



ABN 20 009 454 111

Review Report
Merredin Energy Pty Ltd 2020 Electricity
Generation Licence Asset Management System
Review

October 2020



Executive Summary

Merredin Energy Pty Ltd (MEPL or the licensee) holds an Electricity Generation Licence (EGL25) issued by the Economic Regulation Authority (the ERA) under Sections 7 and 15 of the Electricity Industry Act 2004 (WA) (the Act). The licence enables MEPL to construct and operate power generating facilities in accordance with the licence conditions.

Sections 14 of the Act requires MEPL to provide the ERA with a report by an independent expert on the measures taken by the licensee to meet the criteria specified in the licence on the effectiveness of its asset management system. In May 2020 MEPL commissioned Qualeng to carry out the asset management system review (this review) for the period 1 July 2017 to 30 June 2020. The review has been conducted and this report prepared in accordance with the ERA's "2019 Audit and Review Guidelines: Electricity and Gas Licences (March 2019)" (the guidelines).

THE ASSETS

The licence has been granted for an area located at Lot 191 Robartson Rd in the Shire of Merredin, Western Australia. The generating assets consist of two diesel fuelled GE Frame 6 open cycle gas turbines (GT) driving Brush generators, diesel fuel tanks, fuel receipt and forwarding facilities, high voltage switchyard, water treatment and water storage facilities, compressed air system, main control building, workshop, evaporation pond, stormwater pond and water traps. Each GT is rated at 41.7 MW at 41°C with a total export capacity from the station of 82 MW.

THE BUSINESS

MEPL, the licensee and owner of the Merredin Power Station, has engaged Palisade

Integrated Management Services Pty Ltd (PIMS) (previously known as Palisade Asset Management Pty Ltd), a subsidiary of Palisade Investment Partners Ltd, to provide asset management services to the licensee. MEPL has also engaged TW Power Services Pty Ltd to manage the operation and maintenance of the assets.

THE REPORT

The report includes:

- (i) a summary of the objectives, the scope of the task and details of this review;
- (ii) key findings and recommendations from this review.

Separately, a post review implementation plan will be prepared by the licensee listing the review recommendations and the responses and actions proposed by MEPL. The plan does not form part of the report and is to be provided separately to complete the documentation.

LICENSEE'S RESPONSE TO PREVIOUS REVIEW RECOMMENDATIONS

The previous review report covered the period 1 July 2014 to 30 June 2017. The report made five recommendations. All the recommendations were closed during this review period.

SUMMARY OF FINDINGS AND RECOMMENDATIONS FROM CURRENT ASSET MANAGEMENT SYSTEM REVIEW

The review has found that Merredin Energy Pty Ltd has an effective plan for managing the different aspects of the asset management system and is committed to continuous improvement and regulatory compliance. Overall the review found that the licensee's attitude towards compliance was always proactive and cooperative.

Table 1 below presents the Asset Management System Review summary and lists the findings and recommendations for areas assessed as needing improvement.

Table 1- Asset management system review findings and recommendations

Table of current review asset management system deficiencies / recommendations			
Reference No/ Year	Asset management process and effectiveness criterion	Findings	Auditor's Findings
1/2020	Asset Creation and Acquisition (2.4) Commissioning tests are documented and completed.	▶ There is evidence that commissioning records for the plant are fragmented or not available. Independent report confirms that there is lack of commissioning documentation. Status of action to recover data and registration of lifting equipment such as davits and lifting	1/2020 Identify critical plant that requires essential commissioning data and/or registration to satisfy risk and safety requirements and document the existence and location of data. If data is not available ensure that it is

Table of current review asset management system deficiencies / recommendations			
Reference No/ Year	Asset management process and effectiveness criterion	Findings	Auditor's Findings
		beams was not clear.	sourced.
2/2020 3/2020 4/2020	Asset Management Information System (7.5) Data backup procedures appear adequate and backups are tested.	<ul style="list-style-type: none"> ▶ This review did not find an adequate level of written documentation on the backup strategy and procedures. ▶ The 2017 report from the previous 2014-2017 review reported "Limited information presented to assess performance.". During this review period, 2017 - 2020, whilst there was information on the setting and location of servers and expected backup regime, evidence of successful tests verifying that the backup data can be restored from storage was not available. ▶ Implementation of cloud storage for both GTs and Balance of Plant (BOP) SCADA data was still in progress at end of review period. 	<p>2/2020 Document the data backup plan for the asset management system including among others, the maintenance system, the asset records, the document management system and the SCADA data.</p> <p>3/2020 Strengthen the integrity of the backup process by verifying the restoration of individual files or systems from storage.</p> <p>4/2020 Continue with the implementation of cloud storage for both GTs and Balance of Plant (BOP) SCADA data.</p>

AUDITOR'S OPINION, ASSET MANAGEMENT SYSTEM REVIEW

On completion of the asset management system review, after assessment and testing of the licensee's asset management system the auditor has formed the opinion that during the review period of 1 July 2017 to 30 June 2020, Merredin Energy Pty Ltd's asset management system was operating effectively.

On all of the 12 areas of the asset management system, process and policy were found to be adequate and the licensee's performance met the required level.

POST REVIEW ACTION PLAN

The review has resulted, where applicable, in findings and recommendations that require corrective actions by the licensee.

The recommendations are due to be included in a Post Review Implementation Plan prepared by the licensee. Responses including actions, responsibilities and dates for completion are also due to be completed by the licensee.

This report is an accurate representation of the findings and opinions of the auditors on completion of the review of the client's conformance to nominated Licence conditions. The review is reliant on evidence provided by other parties and is subject to limitations due to the nature of the evidence available to the auditor, the sampling process inherent in the review process, the limitations of internal controls and the need to use judgement in the assessment of evidence. On this basis Qualeng shall not be liable for loss or damage to other parties due to their reliance on the information contained in this report or in its supporting documentation.

The Post Audit/Review Implementation Plan is a document prepared by the licensee in response to the recommendations provided by the review. As it represents the licensee's views and actions it does not form part of this review.

Approvals

Representation	Name	Signature	Position	Date
Auditor:	M Zammit		Lead Auditor / Projects Director, Qualeng	25 November 2020

Ref:	72/1	
Issue Status		
Issue No	Date	Description
1	25 Nov 2020	Final issue

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1 OBJECTIVES AND SCOPE OF REVIEW

1.1 BACKGROUND

Merredin Energy Pty Ltd (MEPL or the licensee) generates and supplies electricity to the South West Interconnected System (SWIS) in Western Australia under the EGL25 Electricity Generation licence (the licence) granted by the Economic Regulation Authority (the ERA) on 22 June 2012 (the licence was at Version 3, 1 July 2018 at the end of the review period).

The licence has been issued under Sections 7 and 15 of the Electricity Industry Act 2004 (WA) (the Act) and enables the licensee to construct and operate generating works or operate existing generating works in accordance with the licence terms and conditions.

The licence has been granted for an area located at Lot 191 Robartson Rd in the Shire of Merredin, Western Australia. The generating assets consist of:

- two diesel fuelled GE Frame 6B open cycle gas turbines (GT) driving Brush generators;
- three 150,000 litre diesel fuel tanks, fuel receipt and forwarding facilities;
- high voltage switchyard;
- water treatment and water storage facilities;
- ancillary power supply system;
- compressed air system;
- main control building and workshop and
- evaporation pond, stormwater pond and water traps.

Each GT is rated at 41.7 MW at 41°C with a total export capacity from the station of 82 MW.

The power station supplies all the power generated by the plant to the sole connection point with the SWIS at Western Power's Merredin Terminal, north of the power station via a single circuit 132kV overhead transmission line.

Under section 14 of the Act MEPL's systems are subject to asset management system reviews at 24 month intervals or some other period determined by the ERA.

Qualeng has been engaged by MEPL to conduct the asset management system review (the review) for the period 1 July 2017 to 30 June 2020. The review has been conducted and this report prepared in accordance with the "2019 Audit and Review Guidelines: Electricity and Gas Licences (March 2019)" (the guidelines).

1.2 OBJECTIVES OF REVIEW

The objective of the asset management system review is to assess the effectiveness of the measures taken by the licensee for the proper management of assets used in the provision and operation of services and, where appropriate, for the construction or alteration of relevant assets.

1.2.1 Methodology of review

The review followed the methodology defined in the ERA's guidelines including:

- Review of documentation;
- Preparation of the review plan, risk assessment and system analysis;
- Fieldwork including the document review and meetings;
- Reporting.

These activities were supported by additional investigations to further clarify aspects of the procedures.

The review plan was prepared outlining the objectives, scope, risk assessment, system analysis, fieldwork plan, the report structure, key contacts and auditing staff.

The review adopted a risk based approach where a preliminary risk and materiality assessment was carried out and followed the methodology defined in the guidelines. The risks resulting from lack of controls (inherent risks) and the strength of existing controls to mitigate the inherent risks were rated. The risk assessment was carried out on each asset management system (AMS) element to assess the effectiveness of the current asset management processes and allocate review priority to each of the processes.

1.3 SCOPE OF REVIEW

1.3.1 Scope of Asset Management System Review

The scope of the asset management system review includes the assessment of the adequacy and effectiveness of the licensee's asset management system by evaluating the key processes of:

- Asset planning
- Asset creation/acquisition
- Asset disposal
- Environmental analysis
- Asset operations
- Asset maintenance
- Asset management information system
- Risk management

- Contingency planning
- Financial planning
- Capital expenditure planning
- Review of the asset management system.

Each of the system processes was evaluated against effectiveness criteria defined in the guidelines.

Key documentation examined by the auditors is listed in Appendix A.

1.3.2 Review period

The review covers the period between 1 July 2017 to 30 June 2020.

1.3.3 Type of assurance engagement

As the licensee has made material changes to its asset management system since the previous review this review was a reasonable assurance engagement. A reasonable assurance engagement is defined as:

"An assurance engagement in which the assurance practitioner reduces engagement risk to an acceptably low level in the circumstances of the engagement as the basis for the assurance practitioner's conclusion. The assurance practitioner's conclusion is expressed in a form that conveys the assurance practitioner's opinion on the outcome of the measurement or evaluation of the underlying subject matter against criteria" (ASAE3000).

1.3.4 Sites visited

The following facilities were visited during the review:

- MEPL Merredin Power Station site.

The assets are managed as follows:

- asset management activities are currently undertaken by Palisade Integrated Management Services Pty Ltd (PIMS) from its office in Melbourne, Victoria; due to COVID-19 restriction this office was not visited;
- operations and maintenance services for the generation facilities are provided by TW Power Services Pty Ltd (TWPS).

No other sites were operated by the licensee during the review period.

1.3.5 Licensee's Personnel

Licensee representatives that participated in the review meetings or were requested to clarify aspects of the licensee's operation were:

- Dale Waterson, Asset Manager, main MEPL representative;
- Gareth Davies, Operator/Maintainer, TWPS.

1.3.6 Documentation

Main documents accessed by the auditors are listed in Appendix A

1.3.7 Work schedule

Activities

The review followed the methodology defined in the ERA's guidelines including:

- Review of documentation;
- preparation of the review plan, risk assessment and system analysis;
- fieldwork including the document review, interviews, meetings and site visit;
- report preparation;
- review of report;
- issue of report to the licensee for first review;
- update and issue of report for formal review by ERA;
- update and final issue of report.

These activities were supported by additional investigations to further clarify aspects of the procedures.

Review team

A summary of the auditing resources utilised in the performance of the review is listed below.

