Alcoa of Australia Ltd

Electricity Generation Licence (EGL14)

2013 Asset Management System Review

November 2013

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14 November 2013

Dear Robert

Electricity Generation Licence (EGL14) Asset Management System Review Report

We have completed the Asset Management System Review for Alcoa of Australia Ltd (Alcoa) for the period 1 July 2010 to 30 June 2013 and are pleased to submit our report to you.

I confirm that this report is an accurate presentation of the findings and conclusions from our review procedures.

If you have any questions or wish to discuss anything raised in the report, please contact Ben Fountain on 9365 7270 or myself on 9365 7270.

Yours sincerely

Darren Gerber
Partner
Deloitte Touche Tohmatsu

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1 Independent Reviewer's Report

With the Authority's approval, Deloitte Touche Tohmatsu (**Deloitte**) was engaged to conduct a limited assurance review of Alcoa of Australia Ltd's (**Alcoa**) Electricity Generation Licence (**Licence**) asset management system. Deloitte engaged KT & Sai Associates Pty Ltd to provide advice where technical expertise was required.

The review was conducted in accordance with the specific requirements of the Licence and the August 2010 issue of the *Audit Guidelines: Electricity, Gas and Water Licences* issued by the Authority (**Audit Guidelines**), for the period 1 July 2010 to 30 June 2013.

Alcoa's responsibility for maintaining an effective asset management system

Alcoa is responsible for putting in place policies, procedures and controls, which are designed to provide for an effective asset management system for assets subject to the Licences.

Our responsibility

Our responsibility is to express a conclusion on the effectiveness of Alcoa's asset management systems to meet its Licence requirements based on our procedures. We conducted our engagement in accordance with Australian Standard on Assurance Engagements *ASAE 3500 Performance Engagements* issued by the Australian Auditing and Assurance Standards Board and the Audit Guidelines, in order to state whether, based on the procedures performed, anything has come to our attention that causes us to believe that Alcoa's asset management system has not been operating effectively, in all material respects, in accordance with the Audit Guidelines. Our engagement provides limited assurance as defined in ASAE 3500.

Our procedures were set out in the Review Plan reviewed and agreed with by the Authority on 16 August 2013, and set out in Appendix A.

Limitations of use

This report is made solely to the management of Alcoa for the purpose of its reporting requirements under section 14 of the *Electricity Industry Act 2004*. We disclaim any assumption of responsibility for any reliance on this report to any person other than the management of Alcoa, or for any purpose other than that for which it was prepared. We disclaim all liability to any other party for all costs, loss, damages, and liability that the other party might suffer or incur arising from or relating to or in any way connected with the contents of our report, the provision of our report to the other party, or the reliance on our report by the other party.

Inherent limitations

A limited assurance engagement is substantially less in scope than a reasonable assurance engagement conducted in accordance with ASAE 3500 and consequently does not allow us to obtain assurance that we would become aware of all significant matters that might be identified in a reasonable assurance engagement. Accordingly, we will not express an opinion providing reasonable assurance.

We cannot, in practice, examine every activity and procedure, nor can we be a substitute for management's responsibility to maintain adequate controls over all levels of operations and its responsibility to prevent and detect irregularities, including fraud. Accordingly, readers of our reports should not rely on the report to identify all potential instances of non-compliance which may occur.

Any projection of the evaluation of the level of compliance to future periods is subject to the risk that the systems may become inadequate because of changes in conditions, or that the degree of compliance with management procedures may deteriorate.

Independence

In conducting our engagement, we have complied with the independence requirements of the Australian professional accounting bodies.

Conclusion

Based on our work described in this report, nothing has come to our attention to indicate that Alcoa had not established and maintained an effective asset management system for assets subject to the Licence and in operation during the period 1 July 2010 to 30 June 2013.

Table 3 of this report provides effectiveness ratings for each of the 12 key processes in the asset management life-cycle. For those aspects of Alcoa's asset management system that were assessed as having opportunities for improvement, relevant observations, recommendations and post review implementation plans are summarised at section 2.4 of this report and detailed at section 4 of this report.

DELOITTE TOUCHE TOHMATSU

Darren Gerber
Partner
Perth, November 2013

2 Executive Summary

2.1 Introduction and background

The Economic Regulation Authority (**the Authority**) has under the provisions of the *Electricity Industry Act 2004* (the **Act**), issued Alcoa of Australia Ltd (**Alcoa**) an Electricity Generation Licence (EGL14) (**the Licence**). The Licence relates to Alcoa's operation of generating works at its Kwinana, Pinjarra and Wagerup facilities. These works are managed by Alcoa's WA powerhouse operations within the WA Operations (**WAO**) business unit. When the licence was first granted to Alcoa, it was anticipated Alcoa's net inflow and outflow would net to nil. Alcoa is now a net importer of 9MW electricity per annum due to increased consumption, predominately related to refinery and mining activity at its Pinjarra facility.

Section 14 of the Act requires Alcoa to provide to the Authority with an asset management system review (the **review**) conducted by an independent expert acceptable to the Authority not less than once in every 24 month period. As a result of the 2010 audit and review, the Authority increased Alcoa's audit period to 36 months. With the Authority's approval, Deloitte Touche Tohmatsu (**Deloitte**) has been appointed to conduct the audit for the period 1 July 2010 to 30 June 2013.

The review has been conducted in accordance with the August 2010 issue of the *Audit Guidelines: Electricity, Gas and Water Licences* (**Audit Guidelines**), which sets out 12 key processes in the asset management life-cycle.

2.2 Findings

In considering Alcoa's internal control procedures, structure and environment, its compliance culture and its information systems specifically relevant to those effectiveness criteria subject to review, we observed that Alcoa has:

- Maintained consistent procedures and controls designed to provide for an effective asset management system
- Allocated responsibilities to specific staff for meeting key Licence obligations, namely the Energy Services Manager and the Principal Mechanical Engineer WAO Powerhouse
- Continued to demonstrate an awareness of and commitment to regulatory compliance, although some further attention is still required to ensure that monitoring processes are implemented in an effective and consistent manner (e.g. ASATs and asset integrity audits)

This review assessed that:

- For the asset management process and policy definition adequacy ratings, 49 of the 55 elements of Alcoa's asset management system are rated as "Adequately defined". Of the six remaining elements, five were rated as "Requires some improvement" and one was 'not rated'
- For the asset management performance ratings, 52 of the 55 elements of Alcoa's asset management system are rated as "Performing effectively". Of the three remaining elements, two were rated as having an "Opportunity for improvement" and one was 'not rated'.
- There are three opportunities for improvement identified in the 2013 AMS review where further action is recommended.

Specific assessments for each criterion are summarised at **Table 3** in the "Summary of findings" section of this report. Detailed findings, including relevant observations, recommendations and action plans are located in section 4 "Detailed findings, recommendations and action plans" of this report.

2.3 Alcoa's response to previous review recommendations

This review considers how Alcoa has progressed against the Post Review Implementation Plan (PRIP) detailed in the 2010 Asset Management System Review report.

Through our examination of relevant documents, discussion with staff and consideration of the results of this review's procedures, we determined that Alcoa has completed two of the four action plans detailed in the 2010 performance audit report. The remaining two action plans are currently 'In Progress'.

Refer to section 5 of this report for further detail.

2.4 Recommendations and action plans

AMS Key Process and Effectiveness Criteria	Adequacy rating	Performance rating	Issue 1/2013
Asset maintenance 6(a) Maintenance policies and procedures are documented and linked to service levels required	Requires some improvement (B)	Opportunity for improvement (2)	Alcoa has documented policies, procedures and protocols for each site, designed to facilitate maintenance of Alcoa's assets. However, we observed that Alcoa is in the process of developing and enhancing its suite of maintenance documentation, including: • Documents detailing the required maintenance level for each specific plant item • Specific plant maintenance instructions for electrical and mechanical plant • Control plans for major plant items such as boiler, generator, deaerators and boiler feed pumps • Supplementary equipment asset strategies. We also noted that document management practices appear to be limited, as documentation requested for during the review was not readily available/could be located.
Recommendation 1/2013 Alcoa should: a) Finalise the development of the its supporting maintenance documentation b) Consider the need for training c) Review current document management practices and identify why some documentation was unable to be located during the review.		**Action plan 1/2013** Alcoa will: a) Finalise the development of the supporting maintenance documentation b) Develop and roll-out training to the required staff c) Review document filing processes to ensure consistency in saving and storing documentation. Alcoa is also currently upgrading its document management system. **Responsible Person:** Principal Mechanical Engineer WAO Powerhouse **Target Date:** 30 June 2014	

AMS Key Process and Effectiveness Criteria	Adequacy rating	Performance rating	Issue 2/2013
Asset maintenance 6(c) Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule	Requires some improvement (B)	Opportunity for improvement (2)	For each facility's major equipment, the eAM system contains plans for scheduled maintenance as well as required emergency and corrective works. However, based on our examination of Alcoa's maintenance practices, we determined that Inspection Test Procedures (ITPs) are currently being developed and uploaded into eAM. Of the ITPs that have been developed, only a small number are being used by Operations & Maintenance staff.
Recommendation 2/2013 Alcoa should a) Finalise the development of its ITPs b) Consider the need for formal training on the content and use of ITPs to all relevant staff.		**Action plan 2/2013** Alcoa will: a) Develop an equipment register, which risk assesses the equipment. For those assessed as being a high risk, ITPs will be developed as a priority b) Provide ITP training to maintenance personnel as part of major shutdown preparations. **Responsible Person:** Principal Mechanical Engineer WAO Powerhouse **Target Date:** 31 December 2014	

AMS Key Process and Effectiveness Criteria	Adequacy rating	Performance rating	Issue 3/2013
Risk Management 8(a) Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system.	Requires some improvement (B)	Performing effectively (1)	We observed evidence of risk management activities being applied to WAO Powerhouse planning and management activities. However, as a minor point to note, Alcoa's suite of risk management policies and procedures refer to the out-dated Risk Management Australian standard AS/NZS 4360:2004. The new risk management standard AS/NZS ISO 31000:2009, although not fundamentally different to the old standard, has been updated including a new definition of risk and provides a greater emphasis on how risk management should be implemented and integrated into an organisation.
Recommendation 3/2013 Alcoa should update the Risk Management suite of documents to reflect the revised Risk Management standard AS/NZS ISO 31000:2009.		**Action plan 3/2013** Alcoa will update its risk management suite of documentation to reflect the revised Risk Management standard. **Responsible Person:** Principal Mechanical Engineer WAO Powerhouse **Target Date:** 30 June 2014	

2.5 Scope and objectives

The objective of the review was to independently examine the effectiveness and performance of the asset management system established for Alcoa's assets subject to Alcoa's electricity generation licence for the period 1 July 2010 to 30 June 2013.

In accordance with the Audit Guidelines, the review considered the effectiveness of Alcoa's existing control procedures within the following 12 key processes in the asset management life-cycle

#	Key processes	Effectiveness criteria
1	Asset planning	(a) Planning processes and objectives reflect the needs of all stakeholders and is integrated with business planning (b) Service levels are defined (c) Non-asset operations (e.g. demand management) are considered (d) Lifecycle costs of owning and operating assets are assessed (e) Funding options are evaluated (f) Costs are justified and cost drivers identified (g) Likelihood and consequences of asset failure are predicted (h) Plans are regularly reviewed and updated.
2	Asset creation and acquisition	(a) Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions (b) Evaluations include all life-cycle costs (c) Projects reflect sound engineering and business decisions (d) Commissioning tests are documented and completed (e) Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood.
3	Asset disposal	(a) Underutilised and underperforming assets are identified as part of a regular systematic review process (b) The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken (c) Disposal alternatives are evaluated (d) There is a replacement strategy for assets.
4	Environmental analysis (all external factors that affect the system)	(a) Opportunities and threats in the system environment are assessed (b) Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved (c) Compliance with statutory and regulatory requirements (d) Achievement of customer service levels.
5	Asset operations	(a) Operational policies and procedures are documented and linked to service levels required (b) Risk management is applied to prioritise operations tasks (c) Assets are documented in an Asset register, including asset type, location, material, plans of components, an assessment of assets' physical/structural condition and accounting data (d) Operational costs are measured and monitored (e) Staff receive training commensurate with their responsibilities.

#	Key processes	Effectiveness criteria
6	Asset maintenance	(a) Maintenance policies and procedures are documented and linked to service levels required (b) Regular inspections are undertaken of asset performance and condition (c) Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule (d) Failures (including the significance of the failure) are analysed and operational/maintenance plans adjusted where necessary (e) Risk management is applied to prioritise maintenance tasks (f) Maintenance costs are measured and monitored.
7	Asset management information system	(a) Adequate system documentation for users and IT operators (b) Input controls include appropriate verification and validation of data entered into the system (c) Logical security access controls appears adequate, such as passwords (d) Physical security access controls appear adequate (e) Data back-up procedures appear adequate (f) Key computations related to licensee performance reporting are materially accurate (g) Management reports appear adequate for the licensee to monitor licence obligations.
8	Risk management	(a) Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system (b) Risks are documented in a risk register and treatment plans are actioned and monitored (c) The probability and consequences of asset failure are regularly assessed.
9	Contingency planning	Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks
10	Financial planning	(a) The financial plan states the financial objectives and strategies and actions to achieve the objectives (b) The financial plan identifies the source of funds for capital expenditure and recurrent costs (c) The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets) (d) The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period (e) The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services (f) Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary.
11	Capital expenditure planning	(a) There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates (b) The plan provide reasons for capital expenditure and timing of expenditure (c) The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan (d) There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned.
12	Review of Asset Management System	(a) A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current (b) Independent reviews (e.g. internal audit) are performed of the asset management system.

Each key process and effectiveness criteria is applicable to Alcoa's Licence and as such were individually considered as part of the review. The Review Plan set out at Appendix A details the risk assessments made for and review priority assigned to each key process and effectiveness criteria.

2.6 Approach

Our approach for this review involved the following activities, which were undertaken during the period August to September 2013:

- Utilising the Audit Guidelines and Reporting Manual as a guide, development of a risk assessment which involved discussions with key Alcoa staff and document review to assess relevant controls
- Development of a Review Plan (see **Appendix A**) for approval by the Authority
- Correspondence and interviews with Alcoa staff to gain understanding of process controls in functions such as planning, asset operations, finance, internal audit and capital expenditure planning (see **Appendix B** for staff involved)
- Visited the Alcoa powerhouse at Pinjarra with a focus on understanding the installation, its function and normal modes of operation, its age and an assessment of the installation against the asset management system review criteria
- Review of documents, processes and controls to assess the overall effectiveness of Alcoa's asset management systems (see **Appendix B** for reference listing)
- Reporting of findings to Alcoa for review and response.

3 Summary of findings

In accordance with the Audit Guidelines, the assessment of both the process and policy definition rating (refer to **Table 1**) and the performance rating (refer to **Table 2**) for each of the key asset management system processes is performed using the below ratings.

For the avoidance of doubt, these ratings do not provide reasonable assurance. Please refer to Section 1 of this report, specifically Inherent Limitations for further details.

Table 1: Asset management process and policy definition adequacy ratings

Rating	Description	Criteria
A	Adequately defined	• 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) are adequate in relation to the assets that are being managed.
B	Requires some improvement	• Process and policy documentation requires 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) require minor improvements (taking into consideration the assets that are being managed).
C	Requires significant improvement	• Process and policy documentation is incomplete or requires significant improvement • Processes and policies do not document the required performance of the assets • Processes and policies are significantly out of date • The asset management information system(s) require significant improvements (taking into consideration the assets that are being managed).
D	Inadequate	• Processes and policies are not documented • The asset management information system(s) is not fit for purpose (taking into consideration the assets that are being managed).

