect GSI invoices due to defect in GSI Fee Calculation Tool	No further action. AEMO has now addressed the remaining issues.
19GSI 1.03	Issue Type AEMO reported non-compliance Process Budgeting and fees	Risk Rating Low Compliance Rating 1	Failure to submit proposal for GSI allowable revenue by deadline	No further action. AEMO has now addressed the remaining issues.
19GSI 1.04	Issue Type RBP reported non-compliance Process Budgeting and fees	Risk Rating Low Compliance Rating 1	Failure to publish historic financial report for financial year ending 2018	No further action - see related finding 19GSI1.05
19GSI 1.05	Issue Type RBP reported non-compliance	Risk Rating Low Compliance Rating 2	Lack of formalised business processes and controls relating to GSI obligations	<ul style="list-style-type: none"> • Institute calendar alerts for key publication/submission deadlines • Document processes including specification of key controls.

Ref	Issue type & process	Risk & Compliance Rating	Finding	Recommendation
	Process Budgeting and fees			
19GSI 1.06	Issue Type AEMO reported non-compliance Process Market operations	Risk Rating Low Compliance Rating 1	Participant details updated incorrectly in GSI Register	No further action. AEMO has now addressed the remaining issues.

OPINION

Qualifications

We have no qualifications to note with respect to the opinions provided below.

Conclusion

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

Subject to the inherent limitations set out in Section 1.5.4, 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 GSI Rules and GSI Procedures during the Audit Period, in all material respects.

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

Based on the audit procedures we have performed and the evidence we have examined, AEMO's Market Software Systems are compliant with the GSI Rules in all material respects.

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

Subject to the inherent limitations set out in Section 1.5.4, 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 GSI Rules and GSI Procedures during the Audit Period in all material respects.

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1 INTRODUCTION

This chapter sets out the regulatory context for the GSI Compliance 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 2018 to 30 June 2019, 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.

Table 7: Regulatory context for the market audit²

Rule reference	Comment
174 (1)	Requirement for AEMO to appoint market auditor at least annually
174(2)	Defines the scope of the Audit to include, at minimum: <ul style="list-style-type: none">• the compliance of AEMO's Internal Procedures and business processes with the GSI Rules• AEMO's compliance with the GSI Rules and Procedures• AEMO's software systems for the Gas Bulletin Board (GGB) and the calculation of GSI Fees and processes for software management

1.3.2 Scope

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

² Rules references are as at 31 May 2017 unless otherwise indicated

- How AEMO implements its obligations under the GSI 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, its processes for software management, and its general IT controls. It includes an assessment of whether:
 - AEMO maintains appropriate records
 - The software used by AEMO to implement its obligations under GSI Rules is compliant with the underlying mathematical formulations and the GSI Rules themselves.
 - AEMO has been compliant with its market systems certification obligations

The GSI Compliance Audit includes the following work streams:

- 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 GSI Rules
- Procedures Assessment of GSI Procedures and Internal Procedures that have changed during the Audit Period.
- Software Compliance Assessment. We reviewed the software used to meet obligations under the GSI Rules. In particular, we:
 - Reviewed AEMO’s Market Systems (used to implement GSI obligations), and in particular the nature of changes to the Gas Bulletin Board (GBB) software and GSI Fees tool to assess compliance with Part 1 Rule 19(1) of the GSI Rules
 - Reviewed AEMO’s software management processes.

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 GSI Procedures (referred to as the *GSI Procedures*) is the Gas Services Information Rules dated 1 March 2019 (referred to as the *GSI Rules*).

The criteria we have used for determining AEMO’s operational compliance and the compliance of AEMO’s Internal Procedures are the GSI Rules and the GSI 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. This includes the following:

Table 8: Procedures reviewed to assess control application

AEMO functional area	Procedures against which control application have has been assessed
Market Operations	Daily Operations Procedure Work Instructions
Finance	WEM and GSI Procedure
IT	IT Change Management Policy, Software Configuration Management 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 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 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 AEMO’s software changes and the compliance of AEMO’s market software systems with the GSI Rules and GSI Procedures
- We provide limited assurance under this standard with respect to our review of:
 - AEMO’s compliance with the GSI Rules and GSI 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 9: Compliance and risk rating definitions

Compliance rating	Risk Rating
1: Instances of non-compliance with the GSI Rules	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.
2: Findings that are not an instance of non-compliance, but pose compliance risk	Significant: 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.
3: Findings related to minor housekeeping issues that do not affect compliance risk	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.

