Alcoa of Australia Limited

2008 Electricity Generation Licence
Asset Management System Review

11 February 2009

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Mr Nick Eaton
Procurement Specialist - Energy
Alcoa of Australia Limited
PO Box 252
Applecross WA 6953

11 February 2009

Dear Mr Eaton

2008 Asset Management System Review – Electricity Generation Licence EGL14

We have completed the Asset Management System Review for Alcoa of Australia Ltd for the period 26 June 2006 to 30 June 2008 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 Andrew Baldwin on 9365 7236 or myself on 9365 7024.

Yours sincerely

Richard Thomas

Richard Thomas
Partner

Member of
Deloitte Touche Tohmatsu

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Contents

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1 Executive summary

1.1 Introduction

Pursuant to the provisions of the Electricity Industry Act 2004 (**the Act**), the Economic Regulation Authority (**the Authority**) has issued Alcoa of Australia Limited (**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. Those works are managed by Alcoa's WA Powerhouse Operations, within the Alcoa WA Operations (**WAO**) business unit.

Section 14 of the Act requires Alcoa to provide the Authority with a report by an independent expert acceptable to the Authority as to the effectiveness of the respective asset management systems established for assets subject to the Licence (**the review**).

1.2 Independent reviewer's report

With the Authority's approval, Deloitte Touche Tohmatsu (**Deloitte**) was appointed to undertake the review. Deloitte engaged Maunsell Australia Pty Ltd (**Maunsell**) to provide advice where technical expertise was required. The review was conducted in accordance with the specific requirements of the Licence and the Authority's *Audit Guidelines: Electricity, Gas and Water Licences* (**Audit Guidelines**).

This is the first such review conducted in accordance with Alcoa's Licence requirements.

Alcoa's responsibility for compliance with the conditions of the Licence

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.

Our 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 conducted our engagement in accordance with Australian Standard on Assurance Engagements ASAE 3500 *Performance Engagements (Revision of AUS 806 and AUS 808)* 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 Authority's Audit Guidelines document. 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 September 2008, and set out in Appendix A.

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 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 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.

Limitations of use

This report is made solely to the management of Alcoa in accordance with our engagement letter dated 11 July 2008, for the purpose of meeting the 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.

Independence

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

1.3 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 26 June 2006 to 30 June 2008.

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 1.6 of this report and also included at section 3 of this report.

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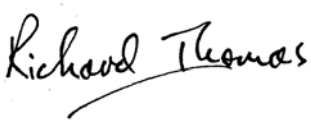

Richard Thomas
Partner
Perth, February 2009

1.4 Alcoa's response to previous review recommendations

As this is the first review under this Licence, there are no previous review recommendations to which Alcoa can respond.

1.5 Findings

The following table summarises the assessments made by this review on the effectiveness of Alcoa's asset management system. On the scale of 0 to 5, 5 is the highest rating possible (continuously improving effectiveness with no recommendations for improving effectiveness) with the rating scale moving down through lower levels of effectiveness. Refer to **Table 2** at the "Summary of findings" section of this report for a description of the effectiveness rating scale applied.

Table 1: Summary of findings, by review priority[1] and effectiveness rating

No. of AMS aspects	Effectiveness Rating							
	Not rated	0	1	2	3	4	5	Total
Priority 2					1	2		**3**
Priority 4					10	15	2	**27**
Priority 5	1		1	2	6	14	1	**25**
Total	**1**		**1**	**2**	**17**	**31**	**3**	**55**

Specific assessments for each asset management system process are summarised at **Table 3** in the "Summary of findings" section of this report.

Detailed findings, including, relevant observations, recommendations and post review implementation plans are located in the "Detailed findings, recommendations and post review implementation plans" section of this report.

[1] Review priority for each aspect of the asset management system was determined as an outcome of the risk assessment approach outlined in the Review Plan, set out in Appendix A

1.6 Recommendations and post review implementation plans

AMS Key Process and Effectiveness Criteria	Effectiveness Rating	Issue 1
Asset management processes and procedures – reference to powerhouse assets (all processes and criteria)	-	Alcoa WA Operations' asset planning and management processes and procedures are designed to accommodate all WA Operations assets, including powerhouse assets. For the purpose of Alcoa's Electricity Generation Licence however, those processes and procedures do not explicitly refer to powerhouse assets, nor do they specifically address the 12 key processes in the asset management life-cycle. Without such explicit references, it is more difficult for Alcoa to demonstrate that it consistently applies all key aspects of its asset planning and management activities to powerhouse assets.
Recommendation 1 Powerhouse Asset Strategies be amended to: ▪ accommodate each of the 12 key processes in the asset management life-cycle ▪ refer to Alcoa WA Operations' existing asset planning and management processes and procedures, as they apply to powerhouse assets.		**Post Review Implementation Plan 1** The WAO Principal Mechanical Engineer will build the 12 key processes required for the Electricity Generation Licence compliance directly into Alcoa's asset planning and management processes and procedures. **Responsible Person:** WAO Principal Mechanical Engineer **Target Date:** 31 July 2009