Table 2: Asset management performance ratings

Rating	Description	Criteria
1	Performing effectively	• 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	Opportunity for improvement	• The performance of the process requires some improvement to meet the required level • Process effectiveness reviews are not performed regularly enough • Process improvement opportunities are not actioned.
3	Corrective action required	• The performance of the process requires significant improvement to meet the required level • Process effectiveness reviews are performed irregularly, or not at all • Process improvement opportunities are not actioned.
4	Serious action required	• Process is not performed, or the performance is so poor that the process is considered to be ineffective.

This report provides:

- A breakdown of each function of the asset management system into sub-components as described in the Audit Guidelines. This approach is taken to enable a more thorough review of key processes where individual components within a larger process can be of greater risk to the business therefore requiring different review treatment
- A summary of the ratings applied by the review (**Table 3**) for each of:
    - Asset management process and policy definition adequacy (**definition adequacy rating**)
    - Asset management performance (**performance rating**).
- Detailed findings, including relevant observations, recommendations and post review implementation plans (**Section 4**).

Table 3: Asset management system effectiveness summary

Refer to Detailed Findings at section 4 and Review Plan at Appendix A for descriptions of the effectiveness criteria.

						Ratings	
Criteria	Consequence	Likelihood	Inherent Risk	Control Risk	Review Priority	Definition adequacy	Performance
1. Asset planning						**A**	**1**
1(a)	Minor	Unlikely	Low	Strong	Priority 5	A	1
1(b)	Minor	Unlikely	Low	Strong	Priority 5	A	1
1(c)	Minor	Unlikely	Low	Strong	Priority 5	A	1
1(d)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
1(e)	Minor	Probable	Low	Moderate	Priority 5	A	1
1(f)	Moderate	Unlikely	Medium	Moderate	Priority 4	A	1
1(g)	Major	Unlikely	High	Strong	Priority 2	A	1
1(h)	Minor	Probable	Low	Strong	Priority 5	A	1
2. Asset creation and acquisition						**A**	**1**
2(a)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
2(b)	Moderate	Probable	Medium	Strong	Priority 4	A	1
2(c)	Moderate	Unlikely	Medium	Moderate	Priority 4	A	1
2(d)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
2(e)	Major	Unlikely	High	Moderate	Priority 2	A	1
3. Asset disposal						**A**	**1**
3(a)	Minor	Unlikely	Low	Strong	Priority 5	A	1
3(b)	Minor	Unlikely	Low	Strong	Priority 5	A	1
3(c)	Minor	Probable	Low	Strong	Priority 5	A	1
3(d)	Moderate	Probable	Medium	Weak	Priority 3	B	2
4. Environmental analysis						**A**	**1**
4(a)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
4(b)	Moderate	Probable	Medium	Strong	Priority 4	A	1
4(c)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
4(d)	Moderate	Probable	Medium	Strong	Priority 4	A	1
5. Asset operations						**A**	**1**
5(a)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
5(b)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
5(c)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
5(d)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
5(e)	Moderate	Probable	Medium	Strong	Priority 4	A	1
6. Asset maintenance						**A**	**1**
6(a)	Moderate	Probable	Medium	Strong	Priority 4	B	2
6(b)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
6(c)	Moderate	Probable	Medium	Strong	Priority 4	B	2
6(d)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
6(e)	Moderate	Probable	Medium	Strong	Priority 4	A	1
6(f)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1

						Ratings	
Criteria	Consequence	Likelihood	Inherent Risk	Control Risk	Review Priority	Definition adequacy	Performance
7. Asset management information system						**A**	**1**
7(a)	Minor	Probable	Low	Strong	Priority 5	A	1
7(b)	Minor	Probable	Low	Strong	Priority 5	A	1
7(c)	Minor	Probable	Low	Strong	Priority 5	A	1
7(d)	Minor	Unlikely	Low	Moderate	Priority 5	A	1
7(e)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
7(f)	Minor	Probable	Low	Moderate	Priority 5	Not rated	Not rated
7(g)	Minor	Probable	Low	Moderate	Priority 5	A	1
8. Risk management						**A**	**1**
8(a)	Major	Unlikely	High	Strong	Priority 2	B	1
8(b)	Moderate	Probable	Medium	Strong	Priority 4	A	1
8(c)	Moderate	Unlikely	Medium	Strong	Priority 4	A	1
9. Contingency planning						**A**	**1**
9(a)	Major	Probable	High	Strong	Priority 2	A	1
10. Financial planning						**A**	**1**
10(a)	Minor	Unlikely	Low	Strong	Priority 5	A	1
10(b)	Minor	Unlikely	Low	Strong	Priority 5	A	1
10(c)	Minor	Unlikely	Low	Strong	Priority 5	A	1
10(d)	Minor	Unlikely	Low	Strong	Priority 5	A	1
10(e)	Minor	Unlikely	Low	Strong	Priority 5	A	1
10(f)	Minor	Unlikely	Low	Strong	Priority 5	A	1
11. Capital expenditure planning						**A**	**1**
11(a)	Minor	Unlikely	Low	Strong	Priority 5	A	1
11(b)	Minor	Unlikely	Low	Strong	Priority 5	A	1
11(c)	Moderate	Probable	Medium	Weak	Priority 3	B	2
11(d)	Minor	Unlikely	Low	Strong	Priority 5	A	1
12. Review of AMS						**A**	**1**
12(a)	Minor	Probable	Low	Moderate	Priority 5	A	1
12(b)	Minor	Probable	Low	Weak	Priority 5	A	1

4 Detailed findings, recommendations and action plans

Summary of generation works subject to review

Pinjarra Powerhouse

The Alcoa Pinjarra plant is located within Alcoa's Alumina Refinery Facilities at Pinjarra. The plant is comprised of four generators, which were commissioned between 1971 and 1977. Key details relating to Alcoa's Pinjarra operations are:

- Turbo Alternator (TA) units two, three and four each have a generation capacity of 20MW. Unit five (TA#5) has a generating capacity of 38.5MW
- The Alcoa Pinjarra Powerhouse has six boilers and additional steam is supplied from the Alinta Cogeneration units. The boilers produce steam for use in the refinery process
- Under normal operating circumstances, with the refinery and all major equipment in operation, the refinery is expected to import approximately 25MW of power from two Western Power tie transformers. The tie transformers operate in parallel, supplied from the Western Power Pinjarra 132kV switchyard
- Major items of equipment are approaching the end of normal design life. Management, refurbishment and replacement of equipment at end of life is an important consideration for Alcoa Pinjarra.

A loss of Alcoa's generation capability has the following effect:

- May directly impact refinery production. As the cost impact of lost production is significant, Alcoa demands high availability and reliability of major steam and electrical equipment
- In the event that Pinjarra Powerhouse equipment fails and electricity supply from the grid is inadequate, Alcoa's Pinjarra operations are impacted. There is no impact on the external grid.

Wagerup Powerhouse

The Alcoa Wagerup plant is located within Alcoa's Alumina Refinery Facilities at Wagerup. The plant comprises three steam turbine generators, which were commissioned between 1981 and 1992. Key details relating to Alcoa's Wagerup operations are:

- Units two (TA#2) and three (TA#3) each have a generation capacity of 18MW. Unit one (TA#1) has a generating capacity of 25MW
- The Alcoa Wagerup Powerhouse has three Babcock boilers. The boilers produce steam for generating power through steam turbines and for use in the refinery process. Boilers were installed between 1981 and 1992. A gas turbine with Heat Recovery Steam Generator, rated at 38MW was installed in 1998
- Under normal operating circumstances with the refinery and all major equipment in operation, the refinery is expected to export approximately 24MW of power via a single Western Power tie transformer. The tie transformer is connected to the Western Power Wagerup 132kV switchyard
- Major items of equipment are mid-life. Asset Management and maintenance strategies are an important consideration for Alcoa Wagerup.

A loss of Alcoa's generation capability has the following effect:

- May directly impact refinery production. As the cost impact of lost production is significant, Alcoa demands high availability and reliability of major steam and electrical equipment

- In the event that Alcoa Wagerup equipment fails, and electricity supply from the grid is inadequate, then Alcoa's Wagerup operations are impacted. There is a potential loss of approximately 24MW generation on the external grid.

Kwinana Powerhouse

The Alcoa Kwinana plant is located within Alcoa's Alumina Refinery Facilities at Kwinana. The plant comprises six generators, five of which were commissioned between 1962 and 1976 with the sixth in 1998. Key details relating to Alcoa's Kwinana operations are:

- The six generators have a total installed generation capacity of 66MW
- The Kwinana Powerhouse has eight boilers, which produce steam for use in the refinery process. The boilers produce 770 tonnes of steam per hour. Boilers were installed between 1962 and 1976
- Under normal operating circumstances with the refinery and all major equipment in operation, the refinery is expected to import approximately 8MW of power from a Western Power tie transformer. The Kwinana Powerhouse supplies an average of 59MW to the Refinery. Total refinery use is approximately 67MW. The tie transformer 27MVA is supplied from a Western Power 132kV switchyard
- Major items of equipment are approaching the end of normal design life. Management, refurbishment and replacement of equipment at end of life are an important consideration for Alcoa Kwinana. Alcoa Kwinana's major expenditure forecasts and 5 year plan demonstrate that these issues are being considered by management and there are a number of projects for replacing equipment that have been identified.

A loss of Alcoa's generation capability has the following effect:

- Maximum steam capacity does not meet the projected refinery steam requirements beyond 2007. Loss of Kwinana Powerhouse generation capacity or steam capacity may directly impact refinery production. Because the cost impact of lost production is significant, Alcoa demands high availability and reliability of major steam and electrical equipment
- In the event that Kwinana Powerhouse equipment fails and electricity supply from the grid is inadequate, then Alcoa's Kwinana operations are impacted. There is no impact on the external grid.

The following tables contain:

- **Findings**: the reviewer's understanding of the process and any issues that have been identified during the review
- **Recommendations**: recommendations for improvement or enhancement of the process or control
- **Action plans**: Alcoa's formal response to review recommendations, providing details of action(s) to be implemented to address the specific issue(s) raised by the review.

4.1 Asset planning

Key process: Asset planning strategies are focused on meeting customer needs in the most effective and efficient manner (delivering the right service at the right price).

Expected 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.

Planning processes applied for the WA Powerhouse Operations are accommodated through the Alcoa WAO business and strategic planning mechanisms.

<table>
<tr><th>No</th><th>Effectiveness criteria</th><th colspan="2">Findings</th></tr>
<tr><td rowspan="2">1(a)</td><td rowspan="2">Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning</td><td colspan="2">Through discussions with the Principal Mechanical Engineer WAO Powerhouse and the Pinjarra Powerhouse Business Advisor and examination of relevant documentation relating to Alcoa’s planning processes, we determined that:
Strategic planning is undertaken at the WA Operations business unit level with a three to five year outlook. The aim of business planning is to develop long term strategies and operational plans aligned to Alcoa’s vision, mission and corporate business goals
The three year strategic operational plan is cascaded down to individual sites and their operational centres and departments to facilitate site planning
Powerhouse supervisors at each site are responsible for developing an operational plan with the input of engineering, operational and maintenance staff. Specifically a shutdown planner is prepared to reflect planned outages for up to seven years ahead.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
<tr><td rowspan="2">1(b)</td><td rowspan="2">Service levels are defined</td><td colspan="2">Through discussions with the Principal Mechanical Engineer WAO Powerhouse and the Pinjarra Powerhouse Business Advisor and examination of the rolling five year plans prepared for each of Alcoa’s powerhouses, we determined that:
The Western Australian management group determines refinery targets for the coming year, which in turn sets the service levels for each of the powerhouses. The plans and targets require approval from Australian operations management and ultimately Alcoa’s global management
Powerhouse asset strategies specify the required service levels of the respective powerhouse assets, including detail for the planning aspects of the respective powerhouse assets e.g. production capacity, historical results.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
</table>

No	Effectiveness criteria	Findings	
1(c)	Non-asset options (e.g. demand management) are considered	Alcoa has developed an Expenditure Approval Policy and Procedure, which outline the requirements for project evaluations to be undertaken when a project is deemed to have measurable financial benefits to Alcoa's business. As part of this process, Alcoa requires new projects to be evaluated against a range of considerations such as timeframe, environmental considerations, asset alternatives, approval requirements, financial and capital requirements by means of the Request for Authorisation (RfA), which is supported by an economic evaluation model for opportunity cost analysis. Through discussion with the Principal Mechanical Engineer WAO Powerhouse and consideration of Alcoa's planning processes, we determined that it is a formal requirement for non-asset options to be considered when purchasing powerhouse assets. Owing to the importance of the powerhouses to Alcoa's refinery operations, such non-asset operations are typically not actioned, however we noted one example identified by the Principal Mechanical Engineer WAO Powerhouse where a decision was made to continue to purchase power from the South West Interconnected System (SWIS) instead of building a new turbine/alternator to generate power for Pinjarra refinery.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
1(d)	Lifecycle costs of owning and operating assets are assessed	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and the Pinjarra Powerhouse Business Advisor and examination of the Expenditure Approval Policy and Procedure we determined that: • Lifecycle costs of owning and operating assets are assessed as part of the RfA process supported by the economic evaluation template • The economic evaluation template utilises a set of economic assumptions that are reviewed and published on a quarterly basis by Alcoa. The economic measures considered within the evaluation model include Internal Rate of Return (IRR), Net Present Value (NPV) and discounted payback period • Project evaluations conducted incorporate a wide range of operational aspects by obtaining input from engineering and finance as well as environmental and health and safety personnel. We examined a RfA for overhaul of a boiler at Wagerup powerhouse and noted that the project evaluation for the scheduled overhaul identified and assessed all life cycle costs, including planning, pre-works, procurement of parts and materials, specialist labour and electrical costs.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

No	Effectiveness criteria	Findings	
1(e)	Funding options are evaluated	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and the Pinjarra Powerhouse Business Advisor and consideration of Alcoa's planning and expenditure authorisation processes, we determined that: • Funding options are evaluated by means of the RfA template supported by a formal process of funds authorisation that requires selection and completion of appropriate documentation for request of funds • The RfA template and associated approval documents are required to outline the source of funds prior to submission for authorisation, as either Alcoa capital expenditure or partner share (e.g. joint venture) • The approver of funds is responsible for ensuring that the most economical (lowest total cost/best fit for purpose) alternative has been selected, or there are sound reasons documented for not doing so • Purchases of mobile equipment, company vehicles, assets subject to short-term technological obsolescence, and other non-core assets are encouraged to be financed through an operating lease, wherever possible, instead of being purchased.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
1(f)	Costs are justified and cost drivers identified	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and the Pinjarra Powerhouse Business Advisor and consideration of Alcoa's asset planning processes, we determined that: • The RfA template and funds authorisation process requires a business case to be prepared, which identifies costs and cost drivers relating to the project • All projects with an estimated value higher than AU$100K are required to seek a preliminary approval prior to commencing each phase of the project, which is required to include all prior costs plus the estimated value to complete the next phase. In particular, we examined an RfA for overhaul of a boiler at Wagerup powerhouse and noted that the project evaluation for the scheduled overhaul identified and considered all costs, including planning, pre-works, procurement of parts and materials, specialist labour and electrical costs. The RfA template also included a specific section on the project's justification and economics as well as a solution option analysis to consider alternative options.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