<i>Item</i>	<i>Resource</i>	<i>Description</i>	<i>Hours</i>
1	M Zammit	Project Director and Lead Auditor	85
2	S Campbell	Senior Engineer, Document Reviewer and Verifier	5

1.3.8 Review timeline

The review was carried out between July and October 2020.

1.3.9 Limitations and qualifications

An audit provides a reasonable level of assurance on the effectiveness of control procedures, however there are limitations due to the nature of the evidence available to the auditor, the sampling process inherent in checking the evidence, the limitations of internal controls and the need to use judgement in the assessment of evidence.

In regard to the review process, the reviewer relies on evidence coming to the reviewer's attention showing that the control procedures are not effective, when the initial process and procedures do not provide sufficient evidence to the level that would be required by a review.

As noted above, due to the sampling process, the nature of the evidence available to the auditor, the limitations of internal controls and the need to use judgement in the assessment of evidence there are limitations in the level of accuracy that can be obtained in the audit / review and errors and non-compliances may remain undetected.

The Post Review Implementation Plan (PRIP) is a document prepared by the licensee in response to the recommendations provided by the review. As it represents the licensee's views and actions it does not form part of the review and is provided separately in accordance with the guidelines.

1.4 ABBREVIATIONS

AMP	Asset Management Plan
AMIS	Asset Management Information System
AMS	Asset Management System
AS	Australian Standard
BOP	Balance of Plant
CAPEX	Capital Expenditure
CEO	Chief Executive Officer
CMMS	Computerised Maintenance Management System
DCS	Distributed Control System
DM	Document Management
DMS	Document Management System
DSOC	Declared Sent Out Capacity
EC	Effectiveness Criteria
EH&S	Environmental Health and Safety
EIM	Enterprise Information Management System
EOY	End of year
ERA	Economic Regulation Authority
FY	Financial Year
GT	Gas Turbine
HV	High voltage
KPI	Key Performance Indicators
LV	Low voltage
MEPL	Merredin Energy Pty Ltd
NA	Not applicable

NP	Not performed
NR	Not rated
O&M	Operation and Maintenance
OEM	Original Equipment Manufacturer
OFI	Opportunity for Improvement
OHS	Occupational health and safety
OHSE	Occupational Health, Safety and Environmental
OPEX	Operating Expenditure
P&L	Profit and Loss
PPA	Power Purchase Agreement
PRIP	Post Review Implementation Plan
Review	2020 Electricity Generation Licence Asset Management System Review
SLA	Service Level Agreement
WO	Work Order
YTD	Year to Date

1.5 DEVIATIONS FROM REVIEW PLAN

There were no deviations from the review plan approved by the ERA on 22 July 2020.

2 RECOMMENDATIONS FROM PREVIOUS REVIEW

2.1 LICENSEE'S RESPONSE TO PREVIOUS REVIEW RECOMMENDATIONS

The previous review report covered the period 1 July 2014 to 30 June 2017. The report made five recommendations. All recommendations were closed in the current review period of 1 July 2017 to 30 June 2020.

Table 2- Status of recommendations addressing asset management system (AMS) deficiencies from the previous review

EC = Effectiveness criterion

Table of previous review AMS deficiencies and recommendations				
A Resolved during current review period				
Recommendation reference (no/ year)	AMS process Process and policy deficiency / Performance deficiency (Rating / EC reference number, asset management process & EC / Details of deficiency)	Auditor's recommendation	Date resolved	Further action required (Yes/No/Not Applicable)
1/2017	<p>A2 (2.4) Asset Creation and acquisition Commissioning tests are documented and completed.</p> <p>No evidence of commissioning tests to substantiate this were presented. It is still not clear whether some original commissioning tests have been completed as per the previous audit recommendations.</p>	Merredin Energy to complete the commissioning tests if the tests were not completed as per the 2014 Post Audit Implementation Plan.	19 July 2019	<p>No further action required.</p> <p>The action recorded by Merredin Energy (MEPL) in the Post Review Implementation Plan of 2017 was to:</p> <ul style="list-style-type: none"> - identify outstanding commissioning test requirements and undertake additional testing as deemed necessary, with consideration of operational history and OEM requirements. <p>MEPL consulted with a member of the commissioning team who advised that the only outstanding commissioning test was a 24 hour continuous run test. The financial cost and environmental impacts of this commissioning run were deemed by the Board to be too onerous. General Electric, the Original Equipment Manufacturer were satisfied with MEPL decision and certified the equipment without completing</p>

				<p>this test.</p> <p>No further commissioning tests were deemed to be required. This completed the action proposed by MEPL.</p>
2//2017	<p>A1</p> <p>(6.2) Asset Maintenance</p> <p>Regular inspections are undertaken of asset performance and condition.</p> <p>GT2 still has unreliable starting.</p>	Investigate, rectify and prove GT2 poor starting issues.	30 June 2018	<p>No.</p> <p>No further action required.</p>
3/2017	<p>A2</p> <p>(7.2) Asset Management Information System</p> <p>Input controls include appropriate verification and validation of data entered into the system</p> <p>Data is collected by the DCS and reported.</p> <p>Availability is broadcast to System Management via the DCS.</p> <p>No historian is installed.</p>	Consideration be given again to storing historical DCS data.	Second quarter FY2018	<p>No.</p> <p>No further action required.</p>
4/2017	<p>A2</p> <p>(7.5) Asset Management Information System</p> <p>Data backup procedures appear adequate and backups are tested on schedule.</p> <p>Limited information presented to assess performance.</p>	Merredin Energy investigate and assess its data backup requirements and procedures.	30 June 2018	<p>No further action required.</p> <p>External service provider confirmed strategy to outsource data back-ups. Off-site data storage in use since 2018.</p>
5/2017	<p>A1</p> <p>(9.1) Contingency Planning</p> <p>Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks.</p> <p>The contingency plan has been reviewed and marked as updated. Not clear what changes made as previous document unavailable.</p>	Undertake risk review of operations and ensure all contingency plans and emergency response plans are site specific implemented, tested and monitored for effectiveness.	19 July 2019	<p>No.</p> <p>No further action required.</p>

B Unresolved at end of current review period			
Recommendation reference (no/ year)	AMS process Process and policy deficiency / Performance deficiency (Rating / EC reference number, Asset management process & EC / Details of deficiency)	Auditor's recommendation	Further action required (Yes/No/Not Applicable) Details of further action required (including current recommendation reference if applicable)
NA			Not Applicable. No recommendations from previous review were left unresolved at end of this review period.

3 PERFORMANCE SUMMARY

3.1 PROCESSES AND POLICIES RATINGS

The following tables set out the ratings scales auditors must use to rate the adequacy of a licensee's processes and policies and their performance.

Table 3: Process and policy rating scale (reviews)

Rating	Description	Criteria
A	Adequately defined	<ul style="list-style-type: none"> Processes and policies are documented. Processes and policies adequately document the required performance of the assets. Processes and policies are subject to regular reviews, and updated where necessary. The asset management information system(s) is adequate in relation to the assets being managed.
B	Requires some improvement	<ul style="list-style-type: none"> Process and policy require improvement. Processes and policies do not adequately document the required performance of the assets. Reviews of processes and policies are not conducted regularly enough. The asset management information system(s) requires minor improvements (taking into consideration the assets being managed).
C	Requires substantial improvements	<ul style="list-style-type: none"> Process and policy are incomplete or require significant improvement. Processes and policies do not document the required performance of the assets. Processes and policies are considerably out of date. The asset management information system(s) requires significant improvements (taking into consideration the assets being managed).
D	Inadequate	<ul style="list-style-type: none"> Processes and policies are not documented. The asset management information system(s) is not fit for purpose (taking into consideration the assets being managed).
NA	Not applicable	

Table 4: Performance rating scale (reviews)

Rating	Description	Criteria
1	Performing effectively	<ul style="list-style-type: none"> The performance of the process meets or exceeds the required levels of performance. Process effectiveness is regularly assessed, and corrective action taken where necessary.
2	Improvement required	<ul style="list-style-type: none"> The performance of the process requires some improvement to meet the required level. Process effectiveness reviews are not performed regularly enough. Recommended process improvements are not implemented.

Rating	Description	Criteria
3	Corrective action required	<ul style="list-style-type: none"> The performance of the process requires substantial improvement to meet the required level. Process effectiveness reviews are performed irregularly, or not at all. Recommended process improvements are not implemented.
4	Serious action required	<ul style="list-style-type: none"> Process is not performed, or the performance is so poor that the process is considered to be ineffective.
NA	Not applicable	<ul style="list-style-type: none">

3.2 PERFORMANCE SUMMARY OF ASSET MANAGEMENT SYSTEM REVIEW

The review of the Asset Management System is summarised below in Table 5. The table lists each of the 12 key asset management system processes together with the effectiveness criteria for each key component. Definition of the ratings is given in Table 3 (process and policy definition) and Table 4 (performance).

Table 5: Asset management effectiveness summary

ASSET MANAGEMENT SYSTEM PROCESS & EFFECTIVENESS CRITERIA	Process and policy ratings	Performance ratings
1. Asset planning	A	1
1.1 Asset management plan covers the processes in this table.	A	1
1.2 Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning.	A	1
1.3 Service levels are defined in the asset management plan.	A	1
1.4 Non-asset options (e.g. demand management) are considered.	NA	NA
1.5 Lifecycle costs of owning and operating assets are assessed. (also at 2.2)	A	1
1.6 Funding options are evaluated.	A	1
1.7 Costs are justified and cost drivers identified.	A	1
1.8 Likelihood and consequences of asset failure are predicted.	A	1
1.9 Asset management plan is regularly reviewed and updated.	A	1

2. Asset creation/ acquisition	A	1
2.1 Full project evaluations are undertaken for new assets, including comparative assessment of non-asset options.	A	1
2.2 Evaluations include all life-cycle costs.	A	1
2.3 Projects reflect sound engineering and business decisions.	A	1
2.4 Commissioning tests are documented and completed.	B	3
2.5 Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood.	A	1
3. Asset disposal	A	1
3.1 Under-utilised and under-performing assets are identified as part of a regular systematic review process.	A	1
3.2 The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken.	A	1
3.3 Disposal alternatives are evaluated.	A	1
3.4 There is a replacement strategy for assets.	A	1
4. Environmental analysis	A	1
4.1 Opportunities and threats in the asset management system environment are assessed.	A	1
4.2 Performance standards (availability of service, capacity, continuity, emergency response, etc) are measured and achieved.	A	1
4.3 Compliance with statutory and regulatory requirements.	A	1
4.4 Service standard (customer service levels etc) are measured and achieved.	A	1
5. Asset operations	A	1
5.1 Operational policies and procedures are documented and linked to service levels required.	A	1

5.2 Risk management is applied to prioritise operations tasks.	A	1
5.3 Assets are documented in an asset register including asset type, location, material, plans of components and an assessment of assets' physical/structural condition.	A	1
5.4 Accounting data is documented for assets.	A	1
5.5 Operational costs are measured and monitored.	A	1
5.6 Staff resources are adequate and staff receive training commensurate with their responsibilities.	A	1
6. Asset maintenance	A	1
6.1 Maintenance policies and procedures are documented and linked to service levels required.	A	1
6.2 Regular inspections are undertaken of asset performance and condition.	A	1
6.3 Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule.	A	1
6.4 Failures are analysed and operational/maintenance plans adjusted where necessary.	A	1
6.5 Risk management is applied to prioritise maintenance tasks.	A	1
6.6 Maintenance costs are measured and monitored.	A	1
7. Asset management information system	A	1
7.1 Adequate system documentation for users and IT operators.	A	1
7.2 Input controls include suitable verification and validation of data entered into the system.	A	1
7.3 Security access controls appear adequate, such as passwords.	B	2