AMS Key Process and Effectiveness Criteria	Effectiveness Rating	Issue 2
Finalisation of Asset Strategies (all processes and criteria)	-	Alcoa has not established designated Asset Management Plans for its powerhouse assets. Instead, Powerhouse Asset Strategies have been drafted for each of the three powerhouses, although the Wagerup and Kwinana Powerhouse asset strategies are not yet complete. We note that the WAO Power Distribution Infrastructure Focus A3 provides for those strategies to be completed in Q2 09.
Recommendation 2 The ongoing drive for further improvement in Alcoa's asset management strategies, documentation and systems be continued and completed through the development of finalised asset strategies for each powerhouse.		**Post Review Implementation Plan 2** The WAO Principal Mechanical Engineer will build the 12 key processes required for the Electricity Generation Licence compliance directly into Alcoa's asset planning and management processes and procedures. **Responsible Person:** WAO Principal Mechanical Engineer **Target Date:** 31 July 2009

AMS Key Process and Effectiveness Criteria	Effectiveness Rating	Issue 3
Prioritisation of projects (various processes and criteria)	-	A number of projects, which are intended to address compliance requirements, have been identified in the Alcoa Powerhouse 5 year plans. Timeframes for delivering those projects and their relative priority have not been clearly outlined to demonstrate Alcoa's commitment to addressing the relevant matters.
Recommendation 3 Clearly prioritise those projects identified in Alcoa Powerhouse 5 year plans, which require attention from an electricity licence compliance perspective.		**Post Review Implementation Plan 3** The WAO Principal Mechanical Engineer will review the Alcoa Powerhouse 5 year plans, and clearly prioritise the projects in these plans with linkage to the electricity licence compliance requirements. **Responsible Person:** WAO Principal Mechanical Engineer **Target Date:** 31 July 2009

AMS Key Process and Effectiveness Criteria	Effectiveness Rating	Issue 4
Asset Management Information System 7(g) Management reports appear adequate for the licensee to monitor licence obligations	2. Planned and tracked	Alcoa's existing operational and management reporting structure and processes do not explicitly accommodate its electricity generation licence obligations. The Alcoa Self Assessment Testing (**ASAT**) internal audit tool also does not specifically address Alcoa's electricity generation licence obligations.
Recommendation 4 (a) Establish a mechanism, which enables Alcoa to effectively and continuously monitor its performance against Licence obligations (b) Consider incorporating licence obligations and asset effectiveness indicators into ASAT.		**Post Review Implementation Plan 4** The Procurement Specialist – Energy and Principal Mechanical Engineer WAO Powerhouse in conjunction with the Audit Manager will develop an ASAT to ensure that licence obligations form part of the powerhouse strategy. This ASAT will be continually monitored and reviewed. This ASAT will be completed annually to meet this end. **Responsible Person:** Procurement Specialist - Energy **Target Date:** 31 July 2009

AMS Key Process and Effectiveness Criteria	Effectiveness Rating	Issue 5
Contingency Planning 9(a) Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	3. Well-defined	While Alcoa's system recovery plans and procedures, equipment redundancy and workforce capabilities each contribute to Alcoa's business continuity objectives, they have not been collectively documented to explicitly capture Alcoa's contingency planning strategies and practices in the event of unexpected and unrecoverable failure of a powerhouse asset.
Recommendation 5 (a) Formally document existing contingency planning strategies and practices in the event of unexpected and unrecoverable powerhouse asset failure. Where appropriate, powerhouse and site specific contingency plans should be developed and documented (b) Implement a review and where appropriate, testing strategy for all system recovery and contingency plans (c) Assign roles and responsibilities for reviewing, testing and implementing contingency plans.		**Post Review Implementation Plan 5** The WAO Principal Mechanical Engineer will ensure: (a) documentation exists defining our contingency planning strategies and that this documentation is captured in the Alcoa document storage system (b) a process is in place to annually review the aforementioned contingency plans and keep these current. (c) the people responsible for these reviews of contingency plans are assigned and documented. **Responsible Person:** WAO Principal Mechanical Engineer **Target Date:** 31 July 2009

AMS Key Process and Effectiveness Criteria	Effectiveness Rating	Issue 6
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 12(b) Independent reviews (e.g. internal audit) are performed of the asset management system	1. Performed informally	Alcoa's existing auditing and review processes do not specifically address Powerhouse licence obligations or the related asset management systems.
Recommendation 6 (a) Develop and implement a structured review program, which explicitly accommodates Alcoa's powerhouse asset management systems. (b) Consideration be given to: ▪ incorporating Licence obligations into ASAT so that they become part of a regular review process ▪ conducting an independent review of the contractual arrangement between Alcoa and Western Power.		**Post Review Implementation Plan 6** The Procurement Specialist – Energy and Principal Mechanical Engineer WAO Powerhouse in conjunction with the Audit Manager will develop an ASAT to comply with Licence requirements to review and keep current Asset Management Plans and to assess the adequacy of arrangements between Alcoa and Western Power. This ASAT will be completed annually to meet this end. **Responsible Person:** Procurement Specialist - Energy **Target Date:** 31 July 2009

1.7 Scope and objectives

The review is designed to gain limited assurance regarding Alcoa's compliance with the conditions of its Licence during the period 26 June 2006 to 30 June 2008.

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

- asset planning (including development & maintenance of an asset management plan)
- asset creation and acquisition
- asset disposal
- environmental analysis (all external factors that affect the system)
- asset operations
- asset maintenance
- asset management information system
- risk management
- contingency planning
- financial planning
- capital expenditure planning
- review of asset management system.

The Review Plan set out at Appendix A presents the risk assessments made for and review priority assigned to each asset management system process.