No	Effectiveness criteria	Findings	
1(g)	Likelihood and consequences of asset failure are predicted	Through discussion with the Principal Mechanical Engineer WAO Powerhouse and review of relevant supporting documentation, we observed that Alcoa has applied mechanisms to identify the likelihood and consequence of powerhouse asset failure, including: • Alcoa's Equipment Integrity Dashboard (the dashboard) that monitors the integrity and capacity of the powerhouse equipment via a combination of performance indicators including leading, lagging and capacity indicators. The dashboard report: o Generates a high level summary of asset performance by providing a total score by weighting and tallying the indicators, which is reported to the relevant global personnel in the quarterly AWA Global Refining Power report o Is updated monthly and reported quarterly to Alcoa's Manufacturing and Technology Council • Loss prevention inspections to identify mechanical and electrical equipment breakdown exposures that could result in a major loss and discuss proposed options to reduce or eliminate those exposures • Classified plant inspections as part of statutory requirements, which involve notifying the respective asset owners about any deficiencies noted during the inspection. Where agreed action is not implemented within required timeframe, a formal notice is served to senior managers requiring consideration and action • An annual high-level review to assess compliance with all licence obligations that is undertaken by the Principal Mechanical Engineer WAO Powerhouse by means of interviews and meetings with staff involved in respective areas. The objective of the review is to determine whether Alcoa has complied with the provisions of its Licence and report results to the Authority by 31 August each year • Alcoa's Self-Assessment Test (ASAT) audits designed to consider the asset management system effectiveness criteria outlined by the Authority's Audit Guidelines. Audit findings and recommendations are recorded and tracked by means of Alcoa's Business Improvement System. Originally designed to be an annual process, these compliance-focussed ASATs are now conducted on a three-year rolling cycle, to be undertaken by Alcoa's Internal Audit team prior to the independent third-party review (i.e. this review). The next audit is scheduled to be performed in 2014 • Additional and more specific ASAT audits conducted at regular intervals focused on asset operations, maintenance, health and safety and environment. During our discussions with the Principal Mechanical Engineer WAO Powerhouse, we were advised that the asset integrity audit (being an engineering-led audit) scheduled for 2011 was not performed because of cost constraints. The Principal Mechanical Engineer WAO Powerhouse confirmed that the WAO business is looking to schedule the integrity audit. We examined the following documents evidencing Alcoa's actions to predict likelihood and consequence of asset failure: • Quarter 2, 2013 GPP Global Refining Powerhouse and Power Operations reliability report, which includes summary equipment integrity dashboard results • Loss prevention inspections (boiler and machinery breakdown and fire prevention) for each of Alcoa's powerhouses • Alcoa's 2011 ASAT for the asset management system • Classified plant inspector's work list.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

No	Effectiveness criteria	Findings	
1(h)	Plans are regularly reviewed and updated	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and examination of asset strategies for each of Alcoa's powerhouses, we determined that: • Site level operational plans are prepared and reviewed on an annual basis, including a rolling five year forecast for the plant to ensure long term utilisation of the powerhouse assets • The WA Operations, location and department level operational plans and objectives are reviewed by Alcoa at regular intervals to identify any critical areas requiring improvement. The review process also enables updates to details of maintenance planning, scheduling, resourcing and execution aspects of powerhouse assets. Asset management strategies for each of Alcoa's powerhouses have been formalised and scheduled to be reviewed at regular intervals or in the event of a major equipment failure. Asset management strategies for each Powerhouse provide history of replacements and upgrades, as well as sustainability issues, which details the current issues under active monitoring (e.g. 125V DC distribution replacement). As such, the strategies detail equipment refurbishment or replacement requirements, as needed.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

4.2 Asset creation and acquisition

Key process: Asset creation/acquisition means the provision or improvement of an asset where the outlay can be expected to provide benefits beyond the year of outlay.

Expected outcome: A more economic, efficient and cost-effective asset acquisition framework which will reduce demand for new assets, lower service costs and improve service delivery.

Asset creation and acquisition processes applied for Alcoa's WA Powerhouse operations are accommodated through established WAO project evaluation and expenditure mechanisms.

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td rowspan="2">2(a)</td><td rowspan="2">Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions</td><td colspan="2">Through discussions with the Principal Mechanical Engineer WAO Powerhouse and the Pinjarra Powerhouse Business Advisor and consideration of Alcoa's planning and expenditure authorisation processes and procedures (as outlined in planning items 1(c) above), we determined that:
• Full project evaluations are a requirement of Alcoa's Expenditure Approval Policy and funds authorisation process, undertaken by means of completing and submitting the RfA. The RfA is supported by an economic evaluation model that utilises a set of economic assumptions, which are reviewed and published by Alcoa on a quarterly basis
• The RfA template outlines the following considerations for instigating new projects, including: environmental considerations, asset alternatives, approval requirements, financial and capital requirements, current state assessments and timelines
• Non-asset options are formally considered when purchasing powerhouse assets. However, due to the importance of the powerhouses to Alcoa's refinery operations, such non-asset operations are typically not actioned.
We examined an RfA for an overhaul of a boiler at Wagerup powerhouse and noted that a full project evaluation, aligned with Alcoa's processes outlined above was performed.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
<tr><td rowspan="2">2(b)</td><td rowspan="2">Evaluations include all life-cycle costs</td><td colspan="2">Through discussions with the Principal Mechanical Engineer WAO Powerhouse and the Pinjarra Powerhouse Business Advisor and consideration of Alcoa's expenditure approval policy and procedures (as outlined in planning item 1(d) above), we determined that:
• Lifecycle costs of owning and operating assets are assessed by completing the economic evaluation model, which utilises a set of economic measures such as Internal Rate of Return (IRR), Net Present Value (NPV) and discounted payback period
• Project evaluations provide for estimates of the amount of investment required from the global organisation and Alcoa Australia, including identifying the source of funds. The project evaluations are developed by obtaining input from a range of Alcoa personnel, including engineering, finance, environmental and health and safety personnel.
We examined an RfA for overhaul of a boiler at Wagerup powerhouse and noted that the project evaluation for the scheduled overhaul considered life-cycle costs, including planning, pre-works, procurement of parts and materials, specialist labour and electrical costs.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
</table>

No	Effectiveness Criteria	Findings	
2(c)	Projects reflect sound engineering and business decisions	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and consideration of Alcoa's documented procedures, we determined that Alcoa has the following processes in place to manage the assessment of projects (consistent with asset planning item 1(d) above): • Project evaluations are conducted with both engineering and finance personnel input and with evaluation results detailed and approved by relevant personnel to ensure all engineering, finance, environmental, health and safety aspects are addressed • The impact of the project on individual locations is to be assessed for those capital projects with a value greater than A$1 million.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
2(d)	Commissioning tests are documented and completed	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and consideration of Alcoa's documented commissioning procedures, we determined that: • The commissioning procedures are designed to comply with AS/NZS 3788:2006, including the requirement for completion and full documentation of commissioning tests for all components added to Alcoa's refinery assets, including Alcoa powerhouses • The results from commissioning tests are required to be recorded in the machinery safety device record book by the witnessing coordinator and also forwarded to the powerhouse senior mechanical engineer. We examined the following documents evidencing completion and documentation of commissioning tests by Alcoa: • Procedure for boiler commissioning • Boiler 4 commissioning record sheet for Kwinana • Boiler 8 commissioning record sheet for Kwinana.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

No	Effectiveness Criteria	Findings	
2(e)	Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood	Through discussions with the Principal Mechanical Engineer WAO Powerhouse, and examination of Alcoa's documented policies and procedures, we determined that Alcoa continues to have processes in place to manage its legal, environmental and safety obligations. Specifically: • Alcoa's RfA template outlines the considerations for instigating a new capital project, including environmental considerations, asset alternatives, the approval history, financial and capital requirements, current state assessments and timelines • Alcoa's environmental obligations relevant to its WA Powerhouse operations are identified and managed by the Environmental Team and recorded on an Environmental Obligations Register • The Environmental Manager at each site is responsible for ensuring that the accountable operating centre/business unit managers are aware of their requirements to monitor and report on legislative compliance • Alcoa's safety obligations relevant to its WA Powerhouse operations continue to be rated as areas of high risk within Alcoa. Safety aspects are addressed at the point of employee induction and through specific and ongoing training, formal assignment of responsibilities to supervisory staff and use of the Access Hazardous Materials Database. A centralised training register is used to record information pertaining to the training, qualification and certification of staff who perform functions affecting safety and environmental management • Alcoa's legal obligations from its WA Powerhouse operations relate primarily to environmental and safety matters. Other legal obligations are addressed by Alcoa's in house legal counsel or external legal advisors, as required. We examined documents relating to Alcoa's management of its environmental, safety and legal obligations, including: • Environmental aspects and impacts procedure • Environmental, Health & Safety Risk Assessment for Pinjarra Powerhouse • Evaluation of Compliance with Environmental Legislation Regulations procedure.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

4.3 Asset disposal

Key process: Effective asset disposal frameworks incorporate consideration of alternatives for the disposal of surplus, obsolete, under-performing or unserviceable assets. Alternatives are evaluated in cost-benefit terms.

Expected outcome: Effective management of the disposal process will minimise holdings of surplus and under-performing assets and will lower service costs.

Asset disposal processes applied for Alcoa's WA Powerhouse operations are accommodated through established WAO disposal mechanisms and powerhouse plans. During the period 1 July 2010 to 30 June 2013, Alcoa did not dispose of or decommission any major powerhouse plant, other than replacement of obsolete equipment.

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td>3(a)</td><td>Under-utilised and under-performing assets are identified as part of a regular systematic review process</td><td colspan="2">Through discussions with the Principal Mechanical Engineer WAO Powerhouse and examination of relevant supporting documentation, we observed that Alcoa has applied the following mechanisms for identifying under-utilised and under-performing assets:
Alcoa's dashboard report monitors the integrity and capacity of the powerhouse equipment via a combination of performance indicators including leading, lagging and capacity indicators. The dashboard report:
Generates a high level summary of asset performance by providing a total score by weighting and tallying the indicators, which is reported to the relevant global personnel in the quarterly AWA Global Refining Power report
Is updated monthly and reported quarterly to Alcoa's Manufacturing and Technology Council
Loss prevention inspections are undertaken to identify mechanical and electrical equipment breakdown exposures that could result in a major loss. As a primary component of Alcoa's risk management activities, the inspections propose options to reduce or eliminate those exposures
Classified plant inspections are undertaken at regular intervals. The respective asset owners are notified about any deficiencies noted during the inspection. Where agreed action is not implemented within required timeframe, a formal notice is served to senior managers requiring action
Asset life assessments, which are completed on a systematic basis
Additional and more specific ASAT audits conducted at regular intervals focused on asset operations, maintenance, health and safety and environment.
Results of these assessments and inspections are factors considered when developing the rolling five year plans for the WA operations.</td></tr>
<tr><td></td><td></td><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
</table>

No	Effectiveness Criteria	Findings	
3(b)	The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and examination of relevant supporting documentation, we observed that Alcoa has applied the mechanisms described at item 3(a) to facilitate the examination of under-utilised and under-performing assets by: • Collecting relevant data and information to enable assessment of the root cause of any underutilisation or poor performance of powerhouse assets • Assessments are incorporated into the rolling 5 year plans established for WA operations, which detail the major projects for the plant/powerhouse planned for the coming financial year, including any equipment refurbishment, upgrade or replacement • As part of the capital expenditure process, the RfA requires the requestor to present a business case, which requires details of why the upgrade/purchase of equipment is important to the condition of the asset.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
3(c)	Disposal alternatives are evaluated	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and examination of the Decommission Classified Plant protocol, we determined that Alcoa's processes require: • Addressing alternatives for decommissioning, removal or storage of key plant or where an item of registered plant is to be permanently removed from site • The rolling 5 year plans established for WA operations to detail the major projects planned for the coming financial year, including any equipment replacement requirements.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
3(d)	There is a replacement strategy for assets	Through discussions with the Principal Mechanical Engineer WAO Powerhouse we determined that the replacement strategies established for Alcoa's powerhouse assets are reflected in Alcoa's rolling 5 year plans established for WA operations. Examination of the Asset Strategies for each of Alcoa's powerhouses indicates that the details of relevant replacement strategies has not been documented in line with section 3(d) of the asset management effectiveness criteria, per the 2010 Post Review Implementation Plan (2/2010). As such, the 2010 Post Review Implementation Plan (2/2010) is currently 'in progress', with actions to explicitly detail the replacement strategies for each of its assets within the Asset Strategy documentation as part of its next review.	
		Adequacy Rating: Requires some improvement (B)	**Performance Rating:** Opportunity for improvement (2)

4.4 Environmental analysis

Key process: Environmental analysis examines the asset system environment and assesses all external factors affecting the asset system.

Expected outcome: The asset management system regularly assesses external opportunities and threats and takes corrective action to maintain performance requirements.

Environmental matters relevant to Alcoa's WA Powerhouse operations are accommodated through established WAO environmental management mechanisms, which demand powerhouse specific environmental issues to be identified and fully managed.

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td>4(a)</td><td>Opportunities and threats in the system environment are assessed</td><td colspan="2">Through discussion with the Environmental Scientist and examination of relevant policies and procedures, we determined that Alcoa has developed a risk-based management system to identify and assess opportunities and threats to the system environment for its powerhouses. Specifically, Alcoa's Environmental Aspects and Impact procedure:
• Applies to all operational aspects of each of Alcoa's refineries, including the powerhouses
• Facilitates the identification and assessment of powerhouse operational risks as well as systematic reviews of environmental aspects and impacts
• Aligns to ISO 14001, Dangerous Goods Regulations and Health and Safety requirements.
• Outlines a methodology for logging, maintaining and reporting on environmental aspects and impacts of Alcoa's site operations.
We also observed that an Aspects and Impacts Register is specifically maintained by Alcoa to:
• Identify all activities and associated risks of its powerhouses, which are assessed by the site Environmental Team, leading to a focused monitoring plan that is reviewed annually
• Record relevant environmental information including the:
o Process (e.g. boiler)
o Activity (e.g. steam generation)
o Environmental aspect of operations (e.g. use of large turbines, use of gas)
o Environmental impact of operations (e.g. noise, depletion of natural resource)
o Emergency potential (either Yes or No)
o Risk rating (with and without controls),
o Corrective action plan, responsible person and the due date for completion.
We further observed that the IHS Incident management system can be used by any Alcoa employee/contractor to log risks and incidents for assessment by the Environmental Team. Any incidents logged onto the IHS system are reviewed at daily Powerhouse and refinery meetings for each site.</td></tr>
<tr><td></td><td></td><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
</table>