Further information on risk and compliance ratings is provided in Appendix A.

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 Gas Market Participants
- The number of Gas 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 GSI Rules and GSI 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 GSI Procedures, Internal Procedures and IT Procedures to ensure GSI 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 GSI Rules and GSI Procedures and to determine the effectiveness of operating controls. In doing so, we have sourced information from all AEMO (WA) teams, with a particular emphasis on the market operations team.

The first two activities were conducted as part of our field visit in May 2018. Remaining activities (including review of self-reported incidents arising after our field visit) have been undertaken remotely.

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:

Table 10: Audit focus areas

AEMO functional area	Focus area
Market Operations	Emergency Management Facility GSI fees invoicing
Finance	GSI Budget and fees

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 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 GSI Rules and GSI 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, if 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 11 present our audit findings relating to the Compliance Assessment and Procedures Assessment work streams on an GSI Rule Chapter by Chapter basis.
- Chapter 12 presents findings relating to AEMO’s GBB and GSI Fees software

1.7 ACKNOWLEDGMENTS

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

2 PART 1 – INTRODUCTORY & ADMINISTRATIVE MATTERS

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

2.1 RULE AMENDMENTS

There have been changes to Part 1 to remove references to the Independent Market Operator (IMO).

2.2 AEMO PROCEDURES

AEMO's GSI Procedures and Internal Procedures are compliant with Part 1 of the GSI Rules in all material respects.

2.3 OPERATIONAL COMPLIANCE WITH PART 1

We have not conducted any audit procedures to assess AEMO's compliance with Part 1 of the GSI Rules.

There have been no self-reported instances of non-compliance with Part 1.

3 PART 2 - REGISTRATION

Part 2 of the GSI Rules covers the registration of Gas Market Participants and facilities, including registration, deregistration, transfers, and exemptions.

3.1 RULE AMENDMENTS

There have been no changes to Part 2.

3.2 AEMO PROCEDURES

AEMO's GSI Procedures and Internal Procedures are compliant with Part 2 of the GSI Rules in all material respects.

3.3 OPERATIONAL COMPLIANCE WITH PART 2

We have not conducted any audit procedures to assess AEMO's compliance with Part 2 of the GSI Rules.

3.3.1 Audit findings

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

Table 11: Operational compliance findings associated with Part 4 of the GSI Rules

Ref	Issue Type & Obligation	Risk & Compliance Rating	Finding	Recommendation
19GSI1.06	<p>Issue Type AEMO reported non-compliance</p> <p>Obligation Rule 51(1)</p>	<p>Risk Rating Low</p> <p>Compliance Rating Level 1</p>	<p>Participant details updated incorrectly in GSI Register.</p> <p>In October 2018, a participant who was already registered as a Gas Shipper submitted forms to register a production facility and consequently also register themselves as a facility operator.</p> <p>During the Facility Operator registration process, due to human error, the participant's registration status was incorrectly changed to reflect that they were no longer a Gas Shipper. This error flowed into the GSI Register and GBB which were incorrect since 14 November 2018.</p> <p>The error was discovered on 30 April 2019 AEMO received an Aggregate Shipper Delivery submission from a pipeline operator indicating that the affected participant had shipped gas on their pipeline in Q1 2019, prompting AEMO to question why the participant was not registered as a Gas Shipper. The error was rectified thereafter.</p> <p>Note that this error was immaterial as:</p> <ul style="list-style-type: none"> Registration categories are not used when deriving GSI invoice amounts which are calculated on the basis of data submitted by participants Shippers do not submit any data for use in GBB reports; hence the removal of the participant as a Gas Shipper had no impact on GBB reports. <p>AEMO has since updated the GSI Register and GBB to correct the participant's registration status.</p>	<p>No further action.</p>

4 PART 3 – PROVISION OF INFORMATION FOR GBB

Part 3 of the GSI Rules deals with the GBB information requirements pertaining to Gas Market Participants and the various classes of Facilities.

4.1 RULE AMENDMENTS

There have been no amendments to Part 3.

4.2 AEMO PROCEDURES

AEMO's GSI Procedures and Internal Procedures are compliant with Part 3 of the GSI Rules in all material respects.