7.4 Physical security access controls appear adequate.	A	1
7.5 Data backup procedures appear adequate and backups are tested.	B	3
7.6 Computations for licensee performance reporting are accurate.	A	1
7.7 Management reports appear adequate for the licensee to monitor licence obligations.	A	1
7.8 Adequate measures to protect asset management data from unauthorised access or theft by persons outside the organisation.	A	1
8. Risk management	A	1
8.1 Risk management policies and procedures exist and are applied to minimise internal and external risks.	A	1
8.2 Risks are documented in a risk register and treatment plans are implemented and monitored.	A	1
8.3 The probability and consequences of asset failure are regularly assessed.	A	1
9. Contingency planning	A	1
9.1 Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks.	A	1
10. Financial planning	A	1
10.1 The financial plan states the financial objectives and identifies strategies and actions to achieve those.	A	1
10.2 The financial plan identifies the source of funds for capital expenditure and recurrent costs.	A	1
10.3 The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets).	A	1
10.4 The financial plan provides firm predictions on income for the next five years and reasonable predictions beyond this period.	A	1

10.5 The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services.	A	1
10.6 Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary.	A	1
11. Capital expenditure planning	A	1
11.1 There is a capital expenditure plan covering works to be undertaken, actions proposed, responsibilities and dates.	A	1
11.2 The capital expenditure plan provides reasons for capital expenditure and timing of expenditure.	A	1
11.3 The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan.	A	1
11.4 There is an adequate process to ensure that the capital expenditure plan is regularly updated and implemented.	A	1
12. Review of asset management system	A	1
12.1 A review process is in place to ensure the asset management plan and the asset management system described in it are kept current.	A	1
12.2 Independent reviews (e.g. internal audit) are performed of the asset management system.	A	1

Note: Where adequacy and performance have not been rated, reasons for the lack of rating are provided in Table 6 - Asset Management System Review.

3.3 OBSERVATIONS AND FINDINGS

The observations and findings of the asset management system review are reported in Table 6.

The tables include all the findings, observations and recommendations and rate MEPL's process and policy and performance for the asset management system in accordance with the ERA's requirements. The rating definitions are given in Table 3 (process and policy definition) and Table 4 (performance).

Where appropriate or where the process and policy definition is rated C or D, or the asset management performance is rated 3 or 4, recommendations are included to address the deficiencies that have resulted in those ratings.

If applicable, the licensee's corrective actions are included in the separate Post Review Implementation Plan.

3.3.1 Asset Management System Review Findings and Observations

Key findings and recommendations arising from the Asset Management System Review are listed against their Effectiveness Criteria (EC) in Table 6.

KEY TO FINDINGS AND RECOMMENDATIONS

Key	Description
►	Finding/ Deficiency
1. Text	Recommendations
[OFI]	Opportunity for Improvement. In accordance with the guidelines OFIs will not be documented and will be communicated directly to the licensee and not included in the report.

Key	Description
Licence Grant Date	Licence grant date was the 22 June 2012.
Audit period	1 July 2017 to 30 June 2020

Table 6 - Asset Management System Review

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
1	Asset Planning	4	<p>Process: Asset planning strategies focus on meeting customer needs in the most effective and efficient manner (delivering the right service at the right price).</p> <p>Outcome: Integration of asset strategies into operational or business plans will establish a framework for existing and new assets to be effectively utilised and their service potential optimised.</p>	A	1
	General: licensee structure		Merredin Energy Pty Ltd (MEPL), the licensee, provides the engineering, asset management, operation and maintenance of Merredin Energy Power Station (MEPS) through selected contractors.		
1.1	<p>Asset management plan covers the processes in this table.</p> <ol style="list-style-type: none"> 1. Asset planning 2. Asset creation/acquisition 3. Asset disposal 4. Environmental analysis 5. Asset operations 6. Asset maintenance 7. Asset management information system 8. Risk management 9. Contingency planning 10. Financial planning 11. Capital expenditure planning 12. Review of the asset management system. 	5	<p>Overall MEPL's asset management framework was documented in the "Asset Management Plan, Merredin Energy" (AMP) and the "Asset Management System, Merredin Energy" (AMS) documents.</p> <p>The planning process was outlined in the AMS, a graphic showed the planning and AMP process which takes place on a yearly basis.</p> <p>Plans were included in the AMP and included maintenance, spares and consumable requirements, staffing and budget.</p> <p>During the review period plans were subject to regular management review.</p> <p>The last review and update of the AMP in May 2019. The AMP covered:</p> <ul style="list-style-type: none"> • planning, reviewing the operation of the plant especially in respect to reliability and performance and identifying performance issues or improvements; • performance test results; • forecasting both future operation and improvements on the basis of current and historical performance; • operating patterns and capital expenditure; • planning the maintenance strategy for the plant over the next 12 months and beyond; • scheduling inspections and maintenance; • evaluating the need for technical upgrades to address plant weaknesses and improvements 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>including;</p> <ul style="list-style-type: none"> the assessment of the need for acquisition or disposal of assets; analysis of external factors including market conditions; asset operation and maintenance; use of IT systems like the computer maintenance management system (CMMS); inputs for the preparation of budgets; reasons for capital works; risk management. <p>The AMS was last reviewed in July 2019 and covered:</p> <ul style="list-style-type: none"> objectives, legislation and licences, efficiency and costs; strategies for the management of the assets and their operation at Merredin Power Station, including areas such as planning, risk, financial, information systems and review; the operation of the plant, including policies, strategies and procedures; occupational health and safety (OHS), environmental and financial systems; all of the other required elements of the AMP. 		
1.2	Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning.	4	<p>The review found that stakeholders requirements had been incorporated in the planning objectives and the planning process was integrated with business planning.</p> <p>The planning process included stakeholders consideration, covering strategies to satisfy owner and business requirements, legislation and licences, efficiency and costs, OH&S and environmental obligations.</p> <p>The objectives reflected the licensee's service levels, risk management, legal, safety and environmental requirements.</p>	A	1
1.3	Service levels are defined in the asset management plan.	4	<p>The review found that the AMP addressed the power station service levels. The licensee's</p>	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>facility was contracted to:</p> <ul style="list-style-type: none"> start at any time and run up to any output level required by a dispatch instruction received from System Management; deliver up to the certified capacity which was tested twice a year, in summer and in winter; start reliably when required, penalties apply for failures to start; in addition the facility has to meet specified emission levels in order to operate. <p>To prove that the plant can deliver the specified performance, it was routinely subjected to tests specified in the AMP including the reserve capacity test, full speed no load tests and exhaust emission tests.</p>		
1.4	Non-asset options (e.g. demand management) are considered.	5	Not applicable to this operation. The operation relies on supplying power required by the customer. The assets are geared to supply as much power as required up to the plant capacity to the customer requirements, therefore there was no demand management as such.	NA	NA
1.5	Lifecycle costs of owning and operating assets are assessed.	4	<p>The review found that lifecycle costs of owning and operating the assets were forecast and cost plans were subject to appropriate approval.</p> <p>The five year business plan “Agenda 5.1 - Merredin Energy Pty Ltd - For Decision: FY21 Budget and Five-Year Business Plan Date: 4 June 2020” (5Y Business Plan) showed the annual budget, operating revenue and costs, and forecasts over five years.</p> <p>The 5Y Business Plan included fuel costs, service costs, O&M charges, cyclical costs including costs of tests such as pressure vessel tests and exhaust emissions. It contained 5 year capital expenditure (CAPEX) projections which included both significant individual expenditure items and a general allowance per year.</p> <p>A procedure, the “MER-GEN-PR-MO-018 Asset Acquisition Procedure”, was available to guide the process of evaluation, budgeting and approval of new capital assets for additional generation or additional Balance of Plant (BOP).</p>	A	1
1.6	Funding options are evaluated.	4	<p>The review found that there was evaluation of funding over the review period:</p> <ul style="list-style-type: none"> the 5Y Business Plan showed that refinancing of debt had been considered and approved; 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<ul style="list-style-type: none"> similarly the document “Merredin Energy Refinance Update Prepared for Board April 2020” provided the case for refinancing options; project recommendations and approval showed that there was allowance for project expenditure in budgets, as well as review and approval at appropriate levels of management: <ul style="list-style-type: none"> the project for a workshop extension included review of funding in its documentation submitted for financial approval; there was an allowance for capital expenditure in annual budgets. 		
1.7	Costs are justified and cost drivers identified.	4	<p>This review found that cost drivers were adequately identified and processes were in place to justify costs.</p> <ul style="list-style-type: none"> Main cost drivers were identified in both the AMS and AMP, including factors such as availability, as poor performance incurs penalties, operation and maintenance (O&M) expenses including fuel costs. Costs were also identified in input documentation into the 5Y Business Plan. Monthly reports recently include KPIs such as availability. Cost expenditure due to improvement and repair projects was supported by written proposals which were submitted for approval to the appropriate level of management: <ul style="list-style-type: none"> Workshop project proposal prepared during the review period included justification of costs. 	A	1
1.8	Likelihood and consequences of asset failure are predicted.	4	<p>The review found that, during the review period, there was a process in place and there was evidence to show that the risks of asset failure, including likelihood and consequences were identified.</p> <p>The AMP analysed the operation and performance of plant and assessed the risk of failures. Monthly reports and the AMP reported on running performance and end of year performance, identifying plant which did not perform and possible improvement actions.</p> <p>Performance was reviewed in reports such as “MER-GEN-CA-MO-013 Merredin Energy Start and Run Data 2019-20” including availability and reliability over the year. Indicators such as the number of successful and unsuccessful starts were included.</p>	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>“PQMS-A2-RMT-FR-001 Risk Management Framework” defined the risk management system for the asset manager.</p> <p>A risk register was updated quarterly and included both internal and external risks; risk treatments and appropriate actions were identified and selected to reduce risks to levels acceptable to the organization.</p> <p>Risks were reported quarterly by the General Manager (GM) to the Board in “GM reports”.</p>		
1.9	Asset management plan is regularly reviewed and updated.	5	<p>Through discussion with the Asset Manager and review of documentation it was found that the AMP was regularly reviewed and updated during the review period.</p> <p>The AMP was first issued on 30 June 2017 and then reviewed and updated in 2018 and 2019. The latest version of the AMP was issued in July 2020, just outside of the review period.</p>	A	1
2	Asset Creation and acquisition	4	<p>Process: Asset creation/acquisition is the provision or improvement of assets.</p> <p>Outcome: The asset acquisition framework is economic, efficient and cost-effective; it reduces demand for new assets, lowers service costs and improves service delivery.</p>	A	1
2.1	Full project evaluations are undertaken for new assets, including comparative assessment of non-asset options.	4	<p>This review found that there was an adequate process for managing project evaluation:</p> <ul style="list-style-type: none"> the requirements for asset acquisition, including project evaluation were contained in the “Asset Acquisition Procedure”; <ul style="list-style-type: none"> the procedure included for consideration of alternative solutions; there was an allowance for generic capital expenditure in the annual financial plans; extraordinary capital expenditure was subject to approval. <p>In the review period there were examples of project proposals and their evaluations:</p> <ul style="list-style-type: none"> a case for the procurement and installation of a permanent external generator set was identified in a risk assessment within the AMP; the “Agenda 5.3, Merredin Energy Holdings Pty Ltd, For Decision: External Generator CAPEX Request Date: 11 March 2020” contained the case for approval of the new permanent external generator at the power station; 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<ul style="list-style-type: none"> a number of different external proposals were provided by service providers for the historian upgrade and SCADA remote connection projects; <ul style="list-style-type: none"> several proposals were submitted between 2015 and 2018; CAPEX for the 'Historian' project was outlined in the budget and business plan for FY2019 which was approved by the Board (ref: "FY19 Budget & 5 Year Plan X Circulating Resolution"). CAPEX for the project was formally approved by PIMS General Manager Power on an email of 27 August 2018 (ref: "CAPEX request - Historian upgrade and CQ Partners SCADA"); a case was made for a workshop extension in 2018 to increase the storage and repair area; quotes were reviewed, selection and approval were made in 2019. 		
2.2	Evaluations include all life-cycle costs.	5	<p>This review found that all projects evaluations reviewed included life cycle costing.</p> <p>It is noted that none of the projects that were carried out during the review period and were examined were complex and required costing evaluation beyond capital expenditure.</p>	A	1
2.3	Projects reflect sound engineering and business decisions.	4	<p>This review found that a process was in place to review and approve projects.</p> <p>All projects examined had extensive documentation showing the process and the extent of evaluation of each project, at times over a period of several years, leading to approval of the preferred alternative.</p> <p>Information in the AMPs on plant performance, improvement needs and options showed that projects were based on operation and reliability improvements required because of demonstrated poor performance and risk management considerations.</p> <p>The projects examined showed that there was sound justification for the project approval.</p>	A	1
2.4	Commissioning tests are documented and completed.	4	<p>The review found that during the review period no significant plant was installed, however there were some upgrades and modifications. Of these there was evidence that commissioning was included in proposals such as the work to implement the historian facility in 2018.</p> <p>Both previous audits, 2014 and 2017, did not find evidence of all original commissioning tests.</p>	B	3