No	Effectiveness Criteria	Findings	
4(b)	Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and the Environmental Scientist, we determined that Alcoa has established the following mechanisms to ensure that performance standards are planned, measured and achieved: • The refinery plans and targets as determined by the WA Operations management group and approved by Alcoa's global management, define the service levels for each of the powerhouses. The plans provide detailed information for the planning aspects of the respective powerhouse assets, including production capacity and performance standards • Alcoa's Equipment Integrity Dashboard (the dashboard) monitors the integrity and capacity of the powerhouse equipment via a combination of performance indicators with predetermined threshold values for red (poor), yellow (fair), and green (OK). In particular, the dashboard: o Comprises: ▪ Leading indicators, which are parameters that may affect equipment integrity, such as an obsolescence index and useful life (e.g. due to high temperature service, fatigue or corrosion) ▪ Lagging indicators, which provide information on availability and production losses due to equipment failures or limitations ▪ Capacity indicators, which provide an indication of refinery demand and capacity. o Provides a total score by weighting and tallying the indicators, which is used as a high level summary of asset performance and reported to the relevant global personnel via the quarterly AWA Global Refining Power report o Is updated monthly and reported quarterly to Alcoa's Manufacturing and Technology Council. • Performance of the powerhouse is also measured by means of maintenance metrics, such as: o Planned work ratio, which measures how much of the total week is spent on planned work o Planned work complete, which measures how much of the work that was planned for the week actually was completed. • To address the eventuality of key system failures or major equipment failures, a series of system recovery plans, including black/brown start procedures have been developed for each powerhouse. The system recovery plans are subject to: o A bi-annual review by means of the loss prevention inspections and a detailed review when triggered by a major equipment change or reconfiguration o Testing in accordance with timeframes specified in the relevant plan (consistent with Contingency Planning 9(a)) • Alcoa continues to engage specialist consultants to assist in monitoring specific aspects of its operations, such as site emissions.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td rowspan="2">4(c)</td><td rowspan="2">Compliance with statutory and regulatory requirements</td><td colspan="2">Alcoa has established the procedure “Evaluation of Compliance with Environmental Legislation and Regulations (WAO)”, which requires the periodic evaluation of compliance with relevant environmental legislation and regulations. To facilitate monitoring of regulatory and legislative requirements, Alcoa has engaged Herbert Smith Freehills to monitor environmental legislative updates. An update report is produced on a quarterly basis and sent to Alcoa to communicate any changes in legislation. These changes are then incorporated onto a compliance list that details all of Alcoa's obligations.
Alcoa maintains ISO-14001 standard and as such is required to maintain an effective Environmental Management System (EMS) that monitors all obligations that have an environmental focus. To ensure that Alcoa is performing appropriately against the legislative requirements, there are three different types of audits conducted:
• Internal audit process conducted by a contractor who visits each department/operational unit and audits against the ISO standard. The findings are placed on an audit action plan on the Business Improvement System
• For Alcoa to maintain its ISO status, it is required to be re-certified every three years via a full audit conducted by an external practitioner. Alcoa’s three sites were re-certified in April 2013. A surveillance audit/monitoring action is also completed every year
• ASAT (as described elsewhere).
Alcoa also operates and monitors its operations in accordance with the following statutory legislation and licences:
• Environmental Operating Licence
• Mines Safety and Inspection Regulations
• WA Gas Standards (Gas fitting & Consumer Gas Installations) Regulations 1999
• NOx emissions: There is currently no license requirement for the powerhouse for NOx emissions however as part of the PEU project, the refinery was not to increase current emissions to the air shed. On a monthly basis measurements are taken from the boiler stacks by an independent organisation. Annual measurements and estimates are made for reporting the total site emission to the National Pollutant Inventory
• Greenhouse Gases: Measurements from the powerhouse and Cogen stack emissions are used to calculate the refineries’ greenhouse gas intensity. Economisers have been fitted to all boilers, to maximise efficiency and reduce greenhouse intensity
• Environmental Noise Regulations licence: Specifies maximum night and day noise level as measured at the boundary
• Water/liquid discharge: All reject condensate and spills are directed to the internal stormwater discharge system, then to the Stormwater Lake, for re-use by the refinery.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
<tr><td rowspan="2">4(d)</td><td rowspan="2">Achievement of customer service levels</td><td colspan="2">As Alcoa is both a generator and consumer of power, it does not have specific customer service levels to attain in relation to its power operations. In the context of its obligations to the community, Alcoa operates and monitors its operations in accordance with the statutory legislation and licences detailed at 4(c) above.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
</table>

4.5 Asset operations

Key process: Operational functions relate to the day-to-day running of assets and directly affect service levels and costs.

Expected outcome: Operations plans adequately document the processes and knowledge of staff in the operation of assets so that service levels can be consistently achieved.

Alcoa has applied consistent asset operations strategies to each of its powerhouses, essentially in line with the asset management strategies employed across the WA operations business.

No	Effectiveness Criteria	Findings	
5(a)	Operational policies and procedures are documented and linked to service levels required	Through discussion with Principal Mechanical Engineer WAO Powerhouse and consideration of Alcoa's documented policies, procedures and protocols and the asset management strategies, we observed that: • Alcoa has documented policies, procedures and protocols for each site that outline the key requirements of effective operation of assets. Alcoa WAO Performance Support System holds all powerhouse related policies, procedures and protocols • Documents detailing required service levels of each specific plant item as well as operating instructions for specific electrical and mechanical plant have been developed • Control plans for major plant items such as boiler, generator, deaerators, and boiler feed pumps etc. have been developed.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
5(b)	Risk management is applied to prioritise operations tasks	Through discussion with Principal Mechanical Engineer WAO Powerhouse and consideration of Alcoa's risk management practices and operational activities, we determined that risk management practices are applied in relation to Alcoa's asset operations methodology. In particular, we observed that: • Powerhouse assets are managed in association with refinery requirements using risk-based processes • Maintenance tasks are performed in a sequential manner giving priority to safety and people, followed by environment and customers. These processes are further described below at section 8 – risk management.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
5(c)	Assets are documented in an Asset Register including asset type, location, material, plans of components, an assessment of assets' physical/structural condition and accounting data	Through discussion with Principal Mechanical Engineer WAO Powerhouse and consideration of documented policies, procedures and protocols, we observed that: • Alcoa continues to use the online Electronic Assets Maintenance (eAM) system to store information relating to its assets • For major equipment, the eAM system holds detailed information such as the asset's unique asset identifier, equipment details, type, location, components, expected life, purchase date and cost, operational history and maintenance procedures, depreciation rates and book value.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

No	Effectiveness Criteria	Findings	
5(d)	Operational costs are measured and monitored	Through discussion with Pinjarra Powerhouse Business Advisor and consideration of Alcoa's operational methodology, we determined that: • For each site, Expense Control Reports (ECRs) are produced on a monthly basis • A comparison of actual against budgeted expenditure is regularly undertaken by means of management reports and financial analysis • Any significant budget variances are reviewed at the cost centre level and analysed for underlying causes.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
5(e)	Staff receive training commensurate with their responsibilities	Through discussion with Principal Mechanical Engineer WAO Powerhouse and consideration of relevant training documentation, we determined that Alcoa utilises a WAO Operator Traineeship Programme to ensure its operators are trained in all aspects of powerhouse operations that are relevant to their respective positions. Specifically, we observed that: • Training registers are maintained by the powerhouse supervisor to keep training and operator high risk tickets of all staff valid and relevant to their responsibilities • The traineeship programme runs for 18 months • All operators are trained to Certification (3 or 4). We also noted that Alcoa is now an accredited training organisation, since the end of 2010.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

4.6 Asset maintenance

Key process: Maintenance functions relate to the upkeep of assets and directly affect service levels and costs.

Expected outcome: Maintenance plans cover the scheduling and resourcing of the maintenance tasks so that work can be done on time and on cost.

Alcoa has applied consistent asset maintenance strategies to each of its powerhouse's mechanical, electrical and control protection systems and major equipment, in line with the asset strategies employed across the WA Operations business. Alcoa's eAM system is designed to facilitate its maintenance strategies and compliance with statutory requirements.

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td rowspan="3">6(a)</td><td rowspan="2">Maintenance policies and procedures are documented and linked to service levels required</td><td colspan="2">Through discussion with Principal Mechanical Engineer WAO Powerhouse and examination of documented policies, procedures and protocols, we observed that:
• Alcoa's WAO Performance Support System holds documented policies, procedures and protocols for each site, designed to facilitate maintenance of Alcoa's assets. The eAM incorporates major equipment maintenance procedures, equipment details, maintenance intervals, costs and equipment history
• Developed procedures, which specifically refer to required service levels (where appropriate) for the operation of the specific item of equipment, or specific electrical or mechanical procedures
• Alcoa's eAM system stores detailed information for each major equipment, including operational history and maintenance procedures.
However, based on our discussions with the Principal Mechanical Engineer WAO Powerhouse and observations of asset maintenance documentation currently in place, we understand that Alcoa is in the process of developing and enhancing its suite of maintenance documentation, including:
• Documents detailing the required maintenance level for each specific plant item
• Specific plant maintenance instructions for electrical and mechanical plant
• Control plans for major plant items such as boiler, generator, deaerators and boiler feed pumps
• Supplementary equipment asset strategies.
We also noted that Alcoa's document retrieval practices appear to be limited, as documentation requested for during the review was not readily available/could not be located.</td></tr>
<tr><td>Adequacy Rating: Requires some improvement (B)</td><td>Performance Rating: Opportunity for improvement (2)</td></tr>
<tr><td colspan="2">Recommendation 1/2013
Alcoa should:
a) Finalise the development of the its supporting maintenance documentation
b) Consider the need for training
c) Review current document management practices and identify why some documentation was unable to be located during the review.</td><td>Action plan 1/2013
Alcoa will:
a) Finalise the development of the supporting maintenance documentation
b) Develop and roll-out training to the required staff
c) Review document filing processes to ensure consistency in saving and storing documentation. Alcoa is also currently upgrading its document management system.
Responsible Person:
Principal Mechanical Engineer WAO Powerhouse
Target Date: 31 December 2014</td></tr>
</table>

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td>6(b)</td><td>Regular inspections are undertaken of asset performance and condition</td><td colspan="2">Through discussion with Principal Mechanical Engineer WAO Powerhouse and consideration of relevant reports and documentation, including asset management strategies, we observed that reports are produced from asset inspections at each of Alcoa's sites, indicating that Alcoa's maintenance processes continue to be operational. In particular, we observed that:
• A structured programme exists for major mechanical and electrical plant items to be condition monitored, utilising vibration monitors for rotating machinery and electrical PI and dielectric tests for the generators
• Assessment and inspection reports for equipment condition and performance are made available for management consideration.</td></tr>
<tr><td></td><td></td><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
<tr><td>6(c)</td><td>Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule</td><td colspan="2">Through discussion with Principal Mechanical Engineer WAO Powerhouse and consideration of Alcoa's eAM system and outage reports, we observed that:
• For each facility's major equipment, the eAM system contains plans for scheduled maintenance (i.e. preventative maintenance) as well as required emergency and corrective works. Unplanned works (corrective or emergency) have the highest priority as they can impact refinery production
• All maintenance work undertaken is recorded in the eAM system
• Alcoa's operational requirements lead to emergency and corrective works having the highest priority due to the potential impact on refinery production
• Maintenance schedules are monitored.
However, based on our examination of Alcoa's maintenance practices, we determined that Inspection Test Procedures (ITPs) are currently being developed and uploaded into eAM. Of the ITPs that have been developed, only a small number are being used by Operations & Maintenance staff.</td></tr>
<tr><td></td><td></td><td>Adequacy Rating: Requires some improvement (B)</td><td>Performance Rating: Opportunity for improvement (2)</td></tr>
<tr><td></td><td colspan="2">Recommendation 2/2013
Alcoa should
a) Finalise the development of its ITPs
b) Consider the need for formal training on the content and use of ITPs to all relevant staff.</td><td>Action plan 2/2013
Alcoa will:
a) Develop an equipment register, which risk assesses the equipment. For those assessed as being a high risk, ITPs will be developed
b) Provide ITP training to maintenance personnel as part of major shutdown preparations.
Responsible Person:
Principal Mechanical Engineer WAO Powerhouse
Target Date: 31 December 2014</td></tr>
</table>

No	Effectiveness Criteria	Findings	
6(d)	Failures (including the significance of the failure) are analysed and operational/maintenance plans adjusted where necessary	Through discussion with Principal Mechanical Engineer WAO Powerhouse and consideration of external reports and Alcoa's operations and maintenance procedures, we observed that those procedures provide for equipment failure to be investigated and where necessary associated systems or procedures to be modified so as to reduce the likelihood of repeated similar failures.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
6(e)	Risk management is applied to prioritise maintenance tasks	Alcoa applies risk management practices with regards to asset operations. Through discussions with the Principal Mechanical Engineer WAO Powerhouse and consideration of Alcoa's risk management practices and operational activities, we determined that Alcoa's operational methodology is designed to: • Use risk-based processes to manage its powerhouse assets • Perform maintenance tasks in accordance with the sequence of maintenance task priorities being people and safety first, followed by environment, then customer. These processes are further described below at section 8 – risk management.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
6(f)	Maintenance costs are measured and monitored	Through discussion with Pinjarra Powerhouse Business Advisor and consideration of Alcoa's reporting processes, we observed that: • ECRs are produced for each site on a monthly basis • A comparison of actual against budget expenditure is regularly undertaken • All significant budget variances are reviewed at the cost centre level and analysed for underlying causes by the management.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

4.7 Asset management information system

Key process: An asset management information system is a combination of processes, data and software that support the asset management functions.

Expected 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.

Alcoa's Asset Management Information System is predominantly comprised of the eAM system, with some information also being held in Alcoa's Microsoft Office software (documents, spreadsheets etc.).

No	Effectiveness Criteria	Findings	
7(a)	Adequate system documentation for users and IT operators	Through discussion with the Manager – Regional IS Australia, we understand that Alcoa is supported by the Global Support Centre (GSC) for the Oracle E-Business Suite, which houses the range of applications used by Alcoa's operations, including eAM. From our discussions, we noted that: • GSC provides technical support for eAM under a Service Level Agreement • Technical documentation for eAM are managed and maintained by the GSC • Alcoa Performance Support System (APSS) stores user support documentation and provides document version control by assigning a unique identification number to each controlled document • User guides are kept up to date by the Functional Support Representative and key users. Through discussions we were advised that the eAM has been upgraded to version 11i-10 during the review period and further upgrades are planned for October 2013 as part of the overall Oracle e-business suite upgrade.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
7(b)	Input controls include appropriate verification and validation of data entered into the system	Through discussion with the Manager – Regional IS Australia and consideration of Alcoa's 2011 ASAT testing of controls over its information systems interfaces, we observed that : • Input controls are managed through built-in checks in Oracle and manual processes • Processes are in place to verify and validate data entered into the eAM system, including data reconciliation between old and new systems, checking data transferred between one system to another is accurate, timely and complete and validating data as close as possible to the point of origin, which includes the ability to trace data back to the source document • eAM's input controls are subject to annual testing by PwC as part of the broader SOX controls testing, as well as annual ASATs.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

No	Effectiveness Criteria	Findings	
7(c)	Logical security access controls appear adequate, such as passwords	Through discussions with the Manager – Regional IS Australia and consideration of Alcoa's security access and account management policies and procedures, we observed that: • Alcoa's Security Access Policy (Australia) is based on Alcoa's global security standards as outlined in the Security Access Account Management Standard • Logical security access is managed through the Access Request Facility (ARF) systems, where all users are assigned a unique user account and password • Account password requirements have been enhanced during the audit period to include a minimum of eight characters, which includes a mixture of alphabetical, numerical and special characters A password management tool called *Courion* is used to synchronise passwords for the overall Oracle suite with the Windows environment.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
7(d)	Physical security access controls appear adequate	Through discussions with the Manager – Regional IS Australia and consideration of Alcoa's security access policies and procedures and most recent ASAT testing results, we observed that: • Access swipe cards are used to restrict and record physical access to the data centre. Access is required to revoked on termination of an employee and the swipe cards returned to the management of data centre building • A review of access logs to the data centre is undertaken by the Data Centre Manager on a quarterly basis to identify any unauthorised access and take corrective action, as required • Contractors are required to be accompanied by appropriate IT personnel when working in the data centre, unless the contractors are formally inducted and permitted to be based in the data centre such as Tata Consultancy Services (TCS) We also noted that Alcoa has instigated precautions to contain fire and other damaging events in its Data Centre. There are fire extinguishers located within as well as nearby the data centre. Temperature, humidity and flood sensors can be found in the room and notification is sent to the building facility management if any of the sensors are triggered. A VESDA system, which provides advance fire warning and detection, is installed for the room and is connected to the main building control panel.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