4.3 OPERATIONAL COMPLIANCE WITH PART 3

AEMO has limited obligations under Part 3; the obligations are all automated via the GBB which is independently tested and certified. Therefore, we have not conducted any audit procedures to assess AEMO's compliance with Part 3 of the GSI Rules.

There have been no self-reported instances of non-compliance with Part 3.

5 PART 4 – THE GAS BULLETIN BOARD

Part 4 of the GSI Rules describes the information that is required to be published on the Gas Bulletin Board.

5.1 RULE AMENDMENTS

GRC_2018_01 commenced on 1 March 2019 removing the specification of the GBB Zone list from the GSI Rules to a GSI Procedure so that changes to the list could be made without requiring a GSI Rule change.

5.2 AEMO PROCEDURES

AEMO's GSI Procedures and Internal Procedures are compliant with Part 4 of the GSI Rules in all material respects.

5.3 OPERATIONAL COMPLIANCE WITH PART 4

5.3.1 Audit activities

The nature of the rule change is such that no consequential changes were required to the GBB systems or BAU processes. Therefore, we have not conducted any audit procedures to assess AEMO's compliance with Part 4 of the GSI Rules.

There have been no self-reported instances of non-compliance with Part 4.

6 PART 5 – EMERGENCY MANAGEMENT FACILITY

Part 5 of the GSI Rules describes the operation of the Emergency Management Facility (EMF), the information that is to be published on the EMF, and the access requirements and limitations.

6.1 RULE AMENDMENTS

There have been no amendments to Part 5 of the GSI Rules.

6.2 AEMO PROCEDURES

AEMO's GSI Procedures and Internal Procedures are compliant with Part 5 of the GSI Rules in all material respects.

6.3 OPERATIONAL COMPLIANCE WITH PART 5

- There have been no activations of the EMF during the Audit Period.
- We reviewed Market Operations work instructions to assess whether an appropriate process and controls exist to manage AEMO's EMF obligations.

There have been no self-reported instances of non-compliance with Part 5.

Note, the Energy Coordinator has not directed an annual test activation of the EMF under Rule 93(7) since 30 May 2016. We note that without a direction from the Energy Coordinator, AEMO is unable to test the EMF.

7 PART 6 – THE GAS STATEMENT OF OPPORTUNITIES

Part 6 of the GSI Rules describes the high-level requirements for the publication and content of the Gas Statement of Opportunities (GSOO).

7.1 RULE AMENDMENTS

There have been no amendments to Part 6 of the GSI Rules.

7.2 AEMO PROCEDURES

AEMO's GSI Procedures and Internal Procedures are compliant with Part 6 of the GSI Rules in all material respects.

7.3 OPERATIONAL COMPLIANCE WITH PART 6

7.3.1 Audit activities

We have not conducted any audit procedures to assess AEMO's compliance with Part 6 of the GSI Rules

There have been no self-reported instances of non-compliance with Part 6.

8 PART 7 – BUDGET AND FEES

Part 7 of the GSI Rules covers AEMO’s allowable revenue, budget and fees.

8.1 RULE AMENDMENTS

Amendments to Part 7 include only transitional changes to remove references to the IMO.

8.2 AEMO PROCEDURES

AEMO’s GSI Procedures and Internal Procedures are compliant with Part 7 of the GSI Rules in all material respects.

8.3 OPERATIONAL COMPLIANCE WITH PART 7

8.3.1 Audit activities

- We conducted (retrospective) business process walkthroughs to determine whether AEMO has complied with the GSI Rules and its Internal Procedures and whether AEMO has applied appropriate controls in its preparation and publication of GSI budget and market fees.
- We reviewed AEMO’s website to assess whether key publications (budget, market fees, historical budget reports) have been published on time and contain the information required under the Rules.

8.3.2 Audit findings

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

Table 12: Operational compliance findings associated with Part 7 of the GSI Rules