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>In fact, the 2017 Review Report confirmed that it was “not clear whether some original commissioning tests have been completed as per the previous review recommendations”.</p> <ul style="list-style-type: none"> During the current review period of 2017-2020 information became available of the original commissioning (performance) tests performed on GT1 on 1 September 2012. The gas turbine was operated in accordance with the agreed Thermal Performance Test Procedure and the test consisted of 3 individual performance runs. These results were corrected to contract conditions per the test procedure and showed the unit achieving an output of over 43MW. However the figure was preliminary and due to be adjusted to allow for diesel fuel analysis. No final test report was sighted. Commissioning records of other plant still appear to be fragmented. While some may only have historical value, the status of other plant and equipment like lifting gear, davits and lifting beams represents a safety risk to the licensee and testing and registration of the plant had to be sought from the suppliers at the end of 2017. There was further evidence of lack of commissioning data in a consultant’s report. On a site visit of 20-22 November 2017 to review the site electronic controls, servers, workstations and access both for the main plant and BOP, the consultant reported in its “STM-L171349-01 Site Visit Report”: <ul style="list-style-type: none"> “There is a lack of documentation, for example: commissioning documentation, full site drawings, preferably in electronic format”. <p>Findings</p> <ul style="list-style-type: none"> There is evidence that commissioning records for the plant are fragmented or not available. independent report confirms that there is lack of commissioning documentation. Status of action to recover data and registration of lifting equipment such as davits and lifting beams, was not clear. <p>Recommendations</p> <ol style="list-style-type: none"> Identify critical plant that requires essential commissioning data and/or registration to satisfy risk and safety requirements and document the existence and location of data. If data is not available ensure that it is sourced. 		

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
2.5	Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood.	4	<p>Through discussion with the Asset Manager and review of documentation it was found that the legal, environmental and safety obligations of the asset owner are assigned and managed.</p> <p>MEPL has assigned the asset management function to PIMS and an Asset Manager has been nominated. The AMPs showed that the asset was managed in accordance with government legislation, MEPL's licences and the rules covering the operation of the Wholesale Electricity Market (WEM).</p> <p>Compliance obligations were captured in an annual "Work Order" generated by the system CMMS, that listed all the obligations against the licence conditions, identified responsibilities and required sign off by the Asset Manager.</p> <p>In addition, an overall compliance report listed all compliance obligations related to operating, legal and environmental requirements that are placed on MEPL.</p>	A	1
3	Asset Disposal	4	<p>Process: Asset disposal is the consideration of alternatives for the disposal of surplus, obsolete, under-performing or unserviceable assets.</p> <p>Outcome: The asset management framework minimises holdings of surplus and under-performing assets and lowers service costs. The cost-benefits of disposal options are evaluated.</p>	A	1
3.1	Under-utilised and under-performing assets are identified as part of a regular systematic review process.	4	<p>The review found that there was a process of review and identification of under-utilised and under-performing plant through the regular reporting of asset performance in internal monthly reports and the annual AMP.</p> <p>During the review period a number of assets were identified as under performing and required replacement or improvement.</p>	A	1
3.2	The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken.	4	<p>The review found that as part of the process of review and identification of under-utilised and under-performing plant corrective action was identified and taken.</p> <p>Sample projects identified in the review period were:</p> <ul style="list-style-type: none"> the procurement and installation of a permanent external generator set; reasons for poor operation performance was identified in a risk assessment within the AMP; <ul style="list-style-type: none"> the "Agenda 5.3, Merredin Energy Holdings Pty Ltd, For Decision: External Generator 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>CAPEX Request Date: 11 March 2020” documented the case for approval of the new permanent external generator at the power station;</p> <ul style="list-style-type: none"> the request was approved for implementation; reasons for the upgrade to the historian to capture the GT data were documented: <ul style="list-style-type: none"> the requirement was identified as Risk ID 24 in the Risk Register during 2018; the FY19 budget and business plan (“FY19 Budget & 5 Year Plan X Circulating Resolution”) included the historian upgrade project and was approved by the Board in April 2018; CAPEX for the project was formally approved by General Manager Power at PIMS in “CAPEX request - Historian upgrade and CQ Partners SCADA”; project was completed in 2019; starting reliability of GT2 was also low in 2017-18 and a number of minor issues were found to contribute to it, one of the main ones being the CAT starting diesel engine which required a rebuild and improvement in diagnostics. 		
3.3	Disposal alternatives are evaluated.	5	<p>The review found that there was evaluation of disposal alternatives in the replacement of assets. The AMP identified the maintenance strategy for major items of plant and due to the low age of the plant there was no need for retiring any of the major items of plant during the review period. Some equipment was subject to investigation and repair, replacement or upgrade due to deteriorating performance or increasing obsolescence:</p> <ul style="list-style-type: none"> historian required upgrade due to computer software obsolescence and deterioration in performance; a repair project was required for the CAT starting diesel engine; the original diesel fuel oil heater was replaced by two higher rated units in FY2019 because of inadequate performance. 	A	1
3.4	There is a replacement strategy for assets.	4	<p>The review found that there was a replacement strategy for the assets which was outlined in the AMP:</p>	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<ul style="list-style-type: none"> the replacement strategy was based on the GTs operating regime; based on current operating conditions there is no likelihood that the main components of plant will require replacement in the lifetime of the plant; there was also a replacement strategy for minor items of plant; strategies were supported by maintenance of spare parts and participation in user forums to facilitate access to advice and replacement equipment. 		
4	Environmental Analysis	4	<p>Process: Environmental analysis examines the asset management system environment and assesses all external factors affecting the asset management system.</p> <p>Outcome: The asset management system regularly assesses external opportunities and threats and takes corrective action to maintain performance requirements.</p>	A	1
4.1	Opportunities and threats in the asset management system environment are assessed.	4	<p>The review found that there were processes in place to separately assess internal and external risks and opportunities:</p> <ul style="list-style-type: none"> there were assessments of risks and opportunities in the AMP and in the AMS; for example the 2019 AMS considered the impact and substantial changes to the electricity market due to the Energy Market Review; risks were continually monitored in quarterly and monthly reports; there was quarterly reporting of operation, the market and risks by the General Manager to the Board, reference “Agenda 6.1 GM Report”, Quarter 3 2020, in regard to external factors such as: <ul style="list-style-type: none"> work by the Energy Transformation Taskforce from Energy Policy WA on the “Whole of System Plan” due in July 2020; updated WEM rules; the proposed Constrained Network Access rules; overall risks were identified in risk management reviews and workshops, they were assessed and rated; mitigation actions recorded and selected and new risks levels quantified. 	A	1
4.2	Performance standards (availability of service, capacity, continuity, emergency response, etc) are	4	The review found that there was a process for setting, measuring and reporting on performance standards.	A	1

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	measured and achieved.		<p>Due to the overall function of the plant, which is to provide reserve capacity, the operation of the plant was set to efficiently maintain its performance to meet those standards. The requirements are firmly established in the AMS and in the AMP and regularly reported on in Quarterly and Monthly reports. The standards include:</p> <ul style="list-style-type: none"> • mandatory six monthly Reserve Capacity Tests to check the capacity of the plant to supply its rated capacity of 82 MW at 41°C through a summer and a winter test, the last test was run in April 2020 and was successful; capacity standards have been regularly achieved; • the ability to successfully run full speed no load (FSNL) tests; these tests are run more frequently (every one to two months) to test the ability of the plant to start-up on demand. <p>Internal performance standards such as reliability and availability were set to be consistent or to exceed external standards:</p> <ul style="list-style-type: none"> • GT1 has achieved reasonable start reliability standards; • start reliability of GT2 was poor early in the review period, however it improved from 59% in 2017-18 to 94% in 2019-20 following plant improvements and changes in operation. 		
4.3	Compliance with statutory and regulatory requirements.	4	<p>The review found that there was a system documenting statutory and regulatory requirements and monitoring compliance.</p> <p>The main tools for monitoring compliance were two systems of work orders:</p> <ul style="list-style-type: none"> • the CMMS system generates an annual “Work Order” that creates a report, the “ERA Generation Licence Compliance Report (12 Monthly)”, that lists all the licence conditions obligations and actions, identifies the responsibilities and requires sign off; • in addition, a CMMS keyword driven report generates the “Closed Work Order List by Type – Compliance” which lists all compliance obligations related to operating, legal and environmental requirements that are placed on MEPL; <p>Evidence of compliance was supported by records of tests.</p> <ul style="list-style-type: none"> • ‘Reserve Capacity Tests’ to check the capacity of the plant to supply its rated capacity of 82 MW at 41°C under summer and winter conditions were run successfully twice a year during the review period. 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<ul style="list-style-type: none"> Testing of the exhaust emission levels from both engines was carried out in August 2017. The frequency of the tests was reduced in November 2017 from annual to 5-yearly on the basis of good performance and consistency. The next test is due in July 2022. <p>Records of further tests and audits were available including:</p> <ul style="list-style-type: none"> pressure vessel tests environmental audit. 		
4.4	Service standard (customer service levels etc) are measured and achieved.	4	<p>The review found that there was a process for measuring and monitoring service standards. Standards such as customer service levels were met during the review period.</p> <p>Service standards related to MEPL's customer, AEMO, included:</p> <ul style="list-style-type: none"> capacity obligation, in this respect the criteria of performance is the ability to meet the certified WEM Reserve Capacity obligation of 82 MW at 41°C both in winter and in summer conditions; in addition the plant is required to reliably start and generate electricity to the output level required in dispatch instructions from System Management or when it is cleared in the WEM; this requires high start reliability which was tested and monitored through monthly or bi-monthly FSNL tests, which test the full start-up sequence of each unit and highlight any issues preventing starts; 'failed starts', which are a performance indicator included in quarterly reports to the Board. <p>The plant met its 'Reserve Capacity' obligations consistently during the review period, however the starting reliability of one of its two units (GT2) was not adequate at the start of the review period.</p> <ul style="list-style-type: none"> a change in the operating procedures enabling higher fuel temperatures has improved start reliability; failures of ancillary equipment, such as the CAT starting diesel engine, also contributed to failed starts and actions have been taken to overcome the issue. <p>Following this improvements Unit 2 has reached an adequate level of starting reliability.</p>	A	1