No	Effectiveness Criteria	Findings	
7(e)	Data backup procedures appear adequate	Through discussions with the Manager – Regional IS Australia and consideration of Alcoa's backup and recovery procedures, we observed that: • Backups of production data occur on a daily basis • EBS data, which includes eAM, is mirrored to another set of disks before being transferred to backup tapes overnight • Backup tapes are collected and stored off-site by Recall • Alcoa's ASAT testing for backup processes is now managed by Alcoa's Internal Audit team. Backup tapes are collected and stored remotely by an external service provider (Recall). On January 24, 2011, data restoration from a disaster recovery test was conducted successfully for the Australia EBS applications. As part of the test, backup tapes were transported to Pinjarra site and restored onto two EBS disaster recovery servers. Recovery of the respective environments was completed well within the seven day recovery priority period.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
7(f)	Key computations related to licensee performance reporting are materially accurate	For the purpose of Alcoa's licence performance reporting to the Authority in accordance with its Licence requirements, Alcoa does not directly extract data from the eAM system and is not directly reliant on computations from that system.	
		Adequacy Rating: Not rated	**Performance Rating:** Not rated
7(g)	Management reports appear adequate for the licensee to monitor licence obligations	Through discussions with the Principal Mechanical Engineer WAO Powerhouse, consideration of Alcoa's ASAT testing and examination of the asset strategies for Pinjarra, Wagerup and Kwinana, we observed that (consistent with AMS review item 12(a) below), Alcoa has the following processes in place to monitor licence obligations: • Asset management strategies for each powerhouse has a reference to the licence obligations outlining the 12 key processes of the asset management system subject to review by the Authority • An annual high-level review to assess compliance with all licence obligations that is undertaken by the Principal Mechanical Engineer WAO Powerhouse by means of interviews and meetings with staff involved in respective areas. The objective of the review is to determine whether Alcoa has complied with the provisions of its Licence and report results to the Authority by 31 August each year • Alcoa's Self-Assessment Test (ASAT) audits designed to consider the asset management system effectiveness criteria outlined by the Authority's Audit Guidelines. Audit findings and recommendations are recorded and tracked by means of Alcoa's Business Improvement System. Originally designed to be an annual process, these compliance focussed ASATs are now conducted on a three-year rolling cycle, to be undertaken by Alcoa's Internal Audit team prior to the independent third-party review (i.e. this review). The next audit is scheduled to be performed in 2014 • The Energy Services Manager has been designated the responsible person for monitoring compliance with regulatory requirements • The Principal Mechanical Engineer WAO Powerhouse is responsible for monitoring the assessment management strategies and performing a review on a regular cycle or in the event of a major equipment failure.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

4.8 Risk management

Key process: Risk management involves the identification of risks and their management within an acceptable level of risk.
Expected outcome: An effective risk management framework is applied to manage risks related to the maintenance of service standards..

Risk management processes applied to Alcoa's WA Powerhouse operations are accommodated by established WAO risk management mechanisms. Alcoa uses well documented, risk-based processes to manage its powerhouse assets, with the sequence of maintenance task priorities being people & safety as the highest followed by environment, then customer.

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td>8(a)</td><td>Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system.</td><td colspan="2">Through discussions with the Principal Mechanical Engineer WAO Powerhouse and examination of Alcoa's risk management practices, we observed that:
Within the application of the Alcoa Business System, Alcoa intends to ensure risk management is a fundamental aspect of its decision-making processes
Alcoa has developed risk management policies and procedures designed to align with AS/NZS 4360:2004. The policy outlines the criteria for risk assessments and the steps in the risk management process. The process specifically steps through (a) Establishing the context, (b) Identifying risks, (c) Examining controls, (d) Evaluating the risk, (e) Establishment of risk treatment plans and (f) Monitor and review of risks on a periodic basis
Overall responsibility for risk management lies with Alcoa's Loss Prevention Engineer who is assisted by external engineering risk consultants
For all Major Hazard equipment at each refinery site (including powerhouse boilers, turbine alternators, deaerator, cogen units), there are Major Hazard equipment single point accountability personnel (SPAs) in the areas of Operations, Maintenance and Engineering. These personnel, delegated by the WAO Powerhouse Manager, are jointly responsible for managing the critical controls surrounding Major Hazard equipment (including Change Control procedures)
An annual high-level review to assess compliance with all licence obligations that is undertaken by the Principal Mechanical Engineer WAO Powerhouse by means of interviews and meetings with staff involved in respective areas. The objective of the review is to determine whether Alcoa has complied with the provisions of its Licence and report results to the Authority by 31 August each year
Alcoa's Self-Assessment Test (ASAT) audits designed to consider the asset management system effectiveness criteria outlined by the Authority's Audit Guidelines. Audit findings and recommendations are recorded and tracked by means of Alcoa's Business Improvement System. Originally designed to be an annual process, these compliance focussed ASATs are now conducted on a three-year rolling cycle, to be undertaken by Alcoa's Internal Audit team prior to the independent third-party review (i.e. this review). The next audit is scheduled to be performed in 2014.
We observed evidence of risk management activities being applied to WAO Powerhouse planning and management activities. We examined the aspects and impacts register for the Pinjarra powerhouse, completed ASATs and insurance loss prevention reviews. However, as a minor point to note, Alcoa's suite of risk management policies and procedures refer to the out-dated Risk Management Australian standard AS/NZS 4360:2004. The new risk management standard AS/NZS ISO 31000:2009, although not fundamentally different to the old standard, has been updated including a new definition of risk and provides a greater emphasis on how risk management should be implemented and integrated into an organisation.</td></tr>
<tr><td></td><td></td><td>Adequacy Rating: Requires some improvement (B)</td><td>Performance Rating: Performing effectively (1)</td></tr>
</table>

No	Effectiveness Criteria	Findings	
	Recommendation 3/2013 Alcoa should update the Risk Management suite of documents to reflect the revised Risk Management standard AS/NZS ISO 31000:2009.	**Action plan 3/2013** Alcoa will update its risk management suite of documentation to reflect the revised Risk Management standard. **Responsible Person:** Principal Mechanical Engineer WAO Powerhouse **Target Date:** 30 June 2014	
8(b)	Risks are documented in a risk register and treatment plans are actioned and monitored	Through discussion with the Principal Mechanical Engineer WAO Powerhouse and examination of the risk management procedure, we determined that Alcoa documents risks in a risk register for monitoring and periodic evaluation. In particular, we noted: • The primary tool used by WAO Powerhouse operations to capture risks related to its powerhouses is the insurance loss prevention reviews and associated recommendation summaries prepared for each powerhouse. The reviews assist with identifying mechanical and electrical equipment breakdown risks and proposed recommendations for reducing or eliminating those exposures. • Alcoa has developed a risk management methodology, which is designed to align with AS/NZS 4360:2004 and outlines the process for assessing risk identified in Alcoa's operating environment and developing mitigation strategies • The recommendation summaries are compiled to represent a live risk register for each site, with the recommendations assigned to a responsible person with the status expected to be reviewed and updated every three to four months • Alcoa has developed an aspects and impacts register, which specifically documents risks relating to environment health and safety concerns of the Powerhouse operations.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
8(c)	The probability and consequences of asset failure are regularly assessed.	Through discussion with the Principal Mechanical Engineer WAO Powerhouse and review of relevant documentation, we observed that Alcoa has mechanisms in place for identifying probability and consequence of powerhouse asset failure (consistent with Asset Planning section1(g)). Specifically, the mechanisms include: • Alcoa's dashboard report that monitors the integrity and capacity of the powerhouse equipment via a combination of performance indicators including leading, lagging and capacity indicators. The dashboard report: o Generates a high level summary of asset performance by providing a total score by weighting and tallying the indicators, which is reported to the relevant global personnel in the quarterly AWA Global Refining Power report o Is updated monthly and reported quarterly to Alcoa's Manufacturing and Technology Council • Additional and more specific ASAT audits conducted at regular intervals focused on asset operations, maintenance, health and safety and environment. • Loss prevention inspections, as a major aspect of Alcoa's risk management activities directed at powerhouse operations • Classified plant inspections, which are conducted as per statutory requirements • Periodic statutory inspection of registered pressure equipment to identify any issues or preventive maintenance activities required.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

4.9 Contingency planning

Key process: Contingency plans document the steps to deal with the unexpected failure of an asset.

Expected outcome: Contingency plans have been developed and tested to minimise any significant disruptions to service standards.

Under normal operating circumstances, Kwinana and Pinjarra operations are net importers of power from the SWIS and Wagerup operations is a net exporter of power. In the event that Alcoa's equipment fails at one of its facilities and electricity supply from the grid is inadequate, then Alcoa's refinery operations are impacted.

No	Effectiveness Criteria	Findings	
9(a)	Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks.	Through discussion with the Principal Mechanical Engineer WAO Powerhouse and examination of relevant supporting documentation, we observed that Alcoa has established a business continuity management framework comprising a series of system recovery plans that are subject to testing in accordance with specified timeframes. Specifically, we observed that: • To address the eventuality of key system failures or major equipment failures, each site has a disaster planning document that enlists contingency plans for various scenarios relating to engineering as well as operational aspects • Each of Alcoa's powerhouses have system recovery plans, including black/brown start procedures as well as a resourced roster to enable the continuation of operations. In the event of a contingency, black start procedures enable recovery from a total shutdown of the power station by facilitating a supply of electricity from an on-site auxiliary generating plant. Conversely, a brown start relates to recovery post a partial shutdown • System recovery plans are subject to a high-level review twice annually via loss prevention inspections and a detailed review when triggered by a major equipment change or reconfiguration • Alcoa's powerhouse workforce is resourced and trained to respond to powerhouse equipment losses, to minimise the interruption to operations. We observed evidence of Alcoa's review and testing of system recovery and restart plans.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

4.10 Financial planning

Key process: The financial planning component of the asset management plan brings together the financial elements of the service delivery to ensure its financial viability over the long term.

Expected outcome: A financial plan that is reliable and provides for the long-term financial viability of the services.

Financial planning processes applied for the WA Powerhouse Operations are accommodated through the Alcoa WA Operations financial planning mechanism.

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td rowspan="2">10(a)</td><td rowspan="2">The financial plan states the financial objectives and strategies and actions to achieve the objectives</td><td colspan="2">Through discussion with the Pinjarra Powerhouse Business Advisor and consideration Alcoa’s financial planning mechanisms, we observed that:
The financial objectives and strategies of the WA Operations business are driven by Alcoa’s overall corporate objectives set by the global organisation and cascaded down through the business units
WAO powerhouses are required to submit a plan and budget that cover labour requirements, maintenance requirements and other operational costs. The maintenance plan is determined based on scheduled work for major items plus base workload. Data is sourced from the maintenance system with reference to the five year plan for each powerhouse
WAO powerhouse plans also take account of required powerhouse output to support the refinery i.e. required levels of steam and electric power generation.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
<tr><td rowspan="2">10(b)</td><td rowspan="2">The financial plan identifies the source of funds for capital expenditure and recurrent costs</td><td colspan="2">Through discussion with the Pinjarra Powerhouse Business Advisor and consideration of Alcoa’s financial planning mechanisms, we observed that:
Any application for funds made by Alcoa WA Operations is not required to identify the specific source of funds
Individual powerhouse plans form part of the site level plan, which is rolled up into the WA Operations, then to Alcoa Australia and ultimately to Alcoa US for final sign-off
Financial plans are submitted to the Alcoa global organisation for interrogation to determine viability and appropriateness of the request. The plan is then approved by the Alcoa global organisation if it is considered appropriate.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
</table>

No	Effectiveness Criteria	Findings	
10(c)	The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets)	Through discussions with the Pinjarra Powerhouse Business Advisor and consideration of Alcoa's financial planning mechanisms, we observed that: • Although projections of operating statements and statement of financial position do not occur specifically at the powerhouse level, those projections take account of powerhouse operations as part of the entire WA Operations business projections • Budgets and management reporting is broken down to the powerhouse level. Primarily, reporting to the powerhouse is in relation to costs utilising expense control reports • Projections of operating statements and statements of financial position are submitted at a detailed level for the next year, with higher level projections for a further two years also submitted.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
10(d)	The financial plan provides firm predictions on income for the next five years and reasonable indicative predictions beyond this period	Through discussions with the Senior Business Advisor and consideration of Alcoa's financial planning mechanisms, we observed: • Three year financial plans are developed at a high level • Capital funding plans are developed for periods of up to 10 years. We note that the financial plan does not provide detail of each powerhouse's revenue and therefore impact on financial objectives and strategies as the output of the powerhouses is not intended as a main income source, rather a bi-product of supporting refinery operations.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
10(e)	The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services	Through discussions with the Pinjarra Powerhouse Business Advisor and Principal Mechanical Engineer WAO Powerhouse, and examination of an extract from Pinjarra powerhouse financial plan, we determined that each powerhouse is required to submit a plan that outlines labour, maintenance, operational and capital expenditure. We also noted that: • Financial plans for each site address operational, resource and maintenance requirements. The plans are supported by a capital expenditure plan, which outlines and ranks projects and expenditure over a ten year timeframe • The maintenance plan is determined based on information from planned outage schedule and rolling five year plans as well as base workload. Consideration is also given to the required service levels of electricity and steam generation to support the refinery operations • The financial plan does not provide firm predictions of income for any period greater than the financial year that it is intended.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

No	Effectiveness Criteria	Findings	
10(f)	Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary	Through discussions with the Pinjarra Powerhouse Business Advisor and Principal Mechanical Engineer WAO Powerhouse and examination of an ECR and Operational and Maintenance Cost Reports, we observed: • Operational and maintenance cost reports are produced on a daily basis • ECRs are produced on a monthly basis for each site, enabling management to specifically assess powerhouse actual v budgeted expenditure, identify cost centres that are over budget or problematic and to determine necessary corrective action • The WAO Powerhouse group meets every week, of which one meeting per month is set aside as a formal cost review. Actual performance against plan is reviewed in addition to the expected year end outcome. Each month there is a formal process to reforecast the rest of year expenditure to determine the full year position. We sighted a particular instance where a cost over-run due to breakdown of an air compressor was reviewed and approved prior to funds being allocated.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

4.11 Capital expenditure planning

Key process: The capital expenditure plan provides a schedule of new works, rehabilitation and replacement works, together with estimated annual expenditure on each over the next five or more years. 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.

Expected outcome: A capital expenditure plan that provides reliable forward estimates of capital expenditure and asset disposal income, supported by documentation of the reasons for the decisions and evaluation of alternatives and options.

Capital expenditure planning processes applied for the WA Powerhouse Operations are accommodated through the Alcoa WA Operations capital expenditure planning mechanism.