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
19GSI1.02	Issue Type AEMO reported non-compliance Obligation Rule 116	Risk Rating Low Compliance Rating 1	Incorrect GSI invoices due to defect in GSI Fee Calculation Tool On 9 November 2018, a manifest error was discovered in the GSI Invoices issued. The error was a result of the GSI fees tool attributing the wrong signs to credits when generating invoices and summing quantities across periods. AEMO has since corrected this error in the GSI tool and addressed the invoicing errors via adjustments. We have sighted the fix and the calculation of the resulting adjustments.	No further action
19GSI1.03	Issue Type AEMO reported non-compliance Obligation Rule 108A(2)	Risk Rating Low Compliance Rating 1	Failure to submit proposal for GSI allowable revenue by deadline AEMO failed to file its AR5 submission for GSI by 30 November 2018. The error was related to the fact that the WEM AR5 submission had been extended to 15 March 2019 (to take into account the reform activity in progress). AEMO staff mistakenly assumed that the extension applied to the GSI submission, as had been done in 2015 given there are some AEMO costs (e.g. lease) that need to be split across WEM and GSI functions so makes sense to do the revenue submissions at the same time. The error was discovered in December 2018, at which point AEMO made the decision to delay the GSI AR5 submission and jointly submit with the WEM AR5. AEMO considered	No further action. However, see 19GSI1.05 recommendations about general controls to mitigate compliance risk.

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			this to have minimal impact on stakeholders since if the ERA didn't make a GSI revenue determination before the start of the next regulatory period, the GSI Rules force a roll-over of the existing fee (Rule 108A(5)) and based on the preliminary information AEMO had at that time believed the existing fee would be sufficient to cover AEMO requirements in 2019/20 (with potentially some use of the 15% over spend allowance).	
19GSI1.04	Issue Type RBP reported non-compliance Obligation Rule 111A(1)(b)	Risk Rating Low Compliance Rating 1	Failure to publish historic financial report for financial year ending 2018 GSI Rule 111A(1)(b) requires AEMO to publish a historic financial report by 31 October showing AEMO's actual financial performance against budgeted financial performance for the previous financial year. AEMO published the historic financial report for the financial year ending 30 June 2018 six month late on 7 May 2019 (due to be published 31 October 2018). This is a recurring breach.	No further action. However, see 19GSI1.05 recommendations about general controls to mitigate compliance risk.
19GSI1.05	Issue Type RBP reported compliance risk Obligation N/A	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 GSI Rules. The existing process documentation is extremely high level and reiterates 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.	We recommend: <ul style="list-style-type: none"> • Calendar alerts be instituted for key publication/submission deadlines such as budget, fees, historic financial reports and allowable revenue submissions. • 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

Ref	Issue Type & Obligation	Risk & Compliance Ratings	Finding	Recommendation
			<p>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 reports this year (see 19GSI1.04). This breach is a recurring one.</p> <p>During our interviews we also noted that 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.</p>	<p>included in the budget/Allowable Revenue process description</p>

9 PART 8 – RULE CHANGES

Part 8 of the GSI Rules details the process for making changes to the GSI Rules.

9.1 RULE AMENDMENTS

There have been no amendments to Part 8.

9.2 AEMO PROCEDURES

AEMO has no obligations under Part 8 of the GSI Rules. Therefore, AEMO has no procedures relating to Part 8.

9.3 OPERATIONAL COMPLIANCE WITH PART 8

As noted above, AEMO has no obligations under Part 8 of the GSI Rules. Therefore, we have conducted no audit activities in relation to Part 8.

10 PART 9 – GSI PROCEDURES

Part 9 of the GSI Rules details the process for developing and changing GSI Procedures.

10.1 RULE AMENDMENTS

There have been no amendments to Part 9.

10.2 AEMO PROCEDURES

AEMO's GSI Procedures and Internal Procedures are compliant with Part 9 of the GSI Rules in all material respects.

10.3 OPERATIONAL COMPLIANCE WITH PART 9

No procedure changes have been progressed or implemented during the Audit Period. Therefore, we have conducted no audit activities relating to Part 9.

There have been no self-reported instances of non-compliance with Part 9.

11 PART 10 – COMPLIANCE AND ENFORCEMENT

Part 10 of the GSI Rules describes the monitoring, investigating and enforcing compliance of Gas Market Participants with the GSI Rules and GSI Procedures. It also covers auditing of AEMO's own compliance.

11.1 RULE AMENDMENTS

There have been no amendments to Part 10.

11.2 AEMO PROCEDURES

AEMO's GSI Procedures and Internal Procedures are compliant with Part 10 of the GSI Rules in all material respects.

11.3 OPERATIONAL COMPLIANCE WITH PART 10.

We have conducted no audit activities relating to Part 10.

There have been no self-reported instances of non-compliance with Part 10.