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5	Asset Operations	4	Process: Asset operations is the day-to-day running of assets (where the asset is used for its intended purpose). Outcome: The asset operations plans adequately document the processes and knowledge of staff in the operation of assets so that service levels can be consistently achieved.	A	1
5.1	Operational policies and procedures are documented and linked to service levels required.	4	<p>The review found that both operational policies and procedures were documented and linked to service levels:</p> <ul style="list-style-type: none"> The AMP dealt at length with policies on the proposed operation of the plant and service levels. The policies included: <ul style="list-style-type: none"> setting the plant so that it can operate at full peak firing mode to reflect its function of providing reserve capacity on demand; the need for the facility to provide full power for a minimum of one interval (30 minutes) twice per year, in summer and winter, to prove that the settings are right and validate the plant capability; use of FSNL tests to prove the plant starting reliability; other operating procedures such as barring of the GT rotor or cranking the diesel starting engines at frequent intervals to maintain the plant in start-up readiness; maintaining a log of fired hours to ensure that required maintenance is programmed in a timely fashion; the operating strategy was also documented in detail in the “MER-GEN-PR-MO-009 Operating Strategy, June 2017”. 	A	1
5.2	Risk management is applied to prioritise operations tasks.	4	<p>The review found that risk management was routinely applied to the operation of the plant and used to prioritise operation tasks.</p> <p>The initial scheduled maintenance program was based on the advice of original equipment manufacturers (OEM) and on the expected power station operating regime. Regular workshops have identified issues and adapted the operation or prioritised operation tasks to deal with the issues.</p> <p>MEPL carried out regular risk assessments during the review period and maintained a “Risk</p>	A	1

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			<p>analysis matrix” which showed current risks and was regularly updated.</p> <p>The” MER-GEN-PA-EM-001 Merredin Energy Contingency Plan” contained an analysis of risks and the policies to be adopted for the minimisation of risks, including:</p> <ul style="list-style-type: none"> • maintenance of spare parts; • close relationship with OEMs and General Electrics (GE); • analysis of risks associated with the primary plant and the BOP and response actions to deal with failures. <p>Primary function of the plant is to provide full generating capacity at short notice (15 minutes), consequently the plant operation is geared for fast response at full power. Management of risks that affect both plant functionality and reliability was prioritised, for example:</p> <ul style="list-style-type: none"> • the inability to connect diagnostic equipment to the CAT engine prior to start and during run-up hampered fault-finding and jeopardised the start reliability. Power supply to diagnostic equipment has allowed faster fault finding; • surface corrosion in the compressor section, due to the limited operation of the plant was being monitored through borescope inspections; • the risk of degradation of GT performance was being monitored through the use of accelerometers installed in the turbine system and through monitoring machine data during operation and assessing trends over time. 		
5.3	Assets are documented in an Asset Register including asset type, location, material, plans of components and an assessment of assets' physical/structural condition.	4	<p>The review found that an asset register was in operation and included the necessary asset data.</p> <p>The asset register was hosted in the cloud based system “Maintenance Connection” which is the facility CMMS. The register was set up hierarchically so that each major item of plant can be opened up and the records drilled down to individual components.</p> <p>Plant conditions were recorded through maintenance data:</p> <ul style="list-style-type: none"> • work was performed on the equipment by means of work orders; around 400 work orders were visible in the GT1 sub-system including inspection as well as repair data; • history of equipment components including replacement parts was available. 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
5.4	Accounting data is documented for assets	4	<p>The review found that accounting data was documented for the assets.</p> <p>CMMS included information on operating costs.</p> <p>Financial plans showed budgets and all expenditure for the licensee over the period 2016 to 2045 (ref: "ME Financials FY17B vs FY21B"). The plans were updated annually and included:</p> <ul style="list-style-type: none"> • operation and maintenance costs • all other costs • depreciation • ongoing capital expenditure • profit and loss. 	A	1
5.5	Operational costs are measured and monitored.	4	<p>The review found that operational costs were measured and monitored during the review period:</p> <ul style="list-style-type: none"> • costs were summarised in spreadsheets; • costs were reported in monthly reports such as the "MER-GEN-MR-MO-010 Merredin Power Station Monthly Report May 2018"; reports from 2017 to 2020 were reviewed, costs included: <ul style="list-style-type: none"> ◦ monthly expenditure; ◦ YTD expenditure for the financial year (FY); ◦ costs vs budgets and variances; • monthly scorecards such as "ME Scorecard Apr 2020" listed operating costs including actuals vs budget, variances with explanations, and YTD; • operational costs were stored in the Maintenance Connection platform; this review sighted the link between the CMMS data and hours and expenses reports. 	A	1
5.6	Staff resources are adequate and staff receive training commensurate with their responsibilities.	4	<p>Through discussions with the Asset Manager, the Operator/Maintainer, review of documentation and a site inspection it was found that the power station site was well maintained and staff numbers appeared adequate for the operating regime of the facility. Documentation and performance of the training process appeared adequate.</p>	A	1