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td rowspan="2">11(a)</td><td rowspan="2">There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates</td><td colspan="2">Through discussions with the Pinjarra Powerhouse Business Advisor and Senior Project Engineer and consideration of Alcoa’s capital planning procedures, we determined that:
• The Alcoa global organisation prepares rolling 3 and 10 year capital plans that are reviewed by all levels of regional management to enable an annual allocation of funds. The capital plan process commences in July, with full delivery of the annual plan by November of that year
• RfA templates and procedures are used to identify capital expenditure amounts required for a particular period. The RfA amounts form part of the capital plans and facilitate the update of the full year forecasts
• The capital expenditure plan outlines projects and associated expenditure over a ten year timeframe including reason codes, project start and end dates and ranks the projects based on priority and criticality to the site’s operations
• The Capital Program Manager is responsible for the capital planning process and subsequent product
• Approval requests for projects above A$250k are required to be supported by justification demonstrating alignment to the site and regional strategic plans, which includes asset replacement and cost reduction strategies. Identification of projects by location serves to clarify the responsibilities for progression.
Examination of an extract from the capital expenditure plan detailing projects related to the Alcoa Powerhouses indicated that the requirements of 11(a) are maintained within the plan.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
</table>

No	Effectiveness Criteria	Findings	
11(b)	The plan provides reasons for capital expenditure and timing of expenditure	Through discussions with the Pinjarra Powerhouse Business Advisor and Senior Project Engineer and consideration of relevant documentation we observed that: • Alcoa's Expenditure Approval Policy and Procedures require all projects with measurable financial benefits to be evaluated using an economic evaluation model that includes a set of high level economic assumptions published on a quarterly basis • The capital expenditure plan identifies individual capital projects by site and operation centre and reflects the objectives and benefits of completing the project. The plan also indicates the period in which an expenditure amount is planned, including project start and end dates and reasons for the expenditure by code such as health and safety or maintenance • As part of the RfA process, the following are elements that are required to be identified, which support the reasoning and timing of the expenditure: o The reasons for instigating new projects (e.g. environmental considerations) i.e. the business case o Financial and capital requirements o Current state assessment and timeline for the project and expected expenditure timing. • RfA templates are used as the supporting documentation (once approved) that feed into the capital plan for site operations • Capital projects in excess of A$250K are required to seek approval using an RfA process to justify the reasoning and timing of the expenditure. The RfA template is designed to consider specific aspects of the project including environmental considerations, asset alternatives, approval requirements, financial and capital requirements, current state assessment and timeline.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)
11(c)	The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and Pinjarra Powerhouse Business Advisor and consideration of WAO project evaluation processes, we observed that: • Alcoa's procedures address the requirement for life cycle costs of powerhouse assets to be assessed and recorded in formal project evaluations • Alcoa's procedures address the requirement for investment and capital expenditure estimates to be calculated and disclosed within the project evaluation phase • Alcoa's rolling 3 year and 10 year capital expenditure plans accommodate capital projects identified through the business's strategic, business and location/facility planning. Examination of the Asset Strategies for each of Alcoa's powerhouses indicates that the assets useful life has not been explicitly documented. As such, the 2010 Post Review Implementation Plan (3/2010) is currently 'in progress', with actions to explicitly detail the useful life for each of its assets within the Asset Strategy documentation as part of its next review. As part of the review, Alcoa will ensure that the Asset Strategy aligns with the respective capital expenditure plans (e.g. useful lives are consistent).	
		Adequacy Rating: Requires some improvement (B)	**Performance Rating:** Opportunity for improvement (2)

No	Effectiveness Criteria	Findings	
11(d)	There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and Pinjarra Powerhouse Business Advisor and consideration of Alcoa's capital planning processes, we observed that: • The capital plan is reviewed and updated annually to ensure a continuing alignment with business and strategic plans • A WAO Powerhouse group meeting is held monthly to review actual performance against plan and to reforecast expenditure for remainder of the year to reflect a more accurate position • On completion, the projects are reviewed against the approved criteria to assess whether the project objectives were realised. We sighted a WA Capital review presentation as evidence of review of capital expenditure plan. We note that Alcoa's capital expenditure planning processes covers impending replacement/refurbishment expenditure of its Pinjarra and Kwinana powerhouses, which is typically expensed rather than being capital expenditure. The Principal Mechanical Engineer WAO Powerhouse confirmed that there is no major asset replacement currently foreseen. However, we obtained evidence of capital expenditure planning process being applied.	
		Adequacy Rating: Adequately defined (A)	**Performance Rating:** Performing effectively (1)

4.12 Review of Asset Management System

Key process: The asset management system is regularly reviewed and updated.

Expected outcome: Review of the Asset Management System to ensure the effectiveness of the integration of its components and their currency.

<table>
<tr><th>No</th><th>Effectiveness Criteria</th><th colspan="2">Findings</th></tr>
<tr><td rowspan="2">12(a)</td><td rowspan="2">A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current</td><td colspan="2">Through discussions with the Principal Mechanical Engineer WAO Powerhouse and an examination of the Pinjarra, Wagerup and Kwinana Asset Strategies, we determined that Alcoa has put mechanisms in place for the regular review of the asset management system. In particular, we observed that:
The Principal Mechanical Engineer WAO Powerhouse is responsible for reviewing the asset management strategies at regular intervals and in the event of a major equipment failure. Based on examination of the review log for each of the Asset Strategies we determined that they have been reviewed during the review period
The Energy Services Manager has been designated the responsible person for monitoring compliance with regulatory requirements
An annual high-level review to assess compliance with all licence obligations that is undertaken by the Principal Mechanical Engineer WAO Powerhouse by means of interviews and meetings with staff involved in respective areas. The objective of the review is to determine whether Alcoa has complied with the provisions of its Licence and report results to the Authority by 31 August each year
Alcoa’s Self-Assessment Test (ASAT) audits designed to consider the asset management system effectiveness criteria outlined by the Authority’s Audit Guidelines. Audit findings and recommendations are recorded and tracked by means of Alcoa’s Business Improvement System. Originally designed to be an annual process, these compliance focussed ASATs are now conducted on a three-year rolling cycle, to be undertaken by Alcoa’s Internal Audit team prior to the independent third-party review (i.e. this review). The next audit is scheduled to be performed in 2014
Additional and more specific ASAT audits conducted at regular intervals focused on asset operations, maintenance, health and safety and environment.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
<tr><td rowspan="2">12(b)</td><td rowspan="2">Independent reviews (e.g. internal audit) are performed of the asset management system</td><td colspan="2">Through discussions with Principal Mechanical Engineer WAO Powerhouse and examination of a completed ASAT, we determined that ASATs are particularly designed to address obligations relating to Alcoa’s performance audit and asset management system review. Specifically:
ASAT audits are conducted by Alcoa’s Internal Audit team, which is independent of Alcoa’s asset management system, at three year intervals
The audits findings are reported to the Powerhouse Manager as well as the Energy Services Manager and are used as preparation for the third party independent review.</td></tr>
<tr><td>Adequacy Rating: Adequately defined (A)</td><td>Performance Rating: Performing effectively (1)</td></tr>
</table>

5 Follow-up of previous review action plans

Rec. No	Ref	Recommendation	Previous Review Action Plan	Status	Revised action plan (if applicable)
1/10	1(h) 12(a)	Alcoa finalise and formally approve the Asset Strategies for its Powerhouse assets.	Alcoa will finalise and formally approve the Asset Strategies for its Powerhouse assets. **Responsible Person:** Principal Mechanical Engineer – WAO Powerhouse **Target Date:** 31 August 2011	***Complete*** We observed that asset management strategies for each of Alcoa's powerhouses have been finalised and formally approved.	N/A
2/10	3(d)	Alcoa update the Asset Strategies for each of its powerhouses incorporating relevant replacement strategies commensurate with section 3(d) of the asset management effectiveness criteria.	Alcoa will update the Asset Strategies for each of its powerhouses to incorporate relevant replacement strategies commensurate with section 3(d) of the asset management effectiveness criteria. **Responsible Person:** Principal Mechanical Engineer – WAO Powerhouse **Target Date:** 31 August 2011	***In progress*** Examination of the Asset Strategies for each of Alcoa's powerhouses indicates that the details of relevant replacement strategies has not been explicitly documented in line with section 3(d) of the asset management effectiveness criteria. Alcoa should consider explicitly stating the replacement strategies for each of its assets within the Asset Strategy documentation as part of its next review.	Alcoa will update the Asset Strategies for each of its powerhouses to explicitly state replacement strategies (if any). **Responsible Person:** Principal Mechanical Engineer – WAO Powerhouse **Target Date:** 31 December 2013
3/10	11(c)	Alcoa update the Asset Strategies for each of its powerhouses: • To incorporate the relevant asset useful life details to facilitate effective monitoring • Align the Asset Strategy plans to capital expenditure plans to ensure consistency between approved capital programs and expected asset life.	Alcoa will develop an appropriate document that will link to the Asset Strategies for each of its powerhouse, which will: • Incorporate the relevant asset useful life details • Align the Asset Strategy plans to its capital expenditure plans.	***In progress*** Examination of the Asset Strategies for each of Alcoa's powerhouses indicates that the assets useful life has not been explicitly documented. Alcoa should consider explicitly stating the useful life for each of its assets within the Asset Strategy documentation as part of its next review. As part of the review, Alcoa should ensure that the Asset Strategy aligns with the respective capital expenditure plans (e.g. useful lives are consistent).	Alcoa will develop an appropriate document that will link to the Asset Strategies for each of its powerhouse, which will: • Incorporate the relevant asset useful life details • Align the Asset Strategy plans to its capital expenditure plans. **Responsible Person:** Principal Mechanical Engineer – WAO Powerhouse **Target Date:** 30 June 2014

Rec. No	Ref	Recommendation	Previous Review Action Plan	Status	Revised action plan (if applicable)
4/10	12(b)	Alcoa either assign the responsibility for performing the ASAT to an Alcoa staff member independent of the Asset Management System, or engage an external reviewer.	Alcoa will either assign the responsibility for performing the ASAT to an Alcoa staff member independent of the Asset Management System, or engage an external reviewer.	***Complete*** We obtained evidence that the ASATs are now performed by an independent member of the Alcoa internal audit team on a three yearly cycle.	N/A

Appendix A – review plan

Alcoa of Australia Ltd

Electricity Generation Licence (EGL14)

2013 Asset Management System Review

Review Plan

August 2013

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Introduction

Overview

The Economic Regulation Authority (**the Authority**) has under the provisions of the Electricity Industry Act 2004 (**the Act**), issued to Alcoa of Australia Ltd (**Alcoa**) an Electricity Generation Licence (**the Licence**).

The Licence relates to Alcoa's operation of generating works at its Kwinana, Pinjarra and Wagerup facilities. Those works are managed by Alcoa's WA Powerhouse Operations, within the Alcoa WA Operations (WAO) business unit.

Section 14 of the Electricity Act requires Alcoa to provide to the Authority with an asset management system review (**the review**) conducted by an independent expert acceptable to the Authority not less than and in every 24 month period. The audit will be the third to be performed since the issue of the License 2006. As a result of the 2010 audit and review, the authority increased Alcoa's review period to 36 months.With the Authority's approval Deloitte Touche Tohmatsu (**Deloitte**) has been appointed to conduct the review for the period 30 June 2010 to 1 July 2013.

The review will be conducted in accordance with the August 2010 issue of the *Audit Guidelines: Electricity, Gas and Water Licences* (**Audit Guidelines**). In accordance with the Audit Guidelines this document represents the Review Plan (**the Plan**) that is to be agreed upon by Deloitte and Alcoa and presented to the Authority for approval.

Objective

The objective of the Asset Management System Review (the Review) is to independently examine the effectiveness and performance of Alcoa's asset management systems established for assets subject to Alcoa's Licence (Kwinana, Pinjarra and Wagerup).

Scope

In accordance with the Audit Guidelines, the review will consider the effectiveness of Alcoa's existing control procedures within the 12 key processes in the asset management life-cycle as outlined below at Table 1. Each key process and effectiveness criteria is applicable to Alcoa's Licence and as such will be individually considered as part of the review.

Table 1 – Asset management system key processes and effectiveness criteria

#	Key processes	Effectiveness criteria
1	Asset planning	• Planning processes and objectives reflect the needs of all stakeholders and is integrated with business planning • Service levels are defined • Non-asset operations (e.g. demand management) are considered • Lifecycle costs of owning and operating assets are assessed • Funding options are evaluated • Costs are justified and cost drivers identified • Likelihood and consequences of asset failure are predicted • Plans are regularly reviewed and updated.
2	Asset creation and acquisition	• Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions • Evaluations include all life-cycle costs • Projects reflect sound engineering and business decisions • Commissioning tests are documented and completed • Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood.

#	Key processes	Effectiveness criteria
3	Asset disposal	• Underutilised and underperforming assets are identified as part of a regular systematic review process • The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken • Disposal alternatives are evaluated • There is a replacement strategy for assets.
4	Environmental analysis (all external factors that affect the system)	• Opportunities and threats in the system environment are assessed • Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved • Compliance with statutory and regulatory requirements • Achievement of customer service levels.
5	Asset operations	• Operational policies and procedures are documented and linked to service levels required • Risk management is applied to prioritise operations tasks • Assets are documented in an Asset register, including asset type, location, material, plans of components, an assessment of assets' physical/structural condition and accounting data • Operational costs are measured and monitored • Staff receive training commensurate with their responsibilities.
6	Asset maintenance	• Maintenance policies and procedures are documented and linked to service levels required • Regular inspections are undertaken of asset performance and condition • Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule • Failures are analysed and operational/maintenance plans adjusted where necessary • Risk management is applied to prioritise maintenance tasks • Maintenance costs are measured and monitored.
7	Asset management information system	• Adequate system documentation for users and IT operators • Input controls include appropriate verification and validation of data entered into the system • Logical security access controls appears adequate, such as passwords • Physical security access controls appear adequate • Data back-up procedures appear adequate • Key computations related to licensee performance reporting are materially accurate • Management reports appear adequate for the licensee to monitor licence obligations.
8	Risk management	• Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system • Risks are documented in a risk register and treatment plans are actioned and monitored • The probability and consequences of asset failure are regularly assessed.
9	Contingency planning	Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks.

#	Key processes	Effectiveness criteria
10	Financial planning	• The financial plan states the financial objectives and strategies and actions to achieve the objectives • The financial plan identifies the source of funds for capital expenditure and recurrent costs • The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets) • The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period • The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services • Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary.
11	Capital expenditure planning	• There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates • The plan provide reasons for capital expenditure and timing of expenditure • The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan • There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned.
12	Review of Asset Management System	• A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current • Independent reviews (e.g. internal audit) are performed of the asset management system.

Responsibility

Alcoa's responsibility for maintaining an effective asset management system

Alcoa is responsible for putting in place policies, procedures and controls, which are designed to provide for an effective asset management system for assets subject to the Licence.

Deloitte's responsibility

Our responsibility is to express a conclusion on the effectiveness of Alcoa's asset management systems to meet Licence requirements based on our procedures. We will conduct our engagement in accordance with Australian Standard on Assurance Engagements *ASAE 3500 Performance Engagements* issued by the Australian Auditing and Assurance Standards Board and the Audit Guidelines, in order to state whether, based on the procedures performed, anything has come to our attention that causes us to believe that Alcoa's asset management system has not been operating effectively, in all material respects, in accordance with the Audit Guidelines. Our engagement will provide limited assurance as defined in ASAE 3500.

Limitations of use

Our report will be produced solely for the management of Alcoa, for the purpose of meeting the reporting requirements of section 14 of the Act. We disclaim any assumption of responsibility for any reliance on this report to any person other than the management of Alcoa for any purpose other than that for which it was prepared. We disclaim all liability to any other party for all costs, loss, damages, and liability that the other party might suffer or incur arising from or relating to or in any way connected with the contents of our report, the provision of our report to the other party, or the reliance on our report by the other party.

Inherent limitations

A limited assurance engagement is substantially less in scope than a reasonable assurance engagement conducted in accordance with ASAE 3500 and consequently does not allow us to obtain assurance that we would become aware of all significant matters that might be identified in a reasonable assurance engagement. Accordingly, we will not express an opinion providing reasonable assurance.

We cannot, in practice, examine every activity and procedure, nor can we be a substitute for management's responsibility to maintain adequate controls over all levels of operations and their responsibility to prevent and detect irregularities, including fraud. Accordingly, readers of our report should not rely on the report to identify all potential opportunities for improvement which may be required.