1.8 Approach

Our approach for this review involved the following activities, which were undertaken during the period August to December 2008:

- utilising the Audit Guidelines and Reporting Manual as a guide, development of a risk assessment which involved discussions with key staff and document review to assess relevant controls
- development of a Review Plan (see **Appendix A**) and associated work program for approval by the Authority
- interviews with relevant site level 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 sites in Kwinana, Pinjarra and Wagerup. Maunsell conducted site and asset reviews 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 powerhouse asset management systems (see **Appendix B** for reference listing)
- reporting of findings to Alcoa for review and response.

2 Summary of findings

Table 2 sets out the rating scale defined by the Authority in the Audit Guidelines for the assessment of the level of effectiveness of Alcoa's asset management system. For the highest possible effectiveness rating of 5 to be achieved, Alcoa was required to demonstrate it has maintained mature processes and controls, supported by an existing review/continuous improvement process.

Table 2: Effectiveness rating scale

Effectiveness	Rating	Description
Continuously improving	5	Continuously improving organisation capability and process effectiveness
Quantitatively controlled	4	Measurable performance goals established and monitored
Well-defined	3	Standard processes documented, performed and coordinated
Planned and tracked	2	Performance is planned, supervised, verified and tracked
Performed informally	1	Base practices are performed
Not performed	0	Not performed (indicate if not applicable)

This report provides:

- a breakdown of each function of the asset management system into subcomponents as described in the Audit Guidelines. This approach is taken to enable a more thorough review of key processes where individual components within a greater process can be of greater risk to the business therefore requiring different review treatment
- a summary of the findings of the asset management system review (at **Table 3** below)
- detailed findings, including relevant observations, recommendations and post review implementation plans (at **section 3**).

Note that:

- the risk assessment that was presented in the review plan remains unchanged as no issues or concerns were identified that would indicate a need to modify the nature and levels of testing. The risk assessment has been included in this summary section to give context to the ratings that have been determined
- for a number of the asset management system functions, Alcoa's WA Powerhouse operations apply the business wide policies, procedures and practices established for the Alcoa WA Operations business unit.

Table 3: Asset management system effectiveness summary

Refer to Detailed Findings at section 3 and Review Plan at Appendix A for descriptions of the specific effectiveness criteria for the 12 asset management system functions.

						Effectiveness Rating						
Ref	Consequence	Likelihood	Inherent Risk	Control Risk	Review Priority	Not rated	0	1	2	3	4	5
1. Asset planning											✔	
1(a)	Minor	Unlikely	Low	Low	Priority 5						✔	
1(b)	Minor	Probable	Low	Low	Priority 5						✔	
1(c)	Minor	Unlikely	Low	Medium	Priority 5					✔		
1(d)	Moderate	Unlikely	Medium	Medium	Priority 4					✔		
1(e)	Minor	Unlikely	Low	Medium	Priority 5					✔		
1(f)	Moderate	Unlikely	Medium	Medium	Priority 4					✔		
1(g)	Major	Unlikely	High	Low	Priority 2						✔	
1(h)	Minor	Unlikely	Low	Medium	Priority 5						✔	
2. Asset creation and acquisition										✔		
2(a)	Moderate	Unlikely	Medium	Medium	Priority 4					✔		
2(b)	Moderate	Unlikely	Medium	Medium	Priority 4					✔		
2(c)	Moderate	Unlikely	Medium	Low	Priority 4					✔		
2(d)	Moderate	Unlikely	Medium	Medium	Priority 4					✔		
2(e)	Major	Unlikely	High	Medium	Priority 2						✔	
3. Asset disposal										✔		
3(a)	Minor	Unlikely	Low	Low	Priority 5					✔		
3(b)	Minor	Unlikely	Low	Medium	Priority 5					✔		
3(c)	Minor	Unlikely	Low	Low	Priority 5					✔		
3(d)	Moderate	Unlikely	Medium	Medium	Priority 4					✔		
4. Environmental analysis												✔
4(a)	Moderate	Unlikely	Medium	Medium	Priority 4							✔
4(b)	Minor	Probable	Low	Medium	Priority 5							✔
4(c)	Moderate	Unlikely	Medium	Low	Priority 4							✔
4(d)	Moderate	Unlikely	Medium	Medium	Priority 4					✔		
5. Asset operations											✔	
5(a)	Moderate	Unlikely	Medium	Medium	Priority 4						✔	
5(b)	Moderate	Unlikely	Medium	Low	Priority 4						✔	
5(c)	Minor	Unlikely	Low	Low	Priority 5					✔		
5(d)	Moderate	Unlikely	Medium	Low	Priority 4					✔		
5(e)	Moderate	Unlikely	Medium	Low	Priority 4						✔	
6. Asset maintenance											✔	
6(a)	Moderate	Unlikely	Medium	Low	Priority 4						✔	
6(b)	Moderate	Unlikely	Medium	Medium	Priority 4						✔	