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			<p>Due to the limited operation of the plant labour needs are restrained and a single operator was available onsite, with additional resources available on demand. However the remoteness of the site and the use of a single operator on the site means that there are added risks in the operation and maintenance of the plant, including safety risks due to hazards on site and the skilled nature of the operator's function which will take time to be imparted to other personnel. While local resources are available this is a site that is around 270 km from a major centre and local resources in some trades may be restricted at times.</p> <p>During the review period MEPL engaged both external national service providers and local contractors to provide the resources for managing the asset and operating the power station. One of the risks recognised in the enterprise risk assessment was the need to maintain sufficient and adequately skilled resources.</p> <ul style="list-style-type: none"> A training matrix was in place. The matrix had information on mandatory in-house and external training, desirable training and records of primary and additional qualifications. 		
6	Asset Maintenance	4	<p>Process: Asset maintenance is the upkeep of assets.</p> <p>Outcome: The asset maintenance plans cover the scheduling and resourcing of the maintenance tasks so that work can be done on time and on cost.</p>	A	1
6.1	Maintenance policies and procedures are documented and linked to service levels required.	4	<p>The review found that maintenance policies and procedures were well documented and related to the required service levels.</p> <p>Maintenance policies were driven by the function and nature of the plant to:</p> <ul style="list-style-type: none"> provide reserve capacity to the power grid; and cover restrictions on the network due to transmissions system outages, when required. <p>Policies were influenced directly by service levels and performance which were reported through:</p> <ul style="list-style-type: none"> scorecards monthly reports quarterly reports of GM to the Board the annual AMP update. 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>As service levels performance was monitored, the reasons and impact of variances were noted as well as any corrective actions. Performance, trends and forecasts were discussed in the above documents and in the “Operating Strategy” and were used to adjust maintenance procedures and draw future maintenance plans.</p> <p>Operation of the CMMS was witnessed by the auditor and maintenance procedures were easily accessed online including:</p> <ul style="list-style-type: none"> • “Rotor Protection Procedure”; • GE’s “Operation & Maintenance Manual”; • GE’s “GT Operation”. <p>The AMP indicated that GT1 had logged 50% of the factored starts at which a combustion inspection will be required, and at the current rate that inspection will not be required in the next 5 years. Use of GT2 was lower and consequently combustion inspection will not be required in the next few years.</p>		
6.2	Regular inspections are undertaken of asset performance and condition.	4	<p>The review found that maintenance activities were well documented and regular asset inspections and monitoring of asset performance and conditions were carried out effectively.</p> <p>Through interview of the Asset Manager, the Operator/Maintainer and review of documentation the review found:</p> <ul style="list-style-type: none"> • section 4 of the AMP contained scheduled inspection and maintenance tasks including weekly, monthly, three-monthly, six-monthly, annual, two and four-yearly tasks; the appendix contained the maintenance program and the frequency of maintenance activities; • records of inspections were maintained in the power station CMMS; • a report generated from CMMS, “Closed Work Order List by Type – Compliance”, July 2020” showed all major testing carried out during the review period; • the review found evidence of ‘Reserve Capacity’ tests carried out twice annually during the review period confirming the asset performance. 	A	1
6.3	Maintenance plans (emergency, corrective and preventative) are	4	Through discussion with the Asset Manager, the Operator/Maintainer and review of	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
	documented and completed on schedule.		<p>documentation the review found that maintenance plans were well documented and were completed in general conformance with schedules.</p> <p>The AMP included:</p> <ul style="list-style-type: none"> • maintenance plans and schedules of major and minor maintenance activities; • long term maintenance activities including programs for the current year and for the next four years; • action plans for corrective and preventive maintenance showing proposed dates and status. <p>AMPs for 2019 and 2021 showed both test and inspection activities arising from reviews and programs for minor capital upgrades, including repairs to GT1 CAT engine head which required reconditioning.</p> <p>Monthly reports gave details of maintenance activities performed each month. The review sampled the monthly reports and noted that three minor tasks were not performed in December 2019 due to lack of resources, this rose to ten in January 2020 but decreased to two in February 2020. The tasks were not statutory or urgent and were moved to the respective following months.</p>		
6.4	Failures are analysed and operational/maintenance plans adjusted where necessary.	4	<p>Through discussion with the Asset Manager and review of documentation the review found that the licensee had a process for investigating and assessing failures and taking corrective measures in operation and maintenance. Failures were reviewed by O&M personnel and asset management staff and actions implemented, including changes in O&M plans.</p> <p>Through the rigorous use of monthly reports and performance indicators reporting in scorecards, the operation of the plant was focused on maintaining an effective operating environment. Failures or plant poor performance were quickly identified during the review period and response plans formulated, including adjustments in O&M plans. The review noted:</p> <ul style="list-style-type: none"> • monitoring of failed starts of GT 2 showed that this unit had a starting problem with ancillary plant; unit 2 operating and maintenance regime was changed to improve starting reliability; • failure of the CAT starting diesel engine for the GT2 unit contributed to its poor reliability. Water ingress into the lubrication system required the engine to be removed and rebuilt. Regular checks of the oil and cooling system fluids were then introduced to ensure that this 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			issue would not reappear.		
6.5	Risk management is applied to prioritise maintenance tasks.	4	<p>The review found that there was a documented system and processes which were used for the prioritization of maintenance tasks.</p> <p>The power station provides reserve capacity to the grid and must reliably start and run up to any required output when necessary. This requires high reliability from the primary plant as well as all support systems, such as fuel, water, air and control systems.</p> <p>The risks of failure were managed through several processes:</p> <ul style="list-style-type: none"> the asset risk register was reviewed and updated quarterly; risks were reported to the Board quarterly through the GM Report; there was continuous reporting of developing risks in monthly reports; external audits resulting in reports such as "Risk Engineering - Risk Assessment and Risk Improvement" by Zurich, 19 August 2019, were commissioned to review the power station risks and adjust operational and maintenance tasks. <p>Analysis of risks in turn has resulted in the prioritisation, revision or creation of maintenance tasks:</p> <ul style="list-style-type: none"> the risk register indicated the critical maintenance tasks required to prevent machines degradation; these actions received high visibility and high level risks were reported to the Board; minimisation of risks has required the adherence to OEM preventive maintenance scheduling which, in turn, has been entered in the power station CMMS; actions to mitigate risks, such as inadequate start up reliability and future obsolescence of monitoring systems, have received high priority. 	A	1
6.6	Maintenance costs are measured and monitored.	4	<p>The review found that there was a process for measuring and monitoring maintenance costs.</p> <p>The CMMS was used to log labour costs. In addition:</p> <ul style="list-style-type: none"> monthly reports reported on O&M costs and cost of subcontracted work, including labour and consumables; parts taken from stocks were also monitored; 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<ul style="list-style-type: none"> monthly and YTD operating expenses were reported against budgets both in scorecards and quarterly reports from the GM to the Board. 		
7	Asset Management Information System (AMIS)	4	<p>Process: An asset management information system is a combination of processes, data and software supporting the asset management functions.</p> <p>Outcome: The asset management information system provides authorised, complete and accurate information for the day-to-date running of the asset management system. The focus of the review is the accuracy of performance information used by the licensee to monitor and report on service standards.</p>	A	1
7.1	Adequate system documentation for users and IT operators.	5	<p>The review found that there was an adequate system of documentation supporting both the IT operators and users.</p> <p>The review found:</p> <ul style="list-style-type: none"> training and help panels were readily available to guide users through the operation of the system; the review followed the “First Time Login” process online; modules such as “Overview of System” and “Completing the Work Order” gradually led to more specialised uses of the system; the “ME T2 - Maintenance Connection Basics” provided easy entry instructions for accessing the asset management information system (AMIS), the maintenance system, the asset register, procedures and directions for tasks. <p>The review noted that there were separate requirements for accessing the CMMS and ELO, the Document Management System.</p> <p>Potential improvements to the CMMS included:</p> <ul style="list-style-type: none"> inclusion of CMMS training in training register. 	A	1
7.2	Input controls include suitable verification and validation of data entered into the system.	5	<p>It was noted that most of the operating data entered into the system for performance monitoring was generated through automation:</p> <ul style="list-style-type: none"> metering data was collected by the network operator through its primary and check metering system; 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<ul style="list-style-type: none"> AEMO monitored availability and output of power station through the DCS; emission tests data was managed through a NATA registered company; tests were first annual, then 5-yearly following approval by the Department of Water and Environmental Regulation (DWER). A NATA registered independent Company, Ektimo, had the responsibility to carry out the last compliance test in August 2017; MEPL has engaged the Company CQ Energy to provide services which include the review of data; CQ Energy has access to System Management data and reviews any discrepancy between data and separate inputs on behalf of the licensee. 		
7.3	Security access controls appear adequate, such as passwords.	4	<p>The review found evidence of satisfactory systems and processes controlling security access:</p> <ul style="list-style-type: none"> the document “Multifactor Authentication” of March 2019 provided the process for setting up, configuring and operation of the authentication process controlling access to the asset IT systems through multi-devices; access to IT systems was through multi factor authentication; new access required two devices verification and was reset every 14 days; mobile phones issued by PIMS were enabled with a higher level of security as default; a password policy was in place and required specified password strength and regular updates of the password by the user through a specific process. <p>Potential improvements to the CMMS included:</p> <ul style="list-style-type: none"> on CMMS, removal or disabling of operators that are no longer employed or change function. 	B	2
7.4	Physical security access controls appear adequate.	4	<p>Through discussion with the Asset Manager, review of documentation and inspection of the licensee’s facility the review found satisfactory evidence of physical security access control.</p> <p>The procedure “MER-GEN-PR-MO-002 Site Access Procedure”, June 2017, contained policies for managing access to the power station site, including:</p> <ul style="list-style-type: none"> different levels of access for staff, contractors, government agencies, Western Power personnel and miscellaneous visitors; 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<ul style="list-style-type: none"> processes for attending site; restricted areas. <p>The Merredin Energy Power Station site was secured through:</p> <ul style="list-style-type: none"> passive preventive systems such as fencing, locked gates, locked control room and CCTV cameras that monitored and recorded activity around the station perimeter and within the power station; active systems including remote alarm and external surveillance services. 		
7.5	Data backup procedures appear adequate and backups are tested.	4	<p>The review found that there was information on how the data backup was performed and the backup process appeared adequate, however the review did not find an adequate level of written documentation on the backup procedure or adequate evidence of back-up tests. This could be improved by adding a high level overview of the strategy and process in the AMS document. Findings and recommendations are listed below.</p> <p>Through discussions with the Asset Manager and review of documentary evidence it was found that:</p> <ul style="list-style-type: none"> MEPL used third party service provider, MC Global, to provide data integrity; data from the AMIS Maintenance Connection was stored in MC Global Support servers in Sydney, with backups stored across multiple data centres in the Sydney region. Disaster recovery plans included a 'Recovery Time Objective' of 4 hours; an investigation was carried out by an external service provider on the IT systems on site leading to the commencement of implementation of 'cloud' storage of both GTs and BOP SCADA data (ref: emails of 2 June 2020); back ups of the Document Management System (DMS), hosted on ELO servers, was via CommVault. Both the servers and CommVault are located in Azure Datacentres, primarily at the South East Data Centre (Victoria); backup tests are due to be carried out monthly however they are not ELO specific; <ul style="list-style-type: none"> ► evidence for testing was sought but was not available. <p>The previous review report (period 2014-2017) had noted "Limited information presented to assess performance."</p>	B	3