12 GSI SYSTEMS AND IT CONTROLS

This chapter covers the compliance of AEMO's software systems for the GBB and GSI Fees calculations and software management processes with the GSI Rules and GSI Procedures, in accordance with rule 174(2)(c) of the GSI Rules.

- Section 12.1 sets out our review of AEMO's software systems for the GBB and the calculation of GSI Fees
- Section 12.2 sets out our review of AEMO's general IT controls, including processes for software management.

12.1 COMPLIANCE OF AEMO SOFTWARE

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

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

- The Gas Bulletin Board (GBB)
- The GSI Fee Calculation Tool.

12.1.1 Certification of the GBB

The initial version of the GBB was certified in June 2013, prior to the official start of GBB operations on 1 August 2013. Since that time, a number of minor changes have been made to the GBB systems, none of which, in the IMO's or AEMO's opinion, required certifying under rule 19.

19 Certifying GBB software

(1) Subject to this rule, AEMO must ensure that any version of the GBB software used by AEMO has been certified as compliant with the Rules and Procedures by an independent auditor.

(2) AEMO may implement changes to the current version of the GBB software without obtaining certification under subrule (1) where AEMO considers that the change will not have a material impact on any one or more of the following:

(a) the provision of information to AEMO by Gas Market Participants under the Rules;

(b) the processing and publication of information on the GBB or the EMF; or

(c) the calculation and processing of GSI Invoices.

(3) Where AEMO considers that changes to the current version of the GBB software are urgently required and essential for the efficient operation of the GBB, AEMO may implement the changes to the current version of the GBB software prior to certification under subrule (1), and must obtain that certification as soon as practicable.

Details of production software changes made prior to this Audit Period are shown in Table 13. 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.

Table 13: Previous production software changes

System	Version number	Release date	Material impact under 19(2)?	Certification status
GBB	1.0	01/08/2013	Yes	Certified
GBB	1.0.9	20/08/2013	No	Maintained
GBB	1.1.3	11/12/2013	No	Maintained
GBB	1.1.4	19/12/2013	No	Maintained
GBB	1.2.0	23/01/2014	No	Maintained
GBB	1.2.38	30/01/2014	No	Maintained
GBB	1.2-57.7	25/06/2014	No	Maintained
GBB	1.3-145	27/08/2014	No	Maintained
GBB	1.3-145-3	8/01/2015	No	Maintained
GBB	1.4-193	18/03/2015	No	Maintained
GBB	1.4-201	20/05/2015	No	Maintained
GBB	1.4-209-7	9/09/2015	No	Maintained
GBB	1.5-255-3	3/11/2015	No	Maintained

System	Version number	Release date	Material impact under 19(2)?	Certification status
GBB	1.6-289-4	29/11/2015	No	Maintained
GBB	1.6-289-7	30/03/2016	No	Maintained
GBB	1.7-303-6	21/06/2016	No	Maintained
GBB	1.8-316-4	7/11/2016	No	Maintained
GBB	1.9-329	15/11/2017	No	Maintained
GBB	1.9-331	12/01/2018	No	Maintained
GBB	1.9-333	13/02/2018	No	Maintained

For this audit, we reviewed the release notes for all changes made to the GBB during the Audit Period and assessed the changes in relation to rule 19(2) of the GSI Rules. In each case, we agreed with AEMO that certification was not required. The details of these changes are shown in Table 14.

Table 14: Changes to GBB systems in the Audit Period

System	Version number	Release date	Material impact under 19(2)?	Certification status	Comment
GBB	1.11-345	03/09/2018	No	Maintained	Changes to messages, terms of use information, disclaimer. Update to MOSMI alerts.

12.1.2 Certification of the GSI Fee Calculation Tool

While the GSI Fee Calculation Tool is not specifically required to be certified under the GSI Rules, the calculation of GSI Fees is a part of this compliance audit.

During the Audit Period, there have been a small number of minor changes to the GSI Fees tool as follows:

- Automation changes to address finding 17GSIAudit2.04 from the 2017 GSI Audit (relating to manual processes employed in the invoice creation process)

- Correction to address the bug associated with finding 19GSI1.02 (incorrect sign attributed to credits)
- Cosmetic changes to improve invoice formats and sorting of invoice summaries

We have reviewed the latest version of the GSI Fees tool³ and verified that the calculations are compliant with the GSI Rules. We have checked:

- The tool calculates the budget for the period (F(p)) as defined in GSI Rule 116(a).
- Shipper fees on the Shipper tab are calculated in accordance with GSI Rule 116(2)
- Producer fees on the Shipper tab are calculated in accordance with GSI Rule 116(3)
- The Invoice summary reads correct values from elsewhere in the tool.