Ref	Consequence	Likelihood	Inherent Risk	Control Risk	Review Priority	Effectiveness Rating						
						Not rated	0	1	2	3	4	5
6(c)	Moderate	Unlikely	Medium	Medium	Priority 4					✔		
6(d)	Moderate	Unlikely	Medium	Medium	Priority 4						✔	
6(e)	Minor	Probable	Low	Medium	Priority 5						✔	
6(f)	Moderate	Unlikely	Medium	Low	Priority 4					✔		
7. Asset management information system											✔	
7(a)	Minor	Unlikely	Low	Medium	Priority 5						✔	
7(b)	Minor	Unlikely	Low	Medium	Priority 5						✔	
7(c)	Minor	Unlikely	Low	Low	Priority 5						✔	
7(d)	Minor	Unlikely	Low	Low	Priority 5					✔		
7(e)	Moderate	Unlikely	Medium	Medium	Priority 4						✔	
7(f)	Minor	Unlikely	Low	Medium	Priority 5	✔						
7(g)	Minor	Unlikely	Low	Medium	Priority 5				✔			
8. Risk management											✔	
8(a)	Moderate	Unlikely	Medium	Medium	Priority 4						✔	
8(b)	Moderate	Probable	Medium	Medium	Priority 4						✔	
8(c)	Moderate	Unlikely	Medium	Low	Priority 4						✔	
9. Contingency planning										✔		
9(a)	Major	Unlikely	High	Medium	Priority 2					✔		
10. Financial planning											✔	
10(a)	Minor	Unlikely	Low	Low	Priority 5						✔	
10(b)	Minor	Unlikely	Low	Medium	Priority 5						✔	
10(c)	Moderate	Unlikely	Medium	Low	Priority 4						✔	
10(d)	Minor	Probable	Low	Medium	Priority 5						✔	
10(e)	Minor	Unlikely	Low	Low	Priority 5						✔	
10(f)	Moderate	Unlikely	Medium	Medium	Priority 4						✔	
11. Capital expenditure planning											✔	
11(a)	Moderate	Unlikely	Medium	Medium	Priority 4						✔	
11(b)	Minor	Probable	Low	Medium	Priority 5						✔	
11(c)	Moderate	Unlikely	Medium	Medium	Priority 4					✔		
11(d)	Minor	Unlikely	Low	Medium	Priority 5						✔	
12. Review of AMS								✔				
12(a)	Minor	Unlikely	Low	Medium	Priority 5				✔			
12(b)	Minor	Unlikely	Low	Medium	Priority 5			✔				

3 Detailed findings, recommendations and post review implementation plans

The following tables contain:

- a **summary description of generation works subject to this asset management system review**: including the system summary and Business/South West Integrated Network (**SWIN**) impact for each of the three powerhouses
- an **overall summary of observations and recommendations**: for Alcoa's WAO Powerhouse asset management system
- **headline references for each key asset management system process (1 to 12)**
- **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
- **post review implementation plans**: Alcoa's formal response to review recommendations, providing details of action to be implemented to address the specific issue raised by the review.

Summary of generation works subject to this asset management system review

Pinjarra Powerhouse

System summary

- the Alcoa Pinjarra Refinery includes four generators. Turbo Alternators (**TA**) #2, 3 and 4 are 20MW units, and TA#5 is a 38.5MW unit. Generators were installed between 1971 and 1977
- 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 (as at September 2008) with the refinery and all major equipment in operation, the refinery is expected to import approximately 15MW 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.

Business and SWIN impact

- loss of Alcoa Pinjarra 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 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

System summary

- the Alcoa Wagerup Refinery includes three steam turbine generators. TA#1 is a 25MW unit and TA#2 and 3 are 18MW units. Generators were installed between 1981 and 1992
- 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 1994. A gas turbine with Heat Recovery Steam Generator, rated at 38MW was also installed in 1998
- under normal operating circumstances (as at September 2008) with the refinery and all major equipment in operation, the refinery is expected to export approximately 20MW 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.

Business and SWIN impact

- loss of Wagerup 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 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 about 20MW generation on the external grid.

Summary of generation works subject to this asset management system review

Kwinana Powerhouse

System summary

- the Kwinana Refinery includes six generators with total installed generation capacity of 66MW. Generators were installed between 1962 and 1976, with TA#2 installed in 1998
- the Kwinana Powerhouse has eight boilers, which produce steam for use in the refinery process
- under normal operating circumstances (as at September 2008) with the refinery and all major equipment in operation, the refinery is expected to import approximately 3.5 MW of power from a Western Power tie transformer. The Kwinana Powerhouse supplies an average of 61 MW to the Refinery. Total refinery use is approximately 64.5 MW. 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 the fact that these issues are being addressed by management and there are a number of projects for replacing equipment that have been identified in the 5 year plan.

Business and SWIN impact

- 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.

Summary observations and recommendations

For each of the 12 key processes of the asset management system subject to review, this report outlines below:

- the process and expected outcome from the process, as outlined in the Authority's Audit Guidelines
- summary observations (where appropriate)
- specific findings and results for each individual aspect of those processes, as outlined in the Review Plan.

Summary observations

Through discussion with key Alcoa representatives, examination of supporting documents and consideration of each of Alcoa's key asset management system processes, we observed that:

- Alcoa uses well documented, risk based processes to manage it powerhouse assets, with the sequence of maintenance task priorities being people & safety first followed by environment, then customer
- Alcoa's fundamental business requirements place a high expectation on its powerhouse assets for power system reliability and avoidance of unplanned outages or failures
- the major driver for Alcoa's powerhouse asset management strategies is for effective maintenance, refurbishment or replacement of powerhouse assets with consideration of equipments' life cycle, particularly 'end of life'. Major items of equipment are currently approaching the end of normal design life
- Alcoa's Enterprise Asset Management (**eAM**) system is designed to facilitate its asset maintenance strategies and compliance with statutory requirements
- rolling 5 year plans are prepared for each of the three Powerhouses
- in relation to the "Asset operations", "Asset maintenance" and "Contingency planning" asset management system processes considered by this review, Alcoa has designed procedures and mechanisms, which are specifically relevant to each of the three Powerhouses
- in relation to the remaining nine asset management system processes considered by this review, Alcoa WA Operations' broader asset management procedures are designed to accommodate all WA Operations assets, including powerhouse assets. However, those processes and procedures do not explicitly refer to powerhouse assets, nor do they specifically address the 12 key processes in the asset management life-cycle ***(review issue - refer to Recommendation 1)***
- Alcoa has not established designated Asset Management Plans for its powerhouse assets. Instead, Powerhouse Asset Strategies have been drafted for each of the three Powerhouses, although the Wagerup and Kwinana Powerhouse asset strategies are not yet complete. We note that the WAO Power Distribution Infrastructure Focus A3 provides for those strategies to be completed in Q2 09 ***(review issue - refer to Recommendation 2)***

The following projects, which are intended to address compliance requirements, have been identified in powerhouse 5 year plans. Timeframes for delivering those projects and their relative priority have not been clearly outlined to demonstrate Alcoa's commitment to addressing the relevant matters ***(review issue - refer to Recommendation 3)***:

- Kwinana Powerhouse - sub-stations have safety and reliability issues that require attention as a matter of priority
- Kwinana Powerhouse - worn and cracked turbine diaphragms and blading emphasise the fact that the installed air compressors are nearing their end-of-life and require major overhauls to improve reliability
- Kwinana Powerhouse - Boiler Management Systems need to be installed for improving the compliance requirements of the boilers and gas systems and also to eliminate the unreliable relay logic systems
- Wagerup Powerhouse – an Alcoa internal failure report prepared in January 2006 identified a number of apparent weaknesses and areas for improvement in power system performance. Those matters have not yet been addressed, ongoing focus is required to further improve the power system reliability. It is recommended that the short comings and corrective items listed in the report are rectified and completed.

Summary observations and recommendations	
Recommendation 1 Powerhouse Asset Strategies be amended to: ▪ accommodate each of the 12 key processes in the asset management life-cycle ▪ refer to Alcoa WA Operations' existing asset planning and management processes and procedures, as they apply to powerhouse assets.	**Post Review Implementation Plan 1** The WAO Principal Mechanical Engineer will build the 12 key processes required for the Electricity Generation Licence compliance directly into Alcoa's asset planning and management processes and procedures. **Responsible Person:** WAO Principal Mechanical Engineer **Target Date:** 31 July 2009
Recommendation 2 The ongoing drive for further improvement in Alcoa's asset management strategies, documentation and systems be continued and completed through the development of finalised asset strategies for each powerhouse.	**Post Review Implementation Plan 2** The WAO Principal Mechanical Engineer will build the 12 key processes required for the Electricity Generation Licence compliance directly into Alcoa's asset planning and management processes and procedures. **Responsible Person:** WAO Principal Mechanical Engineer **Target Date:** 31 July 2009
Recommendation 3 Alcoa clearly prioritise those projects identified in Alcoa Powerhouse 5 year plans, which require attention from an electricity licence compliance perspective.	**Post Review Implementation Plan 3** The WAO Principal Mechanical Engineer will review the Alcoa Powerhouse 5 year plans, and clearly prioritise the projects in these plans with linkage to the electricity licence compliance requirements. **Responsible Person:** WAO Principal Mechanical Engineer **Target Date:** 31 July 2009

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 WA Operations business and strategic planning mechanism.*			
No	**Effectiveness Criteria**	**Effectiveness Rating**	**Findings**
1(a)	Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning	4. Quantitatively Controlled	Through discussion with the Senior Management Accountant and Principal Mechanical Engineer WAO Powerhouse we understand that at the business unit level (WA Operations), the Alcoa WA Operations business and strategic planning mechanism entails strategic business planning to develop long term strategic objectives with a three to five year horizon. Utilising the following key inputs and on an annual basis, WA Operations has developed three year operational plans: ▪ Alcoa Vision and Mission ▪ Alcoa corporate business goals ▪ strategic manufacturing analyses ▪ newly developed and emerging technologies. The WA Operations business unit plan is communicated to individual departments, including the WAO Powerhouse operations, enabling departments to develop an operational plan, which is fully aligned with the WA Operations plan.
1(b)	Service levels are defined	4. Quantitatively Controlled	This aspect of the asset planning function refers to the service levels of the relevant powerhouse assets. Rolling five year plans prepared for each of the Kwinana, Pinjarra and Wagerup facilities provide considerable detail for the planning aspects of the respective powerhouse assets, including production capacity/historical results, per Alcoa's operational requirements. Asset strategies (currently in draft form) for each of the Kwinana, Pinjarra and Wagerup facilities are also designed to specify the required service levels of the respective powerhouse assets.