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>Findings</p> <ul style="list-style-type: none"> ► This review did not find an adequate level of written documentation on the backup strategy and procedures. ► This review did not find adequate evidence of back-up tests. The 2017 report from the previous 2014-2017 review reported "Limited information presented to assess performance.". During this review period (2017-2020), whilst there was information on the setting and location of servers and the expected backup regime, evidence of successful tests verifying that the backup data can be restored from storage was not available. ► Implementation of cloud storage of SCADA data for both GTs and Balance of Plant (BOP) was still in progress at end of the review period. <p>Recommendations</p> <ol style="list-style-type: none"> 2. Document the data backup plan for the asset management system including among others, the maintenance system, the asset records, the document management system and the SCADA data. 3. Strengthen the integrity of the backup process by verifying the restoration of individual files or systems from storage. 4. Continue with the implementation of cloud storage for both GTs and Balance of Plant (BOP) SCADA data. 		
7.6	Computations for licensee performance reporting are accurate.	5	<p>The review found that the licensee had engaged reputable contractors, including the OEM manufacturers, to ensure that performance reporting was accurate.</p> <ul style="list-style-type: none"> • The key performance target for the GTs was the certified capacity to produce the required Reserve Capacity of 82 MW at 41°C, derated or uprated to the actual environmental conditions of the test day, both under summer and winter conditions. The tests are run under the Australian Energy Market Operator (AEMO) oversight and results are directly available to the AEMO. • Emissions tests were carried out by reputable and NATA registered third party testing companies selected by MEPL and subject to approval by DWER. 	A	1
7.7	Management reports appear adequate for the licensee to monitor	4	Through discussion with the Asset Manager and review of documentation the review found that	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
	licence obligations.		<p>a suite of management reports were in use and appeared adequate to monitor licence obligations:</p> <ul style="list-style-type: none"> • compliance obligations were captured in an annual “Work Order” generated by the system CMMS. The work order listed all the obligations against the licence conditions, identified the responsibilities and required sign off; • in addition, an overall compliance report listed all compliance obligations related to operating, legal and environmental requirements that were placed on MEPL; • reports by the GM to the Board summarized the regulatory requirements and risks to the licensee; • monthly reports provided a granular overview of plant operation, plant condition and upcoming requirements. 		
7.8	Adequate measures to protect asset management data from unauthorised access or theft by persons outside the organisation.	4	<p>Through discussions with the Asset Manager and review of documentation the review found that there was sufficient protection of data from unauthorised access or theft.</p> <ul style="list-style-type: none"> • The CMMS, ‘Maintenance Connection’ was used by the asset manager PIMS to manage and store the data from the licensee’s operation in an individual database, access to the database required a two-step application and verification process. • All of the asset manager (PIMS) devices were protected by multi factor authentication and could be erased remotely if lost or stolen. • Controls applied to all the data that was stored ‘in the cloud’ on service providers’ servers, however there was reliance on the subcontracted party in providing the required security. 	A	1
8	Risk Management	4	<p>Process: Risk management involves the identification of risks and their management within an acceptable level of risk. Outcome: The risk management framework effectively manages the risk of the licensee not maintaining service standards.</p>	A	1
8.1	Risk management policies and procedures exist and are applied to minimise internal and external risks.	4	<p>The review found that policies and procedure for risk management exist and processes were in place to assess and minimize internal and external risks associated with the AMS.</p> <ul style="list-style-type: none"> • A risk management policy was in place for the asset manager, the “PQMS-A1-RMT-PH-001 PIMS Risk Management Policy”. 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<ul style="list-style-type: none"> An overall framework. the “PQMS-A2-RMT-FR-001 Risk Management Framework” was in place to manage the risk management process. A risk register was updated quarterly and included both internal and external risks; risk treatments were included and appropriate actions were identified and selected to reduce risks to levels acceptable to the organization. Risks were reported quarterly by the General Manager to the Board in “GM reports”. External audits were commissioned to review the power station risks and adjust operation and maintenance tasks, and resulted in reports such as "Risk Engineering - Risk Assessment and Risk Improvement" by Zurich, 19 August 2019. 		
8.2	Risks are documented in a risk register and treatment plans are implemented and monitored.	4	<p>The review found that a risk register and processes were in place to action and monitor risk treatment plans.</p> <p>The review found that:</p> <ul style="list-style-type: none"> the quarterly “MER-GEN-RG-RM-001 Risk Register YYYY Qn” is a register that records both internal and external risks, their analysis, responsibility for risk management, assessment of likelihood and consequences of failures and risk rating, mitigation of risk through actions re-assessment of risk rating following mitigation actions; registers for 2018, 2019 and 2020 were sighted; treatment actions were outlined in the register and tracked until the resulting risk was accepted. 	A	1
8.3	Probability and consequences of asset failure are regularly assessed.	4	<p>The review found that there was a process for assessing the power station operating risks in a risk register. The risks included plant operational and maintenance risks and risks due to external catastrophic events.</p> <p>Failures of assets were individually treated in the risk register. The risk register was reviewed by management and updated on a quarterly basis.</p> <p>Monthly management reports and the annual AMP reported on current risks and strategies for reducing the risk of asset failure.</p>	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
9	Contingency Planning	4	<p>Process: Contingency plans document the steps to deal with the unexpected failure of an asset.</p> <p>Outcome: Contingency plans have been developed and tested to minimise any major disruptions to service standards</p>	A	1
9.1	Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks.	4	<p>The review found that contingency and emergency plans were in place and were tested during the review period.</p> <ul style="list-style-type: none"> A “MER-GEN-PA-EM-001 Merredin Energy Contingency Plan” was in place to deal with asset risks, both for the primary plant and the BOP. The plan included the policies and steps to be followed for the minimisation of risks, including: <ul style="list-style-type: none"> operational aspects design considerations maintenance of spare parts close relationship with OEM and suppliers and response to failures that may eventuate. First level of operational response to contingencies was through the integrated management and control system which registered faults and communicated an alarm to operating staff for a first attempt at fixing the problem remotely or, if unsuccessful, to attend site. the “Merredin Energy Emergency Response Procedure (MER-GEN-PR-ME-001) provided responses for events such as: <ul style="list-style-type: none"> explosion or fire chemical spill liquid fuel spill fire on the adjacent properties bomb threat. <p>Test exercises were carried out during the review period.</p> <ul style="list-style-type: none"> A “Crisis & Emergency Management Training & Exercise” was held at the Palisade Asset Management (PAM) Melbourne office and Waterloo Wind Farm on 17 May 2018. The test simulated a failure of the SCADA systems across a number of assets and was conducted to practice the organisational response to a major incident. Whilst not directly involving the MEPL site, the exercise tested crisis response and validity of emergency procedures within 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>the asset manager organisation (ref: "PQMS-B3-HSE-RP-002 - PIMS Crisis Response Exercise Report" by Ri'ziliens Pty Ltd).</p> <ul style="list-style-type: none"> An emergency response activity was carried out at Merredin Energy Power Station (MEPS) with the Merredin's Western Australia Volunteer Fire and Rescue (VFRS) on 8 April 2019. The exercise involved a site familiarisation with particular review of hazardous areas and a pumping / boosting test from the water supply at MEPS using the Merredin VFRS appliance. The test could not proceed due to a mismatch in couplings with the power station water connections, however subsequent to the test a suitable coupling was found. 		
10	Financial Planning	4	<p>Process: The financial plan brings together the financial elements of the service delivery to ensure its financial viability over the long term.</p> <p>Outcome: A financial plan is reliable and provides for the long-term financial viability of the services.</p>	A	1
10.1	The financial plan states the financial objectives and identifies strategies and actions to achieve those.	4	<p>The review found that there was extensive documentation defining the financial plans and objectives, and the strategies and actions required to achieve and maintain those objectives.</p> <p>Financial objectives were part of the AMS and AMP's objectives. The objectives were translated into operating strategies and actions that were outlined in the "MER-GEN-PR-MO-009 Operating Strategy", and continually reported in the annual AMPs and quarterly GM reports to the Board.</p> <p>The "Agenda 5.1 - Merredin Energy Pty Ltd - For Decision: FY21 Budget and Five-Year Business Plan Date: 4 June 2020" reported on the annual budget, operating revenue and costs and forecast over five years. In addition it showed that refinancing of debt had been considered and approved in 2020.</p>	A	1
10.2	The financial plan identifies the source of funds for capital expenditure and recurrent costs.	4	<p>The review found that the licensee maintained a financial plan which showed the source of funds providing for capital and operating costs.</p> <p>Financial plans, such as the "ME Financials FY17B vs FY21B", were created by the licensee. They showed all revenue and expenditure over the period 2016 to 2045 and were updated annually.</p> <ul style="list-style-type: none"> Main sources of revenue were identified in the plan, such as capacity credits and revenues from sales. 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<ul style="list-style-type: none"> Operating costs were included as well as working capital level, debt and debt servicing and ongoing capital expenditure projections. <p>The “Agenda 5.1 - Merredin Energy Pty Ltd - For Decision: FY21 Budget and Five-Year Business Plan Date: 4 June 2020” showed that refinancing of debt had been considered and approved in 2020.</p>		
10.3	The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets).	4	<p>The review found that the licensee’s financial plans showed projections of profit and loss and financial position over the period 2016 to 2045.</p> <p>The “ME Financials FY17B vs FY21B” financial plan showed all revenue and expenditure over the period 2016 to 2045, included projections of profit and loss and financial position, and was updated annually.</p> <p>Five year projections of operating statements (profit and loss) were included in agenda papers that were submitted to the Board for discussion and approval on an annual basis (reference the “Agenda 5.1, Merredin Energy Pty Ltd, For Decision: FY21 Budget and Five-Year Business Plan Date: 4 June 2020”).</p>	A	1
10.4	The financial plan provides firm predictions on income for the next five years and reasonable predictions beyond this period.	4	<p>The review found that the licensee had financial plans with projections of income over the next five years and beyond.</p> <p>The “ME Financials FY17B vs FY21B” financial plan showed all revenue streams over the period 2016 to 2045, included projections of profit and loss and was updated annually. A review of historical figures and projections showed satisfactory correlation.</p> <p>The agenda papers that were submitted to the Board for discussion, listed projections of revenue over the next five years (ref: the “Agenda 5.1, Merredin Energy Pty Ltd, For Decision: FY21 Budget and Five-Year Business Plan Date: 4 June 2020”).</p>	A	1
10.5	The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services.	4	<p>The review found that the licensee maintained a financial plan which showed expenditure including O&M, administration and capital expenditure requirements.</p> <p>Financial plans, reference the “ME Financials FY17B vs FY21B”, have been created and are updated annually by the licensee. the plans show all expenditure for the licensee over the period</p>	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>2016 to 2045. The plans include:</p> <ul style="list-style-type: none"> • operation and maintenance costs • connection charges, licencing fees, legal and insurance fees • management and consultant costs • debt fees and servicing costs • ongoing capital expenditure allowance. <p>The “Agenda 5.1 - Merredin Energy Pty Ltd - For Decision: FY21 Budget and Five-Year Business Plan Date: 4 June 2020” listed projections of expenditure over the following five years.</p>		
10.6	Large variances in actual/budget income and expenses are identified and corrective action taken where necessary.	4	<p>The review found that there was a strong process for monitoring actual income and expenditure against budget.</p> <ul style="list-style-type: none"> • Merredin Energy Monthly Scorecards reported on expenses, by categories, against budget (ref: April and June 2020 scorecards): <ul style="list-style-type: none"> ◦ scorecards showed that monthly variances occurred due to fuel delivery timing; ◦ end of year scorecard showed higher operating expenses however variation was minor (<.05%); ◦ there was additional expenditure due to refinancing costs and related consultants fees however significant savings were assured through the new funding deal. • Scorecard analysis was reproduced in the monthly GM reports to the Board, with commentary on reasons for variances and expected trends. • At a granular level monthly operational reports included: <ul style="list-style-type: none"> ◦ reports of variances between actual versus estimated costs; ◦ reports on YTD expenditure; ◦ analysis of monthly and YTD income and expenditure; ◦ variances were highlighted graphically. <p>This review observed that, on all the reports examined, any variances found were minor.</p>	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
11	Capital Expenditure Planning	4	<p>Process: The capital expenditure plan provides a schedule of new works, rehabilitation and replacement works, together with estimated annual expenditure for these works over the next five or more years.</p> <p>Since capital investments tend to be large and lumpy, projections would normally be expected to cover at least 10 years, preferably longer. Projections over the next five years would usually be based on firm estimates.</p> <p>Outcome: The capital expenditure plan provides reliable forward estimates of capital expenditure and asset disposal income. Reasons for the decisions and for the evaluation of alternatives and options are documented.</p>	A	1
11.1	There is a capital expenditure plan covering works to be undertaken, actions proposed, responsibilities and dates.	4	<p>The review found that the capital expenditure (CAPEX) plan was included in the financial plan and significant extraordinary capital expenditure, actions and responsibilities were well covered by agenda items that were submitted to the Board for approval;</p> <p>The “ME Financials FY17B vs FY21B” covered the projected CAPEX for the period 2016 to 2045. On an annual basis the financial plan included an allowance for miscellaneous minor CAPEX and projected major expenditure.</p> <p>During the review period CAPEX was re-calculated yearly allowing for emerging issues. Revised CAPEX was included in “Circulating Resolutions” (23 April 2018 for FY2019) or “Agenda Items” (4 June 2020 for FY2021) covering the forthcoming FY and the “Five-Year Business Plan” for approval by the Board.</p> <p>Review of long term financial plans of 2016 and 2020 showed that the original plans had been conservative in the allowance for CAPEX, subsequent plans reduced the forecasted amounts. In general actual CAPEX was within forecast.</p>	A	1
11.2	The capital expenditure plan provides reasons for capital expenditure and timing of expenditure.	4	<p>The review found that the CAPEX plan was included in the financial plan. Significant extraordinary capital expenditure was identified in the annual issue of the AMP. The major projects, actions and responsibilities were covered by agenda items that were submitted to the Board for approval.</p> <p>The annual review of the AMP highlighted CAPEX items that were necessary and provided a commentary on the background and reasons for the expected expenditure. On an annual basis CAPEX was re-calculated to allow for emerging issues.</p>	A	1
11.3	The capital expenditure plan is consistent with the asset life and	4	The review found that there was consistency between the information on plant conditions	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
	condition identified in the asset management plan.		contained in the annual version of the AMP and the proposed CAPEX for the year. As noted above, the annual review of the AMP highlighted CAPEX items that were required and provided a commentary on the background and reasons for expected expenditure. On an annual basis CAPEX was re-calculated to allow for changing plant conditions.		
11.4	There is an adequate process to ensure that the capital expenditure plan is regularly updated and implemented.	4	<p>The review found that there was a consistent process and approach to the development of the annual CAPEX plan. Long term financial plans and annual AMPs showed implementation of CAPEX plans. As noted above there was consistency between the status of plant in the annual version of the AMP and the proposed CAPEX for the year.</p> <p>All proposed CAPEX for major items of expenditure was covered by individual project approvals, such as the proposals for a case for the procurement and installation of a permanent external generator set, the case made for a workshop extension in 2018 and CAPEX for the 'Historian' project outlined in the FY19 budget and business plan.</p> <p>Updates on the quarterly "Agenda 6.1 GM Report" provided additional information to the Board on the progress of major CAPEX items. These reports published operating expenses and a single catch-all 'other expenses' item, in general they did not drill down to individual CAPEX items.</p>	A	1
12	Review of AMS	4	<p>Process: The asset management system is regularly reviewed and updated.</p> <p>Outcome: The asset management system is regularly reviewed and updated.</p>	A	1
12.1	A review process is in place to ensure that the asset management plan and the asset management system described in it remain current.	4	<p>The review found that a process of review was in place to keep the AMP and the AMS current.</p> <p>Through discussion with the Asset Manager and review of documentation it was found that the AMP was reviewed and updated annually. There were AMP revisions in 2017, 2018 and 2019.</p> <p>The first issue of the current AMS document was on 30 June 2017, the AMS was subsequently reviewed and updated in 2018 and 2019.</p>	A	1
12.2	Independent reviews (e.g. internal audit) are performed of the asset management system.	4	<p>The review found that there was regular use of independent reviews to assess the asset management system, the operation of the plant and machinery performance.</p> <ul style="list-style-type: none"> An asset management workshop was held in 2019 employing an external specialist from 	A	1

Ref. no.	Asset management process or effectiveness criterion	Review priority	Observations and recommendations (► Findings)	Process & policy rating	Performance rating
			<p>TWPS, resulting in identification of areas of the operation that could be improved as well streamlining inspection activities.</p> <ul style="list-style-type: none"> Two external reviews were carried out by Zurich in September 2018 and July 2019 to assess the risk exposure of the facility. The latest report was issued on 31 July 2019, it made various recommendations and noted which actions had been progressed since 2018. The assessment reviewed: <ul style="list-style-type: none"> safety procedures and management controls asset integrity management systems plant construction and layout fire and process equipment protection systems operating processes. The Department of Mines, Industry Regulation and Safety conducted an audit of the Dangerous Goods (DG) storage facilities at the site on 19 March 2020 and made recommendations to improve dangerous goods handling. 		