The GSI Fees tool is compliant with the requirements of GSI Rule 116.

12.1.3 Compliance of GSI software with the GSI Rules

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

12.2 SOFTWARE MANAGEMENT PROCESSES

Software management processes are also reviewed in the Electricity Compliance Audit. We carried out a single review covering both audits.

12.2.1 Audit activities

We reviewed AEMO's policies and procedures for:

- Business continuity
- Service management

We carried out compliance testing on:

- Release notes
- Service management records (including AEMO Jira and ServiceNow incident, problem, change and release records)

³ We audited the tools used to calculate initial invoices for Quarter 1 of 2019 (Jan-Mar) and adjustments for Quarter 3 of 2018.

12.2.2 Management of the GBB software

AEMO’s obligations in this regard are specified in rule 18(1) of the GSI Rules.

18(1) Where AEMO uses software (GBB software) and IT systems (GBB systems) to receive, store, collate and publish information for the operation of the GBB, AEMO must:

- (a) maintain a record of which version of GBB software was used at each point in time;
- (b) where changes are made to GBB software, maintain records of the differences between each version and the reasons for the changes between versions;
- (c) ensure that appropriate testing of new GBB software versions is conducted; and
- (d) ensure that any version of the GBB software used by AEMO has been certified in accordance with rule 19.

The changes made to the GBB during the Audit Period are listed in the Table 14 in the previous section.

12.3 AUDIT FINDINGS

There have been no self-reported or other instances of non-compliance with rule 18(1) of the GSI Rules.

12.3.1 Compliance of software management processes with the GSI Rules

AEMO's software management processes for the GBB remain sufficient to comply with the GSI Rules.

Table 15: Comment on AEMO’s compliance with rule 18(1) of the GSI Rules during the Audit Period

Clause	Comment on compliance
18(1)(a)	AEMO has maintained a record of all versions of market software used together with their dates in service, in the form of JIRA and ServiceNow records.
18(1) (b)	AEMO has maintained records of the differences between each version and the reasons for the differences, in the form of release notes and JIRA records.
18(1) (c)	AEMO has conducted appropriate testing of all new releases of the market software prior to their being placed in service.
18(1) (d)	AEMO has ensured that all software versions are covered by an independent certification prior to implementation where required.

13 APPENDIX – COMPLIANCE AND RISK RATINGS

This appendix contains information on the compliance and risk ratings used to classify audit findings. The only difference from AEMO’s internal ratings is that we assess the financial impact to market participants in addition to AEMO.

13.1 COMPLIANCE AND RISK RATINGS

Audit findings are categorised as follows:

Table 16: Compliance ratings

Compliance rating	Description
1	Instances of non-compliance with the GSI 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

Table 17: 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 18: Risk rating matrix

		CONSEQUENCE				
		<i>Immaterial</i>	<i>Minor</i>	<i>Moderate</i>	<i>Major</i>	<i>Extreme</i>
LIKELIHOOD	<i>Almost Certain</i>	Medium	Medium	High	Critical	Critical
	<i>Likely</i>	Low	Medium	High	Critical	Critical
	<i>Possible</i>	Low	Medium	High	High	Critical
	<i>Unlikely</i>	Low	Low	Medium	Medium	High
	<i>Rare</i>	Low	Low	Medium	Medium	High

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

13.2 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

13.3 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.