Any projection of the evaluation of the level of effectiveness to future periods is subject to the risk that the systems may become inadequate because of changes in conditions, or that the degree of effectiveness with management procedures may deteriorate.

Independence

In conducting our engagement, we will comply with the independence requirements of the Australian professional accounting bodies.

Approach

The review will be conducted in three distinct phases, being a risk assessment, system analysis/policy and procedure review and examination of performance. From the review results, a report will be produced to outline findings, overall assessments and recommendations for improvement in line with the Audit Guidelines. Each step of the review is discussed in detail below.

Risk assessment

The review will focus on identifying or assessing those activities and management control systems to be examined and the matters subject to review. Therefore, the purpose of conducting the risk assessment as a preliminary phase enables the auditor to focus on pertinent/high risk areas of Alcoa's licence obligations. The risk assessment gives specific consideration to the status of post review action plans devised in response to previous review recommendations, changes to Alcoa's systems and processes and any matters of significance raised by the Authority and/or Alcoa. The level of risk and materiality of the process determines the level of review required i.e. the greater the materiality and the higher the risk, the more effort will be applied.

The first step of the risk assessment is the rating of the potential consequences of Alcoa not meeting its licence obligations, in the absence of mitigating controls. The consequence rating descriptions listed at Table 10 of the Audit Guidelines (refer to **Appendix A-1**), provides the risk assessment with context to enable the appropriate consequence rating to be applied to each obligation subject to review.

Once the consequence has been determined, the likelihood of Alcoa not meeting its licence obligations (against the defined effectiveness criteria) is assessed using the likelihood rating listed at Table 11 of the Audit Guidelines (refer to **Appendix A-2**). The assessment of likelihood is based on the expected frequency of non-performance against the defined criteria, over a period of time.

Table 2 below (sourced from Table 12 of the Audit Guidelines) outlines the combination of consequence and likelihood ratings to determine the level of inherent risk associated with each individual effectiveness criteria.

Table 2: Inherent risk rating

	Consequence		
Likelihood	Minor	Moderate	Major
Likely	Medium	High	High
Probable	Low	Medium	High
Unlikely	Low	Medium	High

Once the level of inherent risk has been determined, the adequacy of existing controls is assessed in order to determine the level of control risk. Controls are assessed and prioritised as weak, moderate or strong dependant on their suitability to mitigate the risks identified. The control adequacy ratings used by this risk assessment are aligned to the ratings listed at Table 14 of the Audit Guidelines (refer to **Appendix A-3**).

Once inherent risks and control risks are established, the review priority can then be determined using the matrix listed at Table 15 of the Audit Guidelines (refer to **Table 3** below). Essentially, the higher the level of risk the greater the level of examination is required.

Table 3: Assessment of Review Priority

	Adequacy of existing controls		
Inherent Risk	Weak	Moderate	Strong
High	Audit priority 1	Audit priority 2	
Medium	Audit priority 3	Audit priority 4	
Low	Audit priority 5		

The following table outlines the review requirement for each level of audit priority. Testing can range from extensive substantive testing around the controls and activities of particular processes to confirming the existence of controls through discussions with relevant staff.

Table 4: Review Priority Table

Priority Rating and Resulting Review Procedures	
Rating	Review requirement
Priority 1	• Controls testing and extensive substantive testing of activities • Follow-up and if necessary, re-test matters previously reported.
Priority 2	• Controls testing and moderate substantive testing of activities • Follow-up and if necessary, re-test matters previously reported.
Priority 3	• Limited controls testing (moderate sample size). Only substantively test activities if further control weakness found • Follow-up of matters previously reported.
Priority 4	• Confirmation of existing controls via observation and walk through testing • Follow-up of matters previously reported.
Priority 5	• Confirmation of existing controls via observation, discussions with key staff and/or reliance on key references (“desktop review”).

The risk assessment has been discussed with stakeholders to gain their input as to the appropriateness and factual accuracy of risk and control ratings and associated explanations. The key sources considered in reaching our preliminary assessment of the risk and control ratings were:

- The 2010 asset management system review report and associated audit plan and risk assessment
- Consideration of annual compliance reports and Alcoa’s performance during audit period
- Initial discussions with key Alcoa staff.
- Our understanding of Alcoa’s regulatory environment.

At this stage, the risk assessment can only be a preliminary assessment based on reading of documentation and interviews by the auditors. It is possible that the ratings and risk assessment comments may be revised as we conduct our work and new evidence comes to light. Accordingly the risk assessment for the asset management system review is a preliminary draft, not a final report, and no reliance should be placed on its findings. It is however an invaluable tool for focussing the review effort.

The asset management system review risk assessment is attached at **Appendix B**.

Systems analysis/policy and procedure review

The level of policy and procedure review required will be determined utilising the aforementioned priority scale. Once the priority level has been defined, the review will consist of:

- Interviewing key operational and administrative staff responsible for the development and maintenance of policy and procedural type documentation
- Examination of documented policies and procedures for key functional requirements and consideration of their relevance to Alcoa's asset management system requirements and standards.

The policy and procedure definition element of the asset management system review will be performed to provide a rating as defined under Table 5 (refer below).

Key documents which may be subject to review are not specifically disclosed in this plan. A list of documents examined will be included in the review report.

Examination of performance

The actual performance of the relevant controls and processes in place will then be examined via:

- Consideration of reports and references evidencing activity
- Interviews with key operational staff
- Physical visits to two of Alcoa's three powerhouses
- Consideration of each installation's function, normal modes of operation and age.

A full work program will be completed to record the specific aspects of our review and examination of the performance of each asset management system key process. This work program will be based on:

- The review priority determined by the risk assessment to be applicable to each effectiveness criteria
- The results of the policy and procedure review, as described above
- The location of personnel and activity to be tested.

The performance effectiveness element of the asset management system review will be performed to provide a rating as defined under Table 6 (refer below).

Reporting

In accordance with the Audit Guidelines, the auditor must provide an assessment of both the process and policy definition rating (refer to **Table 5** below and also **Table 5** of the Audit Guidelines) and the performance rating (refer to **Table 6** below and also **Table 6** of the Audit Guidelines) for each of the key processes in Alcoa's asset management system.

Table 5: Asset management process and policy definition adequacy ratings

Rating	Description	Criteria
A	Adequately defined	• 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) are adequate in relation to the assets that are being managed.
B	Requires some improvement	• Process and policy documentation requires 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) require minor improvements (taking into consideration the assets that are being managed).
C	Requires significant improvement	• Process and policy documentation is incomplete or requires significant improvement. • Processes and policies do not document the required performance of the assets. • Processes and policies are significantly out of date. • The asset management information system(s) require significant improvements (taking into consideration the assets that are being managed).
D	Inadequate	• Processes and policies are not documented. • The asset management information system(s) is not fit for purpose (taking into consideration the assets that are being managed).

Table 6: Asset management performance ratings

Rating	Description	Criteria
1	Performing effectively	• 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	Opportunity for improvement	• The performance of the process requires some improvement to meet the required level. • Process effectiveness reviews are not performed regularly enough. • Process improvement opportunities are not actioned.
3	Corrective action required	• The performance of the process requires significant improvement to meet the required level. • Process effectiveness reviews are performed irregularly, or not at all. • Process improvement opportunities are not actioned.
4	Serious action required	• Process is not performed, or the performance is so poor that the process is considered to be ineffective.

The asset management review report will be structured to address all key components expected by the Audit Guidelines, including:

- Response to previous review recommendations (refer to **Appendix C**)
- Performance summary and rating for each effectiveness criteria (Table 1), utilising the asset management process and policy definition adequacy ratings (Table 5) and the asset management performance ratings (Table 6)

- Review observations for each effectiveness criteria
- Status and reponse to recommendations from the previous review
- Where appropriate, recommendations on actions required to address opportunities for improvement.

Where appropriate, Alcoa will provide post review implementation plans for incorporation into the report as an appendix.

General information

All aspects of the review will undergo quality assurance and review procedures as outlined in our previous communications. Before delivery of a final report, full quality procedures will be applied, including second partner review.

Key Alcoa contacts

The key contacts for this review are:

- Energy Services Manager
- Principal Mechanical Engineer WAO Powerhouse
- Senior Management Accountant WA Operations
- Audit Manager
- Principal Electrical Engineer WAO Powerhouse
- Australian Financial Accounting Manager
- Environmental Manager - Pinjarra
- WAO Capital Program Manager
- Australian Financial Accounting Manager
- Engineering and Maintenance Systems Manager
- Powerhouse Supervisor - Wagerup
- Senior Refinery Electrical Engineer
- Service Delivery Team Leader (Unix and Oracle System)
- Unix Administrator
- Regional IPS Security and Risk Manager

Deloitte Staff

Deloitte staff who will be involved with this assignment are:

- Darren Gerber — Partner
- Ben Fountain — Account Director
- Amit Grover — Senior Analyst
- Richard Thomas — QA Partner

Deloitte staff will be supported by the following KT & Sai Associates staff:

- Keith Sanders — Principal Electrical Engineer
- Clive Lancaster — KT & Sai Consultant

Resumes for key Deloitte and KT & Sai staff are outlined in the proposal accepted by Alcoa and subsequently presented to the Authority.

Timing

The initial risk assessment phase was completed on 7 August 2013. On 9 August 2013, the draft review plan and detailed risk assessment were presented in a state suitable for submission to the Authority for comment.

The remainder of the fieldwork phase is scheduled to be performed in August and September 2013.

Deloitte's time and staff commitment to the completion of the review is outlined in the proposal accepted by Alcoa and subsequently presented to the Authority.

Appendix A – Risk assessment key

A-1 Consequence ratings

Source: Audit Guidelines – Electricity, Gas and Water Licences July 2009

	Rating	Examples of non-compliance			
		Supply Quality	**Supply Reliability**	**Consumer Protection**	**Breaches of legislation or other licence conditions**
1	Minor	Minor public health and safety issues. Breach of quality standards minor - minimal impact on customers.	System failure or connection delays affecting only a few customers. Some inconvenience to customers.	Customer complaints procedures not followed in a few instances. Nil or minor costs incurred by customers.	Licence conditions not fully complied with but issues have been promptly resolved.
2	Moderate	Event is restricted in both area and time e.g., supply of service to one street is affected up to one day. Some remedial action is required.	Event is restricted in both area and time e.g., supply of service to one street is affected up to one day. Some remedial action is required.	Lapse in customer service standards is clearly noticeable but manageable. Some additional costs may be incurred by some customers.	Clear evidence of one or more breaches of legislation or other licence conditions and/or sustained period of breaches.
3	Major	Significant system failure. Life-threatening injuries or widespread health risks. Extensive remedial action required.	Significant system failure. Extensive remedial action required.		

A-2 Likelihood ratings

Source: Audit Guidelines – Electricity, Gas and Water Licences July 2009

	Level	Criteria
A	Likely	Non-compliance is expected to occur at least once or twice a year
B	Probable	Non-compliance is expected to occur every three years
C	Unlikely	Non-compliance is expected to occur at least once every 10 years or longer

A-3 Adequacy ratings for existing controls

Source: Audit Guidelines – Electricity, Gas and Water Licences July 2009

Rating	Description
Strong	Strong controls that are sufficient for the identified risks
Moderate	Moderate controls that cover significant risks; improvement possible
Weak	Controls are weak or non-existent and have minimal impact on the risks

Appendix B – Risk assessment

1	Asset Planning
Key Process:	Asset planning strategies are focused on meeting customer needs in the most effective and efficient manner (delivering the right service at the right price).
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.

Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk	Controls Assessment	Review Priority
1(a)	Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning	Minor	Unlikely	Low	Strong	Priority 5
1(b)	Service levels are defined	Minor	Unlikely	Low	Strong	Priority 5
1(c)	Non-asset options (e.g. demand management) are considered	Minor	Unlikely	Low	Strong	Priority 5
1(d)	Lifecycle costs of owning and operating assets are assessed	Moderate	Unlikely	Medium	Strong	Priority 4
1(e)	Funding options are evaluated	Minor	Probable	Low	Moderate	Priority 5
1(f)	Costs are justified and cost drivers identified	Moderate	Unlikely	Medium	Moderate	Priority 4
1(g)	Likelihood and consequences of asset failure are predicted	Major	Unlikely	High	Strong	Priority 2
1(h)	Plans are regularly reviewed and updated	Minor	Probable	Low	Strong	Priority 5

2	Asset Creation and Acquisition
Key Process:	Asset creation/acquisition means the provision or improvement of an asset where the outlay can be expected to provide benefits beyond the year of outlay
Outcome:	A more economic, efficient and cost-effective asset acquisition framework which will reduce demand for new assets, lower service costs and improve service delivery.

Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
2(a)	Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions	Moderate	Unlikely	Medium	Strong	Priority 4
2(b)	Evaluations include all life-cycle costs	Moderate	Probable	Medium	Strong	Priority 4
2(c)	Projects reflect sound engineering and business decisions	Moderate	Unlikely	Medium	Moderate	Priority 4
2(d)	Commissioning tests are documented and completed	Moderate	Unlikely	Medium	Strong	Priority 4
2(e)	Ongoing legal/environmental/ safety obligations of the asset owner are assigned and understood	Major	Unlikely	High	Moderate	Priority 2

3	Asset Disposal					
Key Process:	Effective asset disposal frameworks incorporate consideration of alternatives for the disposal of surplus, obsolete, under-performing or unserviceable assets. Alternatives are evaluated in cost-benefit terms.					
Outcome:	Effective management of the disposal process will minimise holdings of surplus and under-performing assets and will lower service costs.					
Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
3(a)	Under-utilised and under-performing assets are identified as part of a regular systematic review process	Minor	Unlikely	Low	Strong	Priority 5
3(b)	The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken	Minor	Unlikely	Low	Strong	Priority 5
3(c)	Disposal alternatives are evaluated	Minor	Probable	Low	Strong	Priority 5
3(d)	There is a replacement strategy for assets	Moderate	Probable	Medium	Weak	Priority 3

4	Environmental analysis					
Key Process:	Environmental analysis examines the asset system environment and assesses all external factors affecting the asset system.					
Outcome:	The asset management system regularly assesses external opportunities and threats and takes corrective action to maintain performance requirements.					
Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
4(a)	Opportunities and threats in the system environment are assessed	Moderate	Unlikely	Medium	Strong	Priority 4
4(b)	Performance standards (availability of service, capacity, continuity, emergency response, etc) are measured and achieved	Moderate	Probable	Medium	Strong	Priority 4
4(c)	Compliance with statutory and regulatory requirements	Moderate	Unlikely	Medium	Strong	Priority 4
4(d)	Achievement of customer service levels	Moderate	Probable	Medium	Strong	Priority 4

5	Asset operations
Key Process:	Operational functions relate to the day-to-day running of assets and directly affect service levels and costs.
Outcome:	Operations plans adequately document the processes and knowledge of staff in the operation of assets so that service levels can be consistently achieved.

Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
5(a)	Operational policies and procedures are documented and linked to service levels required	Moderate	Unlikely	Medium	Strong	Priority 4
5(b)	Risk management is applied to prioritise operations tasks	Moderate	Unlikely	Medium	Strong	Priority 4
5(c)	Assets are documented in an Asset Register including asset type, location, material, plans of components, an assessment of assets' physical/structural condition and accounting data	Moderate	Unlikely	Medium	Strong	Priority 4
5(d)	Operational costs are measured and monitored	Moderate	Unlikely	Medium	Strong	Priority 4
5(e)	Staff receive training commensurate with their responsibilities	Moderate	Probable	Medium	Strong	Priority 4

6	Asset maintenance
Key Process:	Maintenance functions relate to the upkeep of assets and directly affect service levels and costs.
Outcome:	Maintenance plans cover the scheduling and resourcing of the maintenance tasks so that work can be done on time and on cost.

Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
6(a)	Maintenance policies and procedures are documented and linked to service levels required	Moderate	Probable	Medium	Strong	Priority 4
6(b)	Regular inspections are undertaken of asset performance and condition	Moderate	Unlikely	Medium	Strong	Priority 4
6(c)	Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule	Moderate	Probable	Medium	Strong	Priority 4
6(d)	Failures are analysed and operational/maintenance plans adjusted where necessary	Moderate	Unlikely	Medium	Strong	Priority 4
6(e)	Risk management is applied to prioritise maintenance tasks	Moderate	Probable	Medium	Strong	Priority 4
6(f)	Maintenance costs are measured and monitored	Moderate	Unlikely	Medium	Strong	Priority 4

7	Asset Management Information System
Key Process:	An asset management information system is a combination of processes, data and software that support the asset management functions.
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.

Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
7(a)	Adequate system documentation for users and IT operators	Minor	Probable	Low	Strong	Priority 5
7(b)	Input controls include appropriate verification and validation of data entered into the system	Minor	Probable	Low	Strong	Priority 5
7(c)	Logical security access controls appear adequate, such as passwords	Minor	Probable	Low	Strong	Priority 5
7(d)	Physical security access controls appear adequate	Minor	Unlikely	Low	Moderate	Priority 5
7(e)	Data backup procedures appear adequate	Moderate	Unlikely	Medium	Strong	Priority 4
7(f)	Key computations related to licensee performance reporting are materially accurate	Minor	Probable	Low	Moderate	Priority 5
7(g)	Management reports appear adequate for the licensee to monitor licence obligations	Minor	Probable	Low	Moderate	Priority 5

8	Risk Management
Key Process:	Risk management involves the identification of risks and their management within an acceptable level of risk.
Outcome:	An effective risk management framework is applied to manage risks related to the maintenance of service standards

Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Control Risk	Review Priority
8(a)	Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system	Major	Unlikely	High	Strong	Priority 2
8(b)	Risks are documented in a risk register and treatment plans are actioned and monitored	Moderate	Probable	Medium	Strong	Priority 4
8(c)	The probability and consequences of asset failure are regularly assessed	Moderate	Unlikely	Medium	Strong	Priority 4

9	Contingency Planning
Key Process:	Contingency plans document the steps to deal with the unexpected failure of an asset.
Outcome:	Contingency plans have been developed and tested to minimise any significant disruptions to service standards.

Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
9(a)	Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	Major	Probable	High	Strong	Priority 2

10	Financial Planning
Key Process:	The financial planning component of the asset management plan brings together the financial elements of the service delivery to ensure its financial viability over the long term.
Outcome:	A financial plan that is reliable and provides for the long-term financial viability of the services.

Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
10(a)	The financial plan states the financial objectives and strategies and actions to achieve the objectives	Minor	Unlikely	Low	Strong	Priority 5
10(b)	The financial plan identifies the source of funds for capital expenditure and recurrent costs	Minor	Unlikely	Low	Strong	Priority 5
10(c)	The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets)	Minor	Unlikely	Low	Strong	Priority 5
10(d)	The financial plan provides firm predictions on income for the next five years and reasonable indicative predictions beyond this period	Minor	Unlikely	Low	Strong	Priority 5
10(e)	The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services	Minor	Unlikely	Low	Strong	Priority 5
10(f)	Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary	Minor	Unlikely	Low	Strong	Priority 5

11	Capital expenditure planning
Key Process:	The capital expenditure plan provides a schedule of new works, rehabilitation and replacement works, together with estimated annual expenditure on each over the next five or more years. 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
Outcome:	A capital expenditure plan that provides reliable forward estimates of capital expenditure and asset disposal income, supported by documentation of the reasons for the decisions and evaluation of alternatives and options.

Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
11(a)	There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates	Minor	Unlikely	Low	Strong	Priority 5
11(b)	The plan provides reasons for capital expenditure and timing of expenditure	Minor	Unlikely	Low	Strong	Priority 5
11(c)	The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan	Moderate	Probable	Medium	Weak	Priority 3
11(d)	There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned	Minor	Unlikely	Low	Strong	Priority 5

12	Review of AMS					
Key Process:	**The asset management system is regularly reviewed and updated.**					
Outcome:	**Review of the Asset Management System to ensure the effectiveness of the integration of its components and their currency.**					
Ref	Effectiveness criteria	Consequence	Likelihood	Inherent Risk Rating	Controls Assessment	Review Priority
12(a)	A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current	Minor	Probable	Low	Moderate	Priority 5
12(b)	Independent reviews (eg internal audit) are performed of the asset management system	Minor	Probable	Low	Weak	Priority 5

Appendix C – Previous review recommendations

Recommendations are drawn from the Alcoa of Australia Ltd 2010 Electricity Generation Licence Asset Management System Review dated 11 January 2011. The report includes the following four recommendations and associated action plans.

Issue 1/10 ***Asset planning 1(h) Plans are regularly reviewed and updated*** ***Review of AMS 12(a) A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current*** At the time of our review, the Asset Strategy documents, which describe the asset management plan for each of Alcoa's three powerhouses, were still in draft and had not been formally approved.	
Recommendation 1/10 Alcoa finalise and formally approve the Asset Strategies for its Powerhouse assets.	**Action Plan 1/10** Alcoa will finalise and formally approve the Asset Strategies for its Powerhouse assets. **Responsible Person:** Principal Mechanical Engineer – WAO Powerhouse **Target Date:** 31 August 2011

Issue 2/10 ***Asset disposal 3(d) There is a replacement strategy for assets*** At the time of our review, the Asset Strategy documents for each of Alcoa's three powerhouses do not contain relevant asset replacement strategies.	
Recommendation 2/10 Alcoa update the Asset Strategies for each of its powerhouses incorporating relevant replacement strategies commensurate with section 3(d) of the asset management effectiveness criteria.	**Action Plan 2/10** Alcoa will update the Asset Strategies for each of its powerhouses to incorporate relevant replacement strategies commensurate with section 3(d) of the asset management effectiveness criteria. **Responsible Person:** Principal Mechanical Engineer – WAO Powerhouse **Target Date:** 31 August 2011

Issue 3/10	
Capital expenditure 11(c) The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan At the time of our review, the Asset Strategy documents for each of Alcoa's powerhouse assets do not document the powerhouse assets useful life.	
Recommendation 3/10 Alcoa update the Asset Strategies for each of its powerhouses: • To incorporate the relevant asset useful life details to facilitate effective monitoring • Align the Asset Strategy plans to capital expenditure plans to ensure consistency between approved capital programs and expected asset life.	**Action Plan 3/10** Alcoa will develop an appropriate document that will link to the Asset Strategies for each of its powerhouse, which will: • Incorporate the relevant asset useful life details • Align the Asset Strategy plans to its capital expenditure plans. **Responsible Person:** Principal Mechanical Engineer – WAO Powerhouse **Target Date:** 31 August 2011

Issue 4/10	
Review of AMS 12(b) Independent reviews (e.g. internal audit) are performed of the asset management system Section 12(b) requires independent reviews to be performed of the asset management system. Currently, Alcoa's process provide for the responsible person for the AMS to also be the person conducting the ASAT. A separate independent review has not been performed or scheduled.	
Recommendation 4/10 Alcoa either assign the responsibility for performing the ASAT to an Alcoa staff member independent of the Asset Management System, or engage an external reviewer.	**Action Plan 4/10** Alcoa will either assign the responsibility for performing the ASAT to an Alcoa staff member independent of the Asset Management System, or engage an external reviewer. **Responsible Person:** Procurement Specialist - Energy **Target Date:** 30 June 2011

Appendix B – references

Alcoa staff participating in the review

- Energy Services Manager
- Principal Mechanical Engineer WAO Powerhouse
- Pinjarra Powerhouse Business Advisor
- Senior Project Engineer
- Principal Electrical Engineer WAO Powerhouse
- Environmental Scientist
- Powerhouse Supervisor - Pinjarra
- Powerhouse Supervisor - Wagerup
- Powerhouse Supervisor - Kwinana
- Manager – Regional IS Australia

Deloitte staff participating in the review

Name	Position	Hours
Darren Gerber	Partner	5.5
Ben Fountain	Account Director	51
Amit Grover	Senior Analyst	70
Emlyn King	Analyst	15
Richard Thomas	Partner - Quality Assurance	2

KT & Sai staff participating in the review

Name	Position	Hours
Clive Lancaster	Senior Engineer	25
Keith Sanders	Senior Engineer – Quality Assurance	25

Key documents and other information sources examined

Organisation references

- Asset Strategies for Pinjarra, Kwinana and Wagerup powerhouses
- Economic Evaluation Model
- Management Systems Model (WAO)
- Expenditure Approval Policy and Procedures
- Funds Authorisation
- Request for Authorisation for Boiler Overhaul (Wagerup) and Load Shed Project (Pinjarra)
- Project Closure and Review procedure
- Post Project Review Process
- WA PHS Shutdown Planner and Outage Schedule
- Loss Prevention Inspection reports
- Commission record sheets
- WA Operations Decommission Classified Plant
- Environmental Aspects and Impacts Procedure
- Evaluation of Compliance with Environmental Legislation Regulations (WAO)
- Environmental Legal Update from Freehills
- AWA Refining Power Reliability Report 2013
- Identification and Access to Legal and Other Requirements
- Combined Organisational Chart
- Wg Bir 1 April 2013 Final Execution Desk Top

- DR Strategy
- Security Access Accounts Management
- Data Tape Management Procedures and Standards
- EBS Back-up for all Environments
- Security Access Policy
- EBS DR Test Summary
- PwC Report – IT Sarbanes Oxley 404 Review
- User guides for work orders
- Alcoa Generation Licence Report 2012/13
- Service Level Agreement with Global Service Centre (2013)
- Quasar to eAM interface
- Risk Management Policy, Overview and Responsibilities
- Risk Classifications
- Staff Strike Roster
- Budget Variance Analysis
- Expense Control Reports
- Annual Capital Plan Process
- CAPEX Planning Tool
- May 2011 Capital Performance
- 2011 EGL ASAT for AMS
- Annual Capital Plan Process Flowpath

Pinjarra references

- Classified plant inspections (Pinjarra)
- Business Plan (Pinjarra)
- ISO14001 Certificate (Pinjarra)
- EHS Risk Assessment (Pinjarra)
- Monthly Emission Monitoring Reports (Pinjarra)
- Organisational Chart (Pinjarra)
- Black Start Procedures (Pinjarra)
- Maintenance Financial Plan (Pinjarra)
- Maintenance Budgeting Review Tool (Pinjarra)

Wagerup references

- Organisational Chart (Wagerup)
- Superheaters, Wall Tube and Steam Drum Inspection Sheets (Wagerup)
- Emergency Shutdown Procedure (Wagerup)
- Black Start Procedures (Wagerup)

Kwinana references

- Boiler 7 Bore Oxide Survey Assessment (Kwinana)
- Registered Pressure Equipment Statutory Inspection Summary (Kwinana)
- Boiler Commissioning Procedure (Kwinana)
- Organisational Chart (Kwinana)
- DR Plan (Kwinana)
- Black Start Procedures (Kwinana).

Appendix C – Post Review Implementation Plan

2013 review

Issue 1/2013

Asset maintenance: 6(a) Maintenance policies and procedures are documented and linked to service levels required

Alcoa has documented policies, procedures and protocols for each site, designed to facilitate maintenance of Alcoa's assets. However, we observed that Alcoa is in the process of developing and enhancing its suite of maintenance documentation, including:

- Documents detailing the required maintenance level for each specific plant item
- Specific plant maintenance instructions for electrical and mechanical plant
- Control plans for major plant items such as boiler, generator, deaerators and boiler feed pumps
- Supplementary equipment asset strategies.

We also noted that document management practices appear to be limited, as documentation requested for during the review was not readily available/could be located.

Recommendation 1/2013	**Action plan 1/2013**
Alcoa should: a) Finalise the development of the its supporting maintenance documentation b) Consider the need for training c) Review current document management practices and identify why some documentation was unable to be located during the review.	Alcoa will: a) Finalise the development of the supporting maintenance documentation b) Develop and roll-out training to the required staff c) Review document filing processes to ensure consistency in saving and storing documentation. Alcoa is also currently upgrading its document management system. **Responsible Person:** Principal Mechanical Engineer WAO Powerhouse **Target Date:** 30 June 2014

Issue 2/2013

Asset maintenance: 6(a) Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule

For each facility's major equipment, the eAM system contains plans for scheduled maintenance as well as required emergency and corrective works. However, based on our examination of Alcoa's maintenance practices, we determined that Inspection Test Procedures (ITPs) are currently being developed and uploaded into eAM. Of the ITPs that have been developed, only a small number are being used by Operations & Maintenance staff.

Recommendation 2/2013	Action plan 2/2013
Alcoa should a) Finalise the development of its ITPs b) Consider the need for formal training on the content and use of ITPs to all relevant staff.	Alcoa will: a) Develop an equipment register, which risk assesses the equipment. For those assessed as being a high risk, ITPs will be developed as a priority b) Provide ITP training to maintenance personnel as part of major shutdown preparations. **Responsible Person:** Principal Mechanical Engineer WAO Powerhouse **Target Date:** 31 December 2014

Issue 3/2013

Risk Management: 8(a) Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system.

We observed evidence of risk management activities being applied to WAO Powerhouse planning and management activities.

However, as a minor point to note, Alcoa's suite of risk management policies and procedures refer to the out-dated Risk Management Australian standard AS/NZS 4360:2004. The new risk management standard AS/NZS ISO 31000:2009, although not fundamentally different to the old standard, has been updated including a new definition of risk and provides a greater emphasis on how risk management should be implemented and integrated into an organisation.

Recommendation 3/2013	Action plan 3/2013
Alcoa should update the Risk Management suite of documents to reflect the revised Risk Management standard AS/NZS ISO 31000:2009.	Alcoa will update its risk management suite of documentation to reflect the revised Risk Management standard. **Responsible Person:** Principal Mechanical Engineer WAO Powerhouse **Target Date:** 30 June 2014

2010 review

Issue 2/2010 *Asset disposal 3(d) There is a replacement strategy for assets* At the time of our review, the Asset Strategy documents for each of Alcoa's three powerhouses do not contain relevant asset replacement strategies.	
Recommendation 2/10 Alcoa update the Asset Strategies for each of its powerhouses incorporating relevant replacement strategies commensurate with section 3(d) of the asset management effectiveness criteria.	**Action Plan 2/10** Alcoa will update the Asset Strategies for each of its powerhouses to explicitly state replacement strategies (if any). **Responsible Person:** Principal Mechanical Engineer – WAO Powerhouse **Target Date:** 31 December 2013

Issue 3/2010 *Capital expenditure 11(c) The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan* At the time of our review, the Asset Strategy documents for each of Alcoa's powerhouse assets do not document the powerhouse assets useful life.	
Recommendation 3/10 Alcoa update the Asset Strategies for each of its powerhouses: • To incorporate the relevant asset useful life details to facilitate effective monitoring • Align the Asset Strategy plans to capital expenditure plans to ensure consistency between approved capital programs and expected asset life.	**Action Plan 3/10** Alcoa will develop an appropriate document that will link to the Asset Strategies for each of its powerhouse, which will: • Incorporate the relevant asset useful life details • Align the Asset Strategy plans to its capital expenditure plans. **Responsible Person:** Principal Mechanical Engineer – WAO Powerhouse **Target Date:** 30 June 2014