4 CHANGES TO THE LICENCE

No changes to the licence conditions are recommended in respect of the Asset Management System review.

5 RECOMMENDATIONS

5.1 CURRENT REVIEW ASSET SYSTEM DEFICIENCIES AND RECOMMENDATIONS

Recommendations on the actions to be taken by the licensee to address current asset management process or effectiveness criteria deficiencies with a process and policy rating of C or D or a performance rating of 3 or 4, are listed in Table 8.

Recommendations on the actions that were taken by the licensee to address previous (historical) asset management process or effectiveness criteria deficiencies are listed in Table 7.

Table 7 – Recommendations to address current asset system historical deficiencies (Resolved)

EC = Effectiveness Criterion

Table of current asset system historical deficiencies and recommendations			
A Resolved during current review period			
Recommendation reference (no/ year)	AMS process Process and policy deficiency / Performance deficiency (Rating / EC reference number, asset management process & EC / Details of deficiency)	Date resolved & action taken by licensee	Auditor's Comments
1/2017	<p>A2</p> <p>(2.4) Asset Creation and acquisition</p> <p>Commissioning tests are documented and completed.</p> <p>No evidence of commissioning tests to substantiate this were presented. It is still not clear whether some original commissioning tests have been completed as per the previous audit recommendations.</p>	<p>19 July 2019</p> <p>The action recorded by Merredin Energy (MEPL) in the Post Review Implementation Plan of 2017 was to:</p> <ul style="list-style-type: none"> - identify outstanding commissioning test requirements and undertake additional testing as deemed necessary, with consideration of operational history and OEM requirements. <p>MEPL consulted with a member of the commissioning team who advised that the only</p>	No further action required.

Table of current asset system historical deficiencies and recommendations			
A Resolved during current review period			
Recommendation reference (no/ year)	AMS process Process and policy deficiency / Performance deficiency (Rating / EC reference number, asset management process & EC / Details of deficiency)	Date resolved & action taken by licensee	Auditor's Comments
		<p>outstanding commissioning test was a 24 hour run. The financial cost and environmental impacts of this commissioning run were deemed by the Board to be too onerous. General Electric, the Original Equipment Manufacturer were satisfied with MEPL decision and certified the equipment without completing this test.</p> <p>No further commissioning tests were deemed to be required. This completed the action proposed by MEPL.</p>	
2//2017	<p>A1</p> <p>(6.2) Asset Maintenance</p> <p>Regular inspections are undertaken of asset performance and condition.</p> <p>GT2 still has unreliable starting.</p>	<p>30 June 2018</p> <p>Merredin Energy and O&M personnel investigated and corrected a number of issues relating to GT2 start performance.</p>	No further action required.
3/2017	<p>A2</p> <p>(7.2) Asset Management Information System</p> <p>Input controls include appropriate verification and validation of data entered into the system</p> <p>Data is collected by the DCS and reported. Availability is broadcast to System Management via the DCS. No historian is installed.</p>	<p>Q2 FY2018</p> <p>Merredin Energy has reconsidered options for historical DCS data storage / historian and implemented the changes.</p>	No further action required.
4/2017	<p>A2</p> <p>(7.5) Asset Management Information System</p> <p>Data backup procedures appear adequate and backups are tested on schedule.</p>	<p>30 June 2018</p> <p>External service provider confirmed strategy to outsource data back-ups. Off-site data storage in use since 2018.</p>	<p>No.</p> <p>No further action required.</p>

Table of current asset system historical deficiencies and recommendations			
A Resolved during current review period			
Recommendation reference (no/ year)	AMS process Process and policy deficiency / Performance deficiency (Rating / EC reference number, asset management process & EC / Details of deficiency)	Date resolved & action taken by licensee	Auditor's Comments
	Limited information presented to assess performance.		
5/2017	<p>A1</p> <p>(9.1) Contingency Planning</p> <p>Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks.</p> <p>The contingency plan has been reviewed and marked as updated. Not clear what changes made as previous document unavailable.</p>	<p>19 July 2019</p> <p>Merredin Energy has updated contingency plan and emergency response plan and implemented them.</p>	No further action required.

Table 8 – Recommendations to address current asset management system deficiencies (Unresolved))

EC = Effectiveness Criterion

Table of current asset management system deficiencies and recommendations			
B Unresolved at end of current review period			
Recommendation reference (no/ year)	AMS process Process and policy deficiency / Performance deficiency (Rating / EC reference number, asset management process & effectiveness criterion / Details of deficiency)	Auditor's recommendation	Action taken by licensee by end of review period
1/2020	<p>B3</p> <p>(2.4) Asset Creation and Acquisition</p> <p>Commissioning tests are documented and completed.</p> <p>► There is evidence that commissioning records for the plant are fragmented or not available. independent report confirms that there is lack of commissioning documentation. Status of action to recover data</p>	<p>Identify critical plant that requires essential commissioning data and/or registration to satisfy risk and safety requirements and document the existence and location of data. If data is not available ensure that it is sourced.</p>	<p>Action in progress.</p> <p>Further development required to satisfy recommendation.</p>

Table of current asset management system deficiencies and recommendations			
B Unresolved at end of current review period			
Recommendation reference (no/ year)	AMS process Process and policy deficiency / Performance deficiency (Rating / EC reference number, asset management process & effectiveness criterion / Details of deficiency)	Auditor's recommendation	Action taken by licensee by end of review period
	and registration of lifting equipment such as davits and lifting beams, was not clear.		
2/2020	<p>B3 (7.5) Asset Management Information System Data backup procedures appear adequate and backups are tested.</p> <ul style="list-style-type: none"> ▶ This review did not find an adequate level of written documentation on the backup strategy and procedures. Status of action to recover data and registration of lifting equipment such as davits and lifting beams, was not clear. 	Document the data backup plan for the asset management system including among others, the maintenance system, the asset records, the document management system and the SCADA data.	Action in progress.
3/2020	<p>As above</p> <ul style="list-style-type: none"> ▶ This review did not find adequate evidence of back-up tests. The 2017 report from the previous 2014-2017 review reported "Limited information presented to assess performance.". During this review period (2017-2020), whilst there was information on the setting and location of servers and the expected backup regime, evidence of successful tests verifying that the backup data can be restored from storage was not available. 	Strengthen the integrity of the backup process by verifying the restoration of individual files or systems from storage.	Recommendation not addressed.
4/2020	<p>As above</p> <ul style="list-style-type: none"> ▶ Implementation of cloud storage of SCADA data for both GTs and Balance of Plant (BOP) was still in progress at end of the review period. 	Continue with the implementation of cloud storage for both GTs and Balance of Plant (BOP) SCADA data.	Action in progress.

6 POST REVIEW IMPLEMENTATION PLAN

The Post Review Implementation Plan is a separate document that, if applicable, will be prepared by the licensee in response to the recommendations made in the review. As it represents the licensee's views and actions, it does not form part of the review report, however it includes all key review findings and recommendations that have been made in the review. For each recommendation the licensee records responses and corrective actions, responsibility for the actions and a proposed date for completion.

Appendix A - Documentation reviewed

Key Documentation Reviewed

1. Electricity Generation Licence EGL25
2. 2017 Performance Audit and Asset Management System Review for Merredin Energy Pty Ltd (EGL25)
3. Post Audit Implementation Plan 2017 – Status, 2017.12.19; 2018.07.24; 2019.01.28; 2019.07.19
4. Merredin Energy Overview (MER)
5. Email 2019.01.28 on update to the Asset Management System
6. Economic Regulation Authority emails on Status of Post Audit Implementation Plan 2017
7. MER-GEN-GL-MO-001 Asset Management System
8. Asset Management Plan, May 2019
9. Asset Management Plan, July 2020
10. MER-GEN-PA-HSE-002 Environmental Management Plan
11. MER-GEN-PA-HSE-001 HSE Management Plan
12. MER-GEN-PR-MO-018 Asset Acquisition Procedure
13. Agenda 5.3 External Genset Capex
14. Merredin GT1 850181 NU, GT1 Performance Tests 2012
15. Q173426 Merredin Energy Scada Display - Server upgrade V1
16. Email ID180614- Merredin - SpeedTronis Control System – MKVle
17. Email ID180827-DW2JD-Capex request - Historian upgrade and CQ Partners SCADA projects
18. Q17342-SCADA Remote Display & Server Upgrade, 30 July 2018
19. Merredin GEII Historian Proposal 1344596
20. MER-GEN-PR-MO-019 Asset Disposal Procedure
21. MER-GEN-AC-RA-006 [DWER] Merredin Energy Operating Licence (Amendment 1)
22. MER-GEN-MR-MO-0nn Merredin Power Station Monthly Reports October 2017 to June 2020
23. ME Scorecard reports
24. Agenda 6.1 GM Reports to Board
25. 20200408 Merredin Board Update [Funding]
26. 2019 March Merredin Energy Technical Committee Minutes
27. 2019 Merredin Energy Asset Management workshop MOM Final
28. 2020 Merredin Energy Technical Committee Agenda and MOM
29. MER-GEN-PR-MO-009 Operating Strategy
30. MER-GEN-RG-HSE-002 Training & Certification Register Merredin Energy
31. GER3620M Heavy Duty Gas Turbine Operations and Maintenance
32. STM-L171349-01 Site Visit Report- Cromarty, 20-22 Nov 2017

33. MER-GEN-PR-MO-002 Site Access Procedure
34. Multifactor Authentication
35. Emails on Merredin Off-site data storage and backups
36. Email ID180328-ADMIN IT-Password Expiry Notification
37. CMMS Report - 2020 Compliance Report
38. ME T1 - First Time Login
39. ME T2 - Maintenance Connection Basics
40. ME T3 - Completing a Work Order
41. ME T4 - Running Reports
42. ME T5 - Labor Module
43. Screenshots - Procedures – CMMS, CMMS Work Orders, CMMS Data Entry, CMMS Asset Hierarchy, ELO DMS Screenshots
44. MER-GEN-RG-RM-001 Risk Register, 2018, 2019, 2020
45. Palisade Asset Management - Merredin Energy - Update 2019, "Risk Assessment and Risk Improvement, Zurich, 2019
46. PQMS-A1-RMT-PH-001 PIMS Risk Management Policy
47. PQMS-A2-RMT-FR-001 Risk Management Framework
48. PQMS-B3-HSE-PR-001 Crisis and Emergency Management Procedure
49. MER-GEN-PA-EM-001 Merredin Energy Contingency Plan
50. MER-GEN-PR-EM-001 Emergency Response Procedure
51. MER-GEN-RP-EM-001 ER Exercise Report 2019 Merredin Fire and Rescue
52. PQMS-B3-HSE-RP-002 - PIMS Crisis Response Exercise Report, Ri'ziliens Pty Ltd
53. Crisis Management Workshop Actions, screenshots
54. ME Financials FY17B vs FY21B [to 2045] - 2016 and 2020
55. ME Budget Summary FY18
56. ME FY2020 Budget Input
57. FY19 Budget & 5 Year Plan - Circulating Resolution
58. Agenda 5.1 - ME FY2021 Budget and Five Year Business Plan
59. 2019 Merredin Energy Asset Management workshop Actions.