<i>Consequence</i>	<i>Reputation and Stakeholders</i>	<i>Financial (AEMO)</i>	<i>Safety</i>	<i>Environment</i>	<i>Market & System Impact</i>	<i>Legal & Compliance</i>
<i>Extreme</i>	<ul style="list-style-type: none"> Significant long term damage to stakeholder and public confidence and relationships. Continued adverse media exposure. Significant financial impact drives participant(s) towards insolvency. 	> \$25M	<ul style="list-style-type: none"> Single fatality or permanent injury or multiple notifiable injuries. 	<ul style="list-style-type: none"> Major environmental harm. e.g. major pollution incident causing significant damage or potential to health or the environment; and/or Fines and prosecution likely. 	<ul style="list-style-type: none"> Involuntary disruption of supply to a state(s) for any duration. Market suspension in multiple jurisdictions or markets. 	<ul style="list-style-type: none"> Corporate fine > \$1M. Imprisonment or fine for personal liability to Officer or Director. Regulatory action likely. Litigation involving Class actions.
<i>Major</i>	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Notifiable injury requiring hospitalisation > 5 days (incapacity beyond 3 months). 	<ul style="list-style-type: none"> Long term or serious environmental damage; and/or Multiple complaints received; and/or Potential for prosecution. 	<ul style="list-style-type: none"> Involuntary disruption of supply to a large portion of a state, for any duration. Market suspension in one jurisdiction or market. 	<ul style="list-style-type: none"> Corporate fine \$100K > \$1M. Fine for personal liability to officer or director. Likely investigation by a Regulator. Litigation involving protracted Court actions possible.
<i>Moderate</i>	<ul style="list-style-type: none"> Some damage to stakeholder confidence and relationships. Some adverse media exposure. Adverse financial impact on participant(s). 	\$500K- \$5M	<ul style="list-style-type: none"> Injury requiring < 5 days hospitalisation or increased level of medical treatment (6 days to 3 months incapacity). 	<ul style="list-style-type: none"> Moderate environmental impact; and/or Will cause complaints; and/or Possible fine. 	<ul style="list-style-type: none"> Market(s) operating in administered state, but not suspended. 	<ul style="list-style-type: none"> Corporate fine with no personal liability to Officer or Director. Likely to give rise to questions from a Regulator. Possible dispute resolution process*.
<i>Minor</i>	<ul style="list-style-type: none"> Manageable reduction in stakeholder confidence. Limited media exposure. Little to no financial impact on participant(s). 	\$100k - \$500K	<ul style="list-style-type: none"> Routine medical treatment only (up to 5 days incapacity). 	<ul style="list-style-type: none"> Minor environmental harm; and/or Potential for complaints; and/or Fine unlikely. 		<ul style="list-style-type: none"> Compliance breach with no penalties. Regulator attention, litigation or dispute resolution* unlikely.
<i>Immaterial</i>	<ul style="list-style-type: none"> No reduction in stakeholder confidence. No media exposure. No financial impact on participant(s). 	< \$100K	<ul style="list-style-type: none"> First aid. 	<ul style="list-style-type: none"> Little or no environmental harm; and/or No fines or complaints. 		<ul style="list-style-type: none"> No breach or minor technical breach of compliance obligation. No reasonable prospect of regulatory attention, litigation or dispute resolution.

Appendix 3 AEMO's response to market auditor's reports



AEMO's Response to Market Auditor's Reports

October 2019

Important notice

PURPOSE

AEMO has prepared this document in response to the Market Auditor's reports for the annual Wholesale Electricity Market and Gas Services Information audits conducted for the period 1 July 2018 to 30 June 2019, as at the date of publication.

DISCLAIMER

This document or the information in it may be subsequently updated or amended. This document does not constitute legal or business advice and should not be relied on as a substitute for obtaining detailed advice about the Wholesale Electricity Market, the Wholesale Electricity Market Rules, the Gas Services Information Rules, or any other applicable laws, procedures or policies. AEMO has made every effort to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

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1. Background

The Wholesale Electricity Market Rules (WEM Rules) and the Gas Services Information Rules (GSI Rules) require AEMO to appoint a market auditor to conduct the WA electricity and gas market audits. The audits are compliance-based reviews of AEMO's obligations under the WEM Rules, the GSI Rules and associated procedures.

The WEM Rules and the GSI Rules require two annual audits to be undertaken:

1. Audit 1 – WEM Electricity Compliance Audit; and
2. Audit 2 – GSI Gas Compliance Audit.

AEMO appointed Robinson Bowmaker Paul (RBP) to conduct the market audits for the period 1 July 2018 to 30 June 2019.

The audit reports prepared by RBP can be found on AEMO's website at <http://aemo.com.au/Electricity/Wholesale-Electricity-Market-WEM/Compliance-and-audit> and should be read in conjunction with this report.

This report sets out the matters that AEMO accepts and does not accept (and reasons for those views) with respect to the audit reports as required under clause 2.14.4(b) of the WEM Rules and rule 174(3) of the GSI Rules.

2. AEMO's Response

AEMO accepts all RBP's findings and recommendations with respect to the audit reports 1 and 2.