No	Effectiveness Criteria	Effectiveness Rating	Findings
1(c)	Non-asset options (e.g. demand management) are considered	3. Well defined	Alcoa WA Operations' Request for Approval (**RFA**) template outlines the considerations for instigating new projects e.g. environmental considerations, asset alternatives, the approval history, financial and capital requirements, current state assessment and timeline. In relation to asset planning, when a powerhouse requires a new or upgraded asset, the RFA template is used to outline the options that can be undertaken, including possible non-asset options. Alcoa WA Operations' Expenditure Approval Policy and Procedures outline the requirement for project evaluations to be undertaken when a project is deemed to have measurable financial benefits to Alcoa's business. Alcoa uses a standard economic evaluation model for these evaluations, as well as a standard set of high level economic assumptions that are published on a quarterly basis. Through discussion with the Senior Management Accountant and consideration of Alcoa WA Operations' planning processes, we observed that it is a formal requirement for non-asset options to be 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.
1(d)	Lifecycle costs of owning and operating assets are assessed	3. Well defined	Assessments of lifecycle costs of owning and operating assets are undertaken as part of WA Operations' project evaluation mechanism. Through discussion with the Senior Management Accountant we understand that WA Operations 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 adequately addressed. Economic measures that are taken into account within WA Operations project evaluations are: ▪ internal rate of return ▪ undiscounted pay back period ▪ net present value. For those capital projects where the value is greater than A$1 million, the project evaluation is also required to show the impact of the project on individual locations (including powerhouses).
1(e)	Funding options are evaluated	3. Well defined	Through discussions with the Senior Management Accountant, we understand that the RFA template described at 1(c) above requires the sources of funds to be outlined as either Alcoa capital expenditure or partner share. The template breaks down the total of the capital expenditure requirements for establishing a new asset for submission to Alcoa for funds allocation.
1(f)	Costs are justified and cost drivers identified	3. Well defined	Through discussions with the Senior Management Accountant, we understand that the RFA template described at 1(c) above requires the costs and cost drivers (in the form of a business case) to be identified.

No	Effectiveness Criteria	Effectiveness Rating	Findings
1(g)	Likelihood and consequences of asset failure are predicted	4. Quantitatively Controlled	Through discussion with the Principal Mechanical Engineer WAO Powerhouse and review of relevant supporting documentation, we observed that Alcoa has applied the following mechanisms for identifying consequence and likelihood of powerhouse asset failure: ▪ asset integrity audits, which are completed on a five yearly basis. Audit findings are maintained in a database and tracked through to completion ▪ other audits (e.g. ASAT), which feed results into Alcoa's Business Improvement System. Similarly, audit findings are stored and tracked for completion ▪ 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. Inspection results are documented within record books and where deficiencies are noted the asset owner is notified. Notices which are not addressed are escalated to more senior managers for consideration and action. We obtained a number of inspection, audit and life assessment reports for each powerhouse.
1(h)	Plans are regularly reviewed and updated	4. Quantitatively Controlled	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and examination of asset strategies for Pinjarra, Wagerup and Kwinana Powerhouses, we observed that site level plans: ▪ are prepared on an annual basis ▪ provide a commentary on past successes and weaknesses, market trends, major expenditure, and the top five focus areas ▪ have been developed to ensure long term utilisation of the powerhouse assets and outline major equipment, customer, maintenance and environmental considerations.

2. Asset Creation/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.

No	Effectiveness Criteria	Effectiveness Rating	Findings
2(a)	Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions	3. Well defined	As described at 1(c) above, Alcoa's procedures address the requirement for: ▪ project evaluations to be undertaken for new assets ▪ formal consideration of non-asset options.
2(b)	Evaluations include all life-cycle costs	3. Well defined	Through discussion with the Principal Mechanical Engineer WAO Powerhouse and Senior Management Accountant and consideration of WAO project evaluation processes, we observed that: ▪ these project evaluations provide for estimates of the amount of investment required from the global organisation and Alcoa Australia: ▪ life-cycle costs are considered as part of the project evaluation process.
2(c)	Projects reflect sound engineering and business decisions	3. Well defined	As described at 1(d) above, Alcoa's procedures address the requirement for: ▪ project evaluations to be conducted with both engineering and finance personnel input to ensure all engineering, finance, environmental, H&S aspects are adequately addressed ▪ the impact of the project on individual locations to be assessed for those capital projects with a value greater than A$1 million.
2(d)	Commissioning tests are documented and completed	3. Well defined	Through discussions with the Principal Mechanical Engineer WAO Powerhouse and consideration of Alcoa's commissioning procedures, we observed that those 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.

No	Effectiveness Criteria	Effectiveness Rating	Findings
2(e)	Ongoing legal/ environmental/safety obligations of the asset owner are assigned and understood	4. Quantitatively Controlled	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 assessment and timeline. The Principal Mechanical Engineer WAO Powerhouse confirmed that the RFA template is applied on each occasion a facility plans for or requires a new or modified asset, including for Powerhouse operations. Alcoa's environmental obligations relevant to its WA Powerhouse operations are comprehensively identified and managed by the Environmental Team and recorded on an Environmental Obligations Register (for further detail of testing performed refer to process 4 below - Environmental Analysis). Alcoa's safety obligations relevant to its WA Powerhouse operations are rated as high risk areas within Alcoa's operations. We observed that considerable effort is made to address safety issues at the point of employee induction, through specific and ongoing training, formal assignment of responsibilities to supervisory staff within the three powerhouses and use of the Access Hazardous Materials Database. Powerhouse equipment is included in Alcoa's major hazard control and management systems. Alcoa's legal obligations relevant to its WA Powerhouse operations primarily relate to environmental and safety matters. Other legal obligations are specifically addressed either directly via Alcoa's in house legal council or with the assistance of external legal advisors.

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 26 June 2006 to 30 June 2008, Alcoa did not dispose of or decommission any major powerhouse plant, other than replacement of obsolete equipment.*			
No	**Effectiveness Criteria**	**Effectiveness Rating**	**Findings**
3(a)	Under-utilised and under-performing assets are identified as part of a regular systematic review process	3. Well defined	Through discussion with the Principal Mechanical Engineer WAO Powerhouse and review of relevant supporting documentation, we observed that Alcoa has applied the following mechanisms for identifying under-utilised and under-performing assets: ▪ asset integrity audits, which are completed on a five yearly basis in accordance with the Alcoa Worldwide Alumina Powerhouse & Plant Utilities Asset Integrity Assessment Protocol. Such audits are designed to determine whether major items of equipment continue to function adequately and where not, to offer recommendations for alternative action ▪ asset life assessments, which are completed on a systematic basis ▪ 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. Results of these assessments and inspections are included in the rolling 5 year plans established for each powerhouse.
3(b)	The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken	3. Well defined	Through the mechanisms detailed at 3(a) above, Alcoa collects relevant data and information to enable assessment of the root cause of any under utilisation or poor performance of powerhouse assets. Such assessments are then incorporated into the rolling 5 year plans established for each powerhouse, which detail the major projects planned for the coming financial year, including any equipment refurbishment, upgrade or replacement.
3(c)	Disposal alternatives are evaluated	3. Well defined	The Alcoa WAO Decommission Classified Plant protocol outlines the need to address alternatives for decommissioning, removal or storage of key powerhouse plant. The rolling 5 year plans established for each powerhouse detail the major projects planned for the coming financial year, including any equipment replacement requirements.
3(d)	There is a replacement strategy for assets	3. Well defined	Replacement strategies established for Alcoa's powerhouse assets are reflected in: ▪ rolling 5 year plans established for each powerhouse ▪ powerhouse asset strategies (Pinjarra only – strategies for Wagerup and Kwinana remain under construction).

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.*			
No	**Effectiveness Criteria**	**Effectiveness Rating**	**Findings**
4(a)	Opportunities and threats in the system environment are assessed	5. Continuously improving	Alcoa has developed an aspects and impacts register to record the following aspects of powerhouse operations: ▪ the process (e.g. boiler) ▪ the activity (e.g. generation of steam) ▪ environmental aspect of operations (e.g. using gas, using large turbines) ▪ environmental impact of operations (e.g. noise, depletion of a finite resource) ▪ environmental materials ▪ emergency potential (either Yes or No) ▪ risk rating with and without controls ▪ corrective action plan ▪ responsible person ▪ due date. Through discussion with the Environmental Manager and examination of the Aspects and Impacts Register, we observed that: ▪ the register indentifies all activities of the powerhouse and associated risks. The risks are then assessed by the Environmental Team, located at Pinjarra. This assessment leads to a focused plan for monitoring circumstances, which is reviewed annually ▪ risks and potential incidents can be logged by any employee onto the 'environmental incident' system, then assessed by the Environmental Team.
4(b)	Performance standards (availability of service, capacity, continuity, emergency response, etc) are measured and achieved	5. Continuously improving	The Environmental Manager advised that Alcoa has engaged a third party consulting firm that assesses sites emissions against expected performance. We observed that Alcoa's ASAT tool is used to assist in assessing performance, by outlining specific areas that are to be audited and tested.

No	Effectiveness Criteria	Effectiveness Rating	Findings
4(c)	Compliance with statutory and regulatory requirements	5. Continuously improving	Alcoa has established the procedure "Evaluation of Compliance with Environmental Legislation and Regulations (WAO)", which describes the process for periodically evaluating compliance with relevant environmental legislation and regulations. Alcoa has engaged 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. We observed that because Alcoa has attained the ISO-14001 standard, it 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 ▪ external audit. For Alcoa to maintain its ISO status, it is required to be re-certified every three years via a full audit. The last full audit was conducted in 2007. A surveillance audit/monitoring action is also completed every year ▪ ASAT (as described above). 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 ▪ noise: The Environmental Noise Regulations licence specifies that the noise level as measured at the boundary must not exceed 35 dbA at night and somewhat higher during the day ▪ 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.
4(d)	Achievement of customer service levels	3. Well defined	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.

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.

Key powerhouse electrical and mechanical systems have been documented, with procedures in place to describe the operations of key pieces of equipment.

Key equipment such as the boiler feed water pumps, turbines, generators and transformers are condition monitored.

Mechanical, electrical and control protection systems and major equipment are maintained as per statutory requirements.

We also observed the following specific matters at the respective Powerhouses:

Pinjarra
- an Asset Strategy has been developed for the Pinjarra Powerhouse
- the Wagerup Powerhouse load system change methodologies are being considered for implementation at the Pinjarra Powerhouse. This matter is addressed in the WA Powerhouse Asset strategy, however we are advised that no recent incidents are driving this change.

Wagerup
- Wagerup Powerhouse condition monitoring shows generator degradation, with a detailed life extension plan to be formulated for the next 2 years
- power distribution asset management strategies are not documented for the Wagerup Powerhouse. This matter is listed as a current item on the WAO Distribution Infrastructure Focus A3 (revised July 2008) and is planned for completion in Q2 09
- the reliability of the power system at Wagerup was questioned in the Alcoa failure report dated January 2006. In response to this failure report, a number of corrective actions were identified. WAO Power Distribution Infrastructure Focus A3 (revised July 2008) lists a number of completed actions and further development of asset management strategies planned to be implemented.

Kwinana
- the Kwinana Powerhouse is currently generating at full capacity. The Kwinana Refinery is a net importer of power from the SWIS when any TAs are out of service. A strategy to support the refinery's future load growth is required. Currently, a new 20MW TA and/or a second new tie to the SWIS is under consideration in the 5 year plan
- power distribution asset management strategies are not documented for the Wagerup Powerhouse. This matter is listed as a current item on the WAO Distribution Infrastructure Focus A3 (revised July 2008) and is planned for completion in Q2 09
- strategy development to ensure long term (30 years) life of TAs is underway but needs to be finalised.

No	Effectiveness Criteria	Effectiveness Rating	Findings
5(a)	Operational policies and procedures are documented and linked to service levels required	4. Quantitatively Controlled	We observed that policies and procedures for the operation of powerhouse equipment for each of the three powerhouses are comprehensively documented within the Alcoa WAO Performance Support System. Where relevant, procedures specifically refer to required service levels for the operation of the specific item of equipment, or specific electrical or mechanical procedure. We also observed that control plans exist for major items of plant, including boilers, generators and the deaerator for each of the three powerhouses.
5(b)	Risk management is applied to prioritise operations tasks	4. Quantitatively Controlled	Alcoa uses well documented, risk based processes to manage its powerhouse assets, with the sequence of maintenance task priorities being people & safety first, followed by environment, then customer. These processes are further described at "8. Risk Management" below.
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	3. Well defined	Alcoa's equipment is managed via its online Alcoa wide electronic asset maintenance system, eAM. The eAM system contains: ▪ unique asset identification (asset id) ▪ equipment details (including type, location, components, operational capacity, age, expected life) ▪ equipment history, including condition ▪ maintenance procedures ▪ maintenance intervals ▪ purchase cost, depreciation rates and net book value. We also observed that all powerhouse electrical and mechanical systems are documented, supporting drawings have been maintained and procedures are in place to describe the operations of key equipment.
5(d)	Operational costs are measured and monitored	3. Well defined	Through discussion with the Senior Management Accountant and examination of Expense Control Reports, we observed that those reports: ▪ are produced on a monthly basis for each site ▪ specifically assess powerhouse actual v budgeted expenditure ▪ identify cost centres that are over budget or problematic, assisting management to monitor areas that are not tracking as expected.
5(e)	Staff receive training commensurate with their responsibilities	4. Quantitatively Controlled	Alcoa has launched a WAO Operator Traineeship Program to ensure its powerhouse operators are fully trained in all key aspects of powerhouse operations (relevant to each individual's position). We observed the use of staff training registers maintained by powerhouse supervisors to keep training and operator tickets of all staff valid and relevant to their responsibilities.

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 powerhouses' mechanical, electrical and control protection systems and major equipment, in line with the asset management strategies employed across the WA Operations business.

Alcoa's eAM system is designed to facilitate its asset maintenance strategies and compliance with statutory requirements.

No	Effectiveness Criteria	Effectiveness Rating	Findings
6(a)	Maintenance policies and procedures are documented and linked to service levels required	4. Quantitatively Controlled	We observed that policies and procedures for the operation and maintenance of powerhouse equipment for each of the three Powerhouses are comprehensively documented within the Alcoa WAO Performance Support System. Where relevant, procedures specifically refer to required service levels for the operation of the specific item of equipment, or specific electrical or mechanical procedure. Alcoa's eAM system contains maintenance procedures, equipment details, maintenance intervals, costs and history. We note that Alcoa Wagerup's 5 Year Plan highlights an increased focus on Autonomous Maintenance to drive improvement in equipment reliability.
6(b)	Regular inspections are undertaken of asset performance and condition	4. Quantitatively Controlled	Through discussion with powerhouse staff and examination of written procedures and reports, we observed that for each Powerhouse: ▪ a structured program is in place for key mechanical and electrical assets (such as turbines, feedwater pumps, transformers, generators, switchgear) to be condition monitored using online vibration monitoring devices and for earthing systems and protection relays to be regularly tested (including partial discharge) to avoid unplanned outages or failures ▪ equipment assessment and inspection reports (e.g. Wagerup Powerhouse Header Integrity inspections and Boiler inspections) are generated and made available to staff and management requiring information on equipment condition and performance.
6(c)	Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule	3. Well defined	Through discussion with WAO Powerhouse Operations staff and examination of Alcoa's eAM system, we observed that: ▪ for each powerhouse asset the eAM system contains plans for scheduled maintenance as well as required emergency and corrective works ▪ 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 impact on refinery production ▪ maintenance schedules are monitored.

No	Effectiveness Criteria	Effectiveness Rating	Findings
6(d)	Failures are analysed and operational/ maintenance plans adjusted where necessary	4. Quantitatively Controlled	Through discussion with WAO Powerhouse Operations staff and walkthrough testing of Alcoa WAO Powerhouse operations and maintenance procedures, we observed that: ▪ the following failures were experienced during the period of review - Pinjarra Powerhouse – significant boiler superheater tube failure - Pinjarra Powerhouse - two major electrical incidents - Wagerup Powerhouse - three major electrical incidents - Kwinana Powerhouse - significant boiler failure. ▪ for each failure, an investigation was undertaken and an associated report prepared ▪ in the case of the boiler failures, root cause analyses were undertaken to investigate causes of failure and corrective action taken to overcome any future faults of similar nature ▪ in the case of the electrical incidents, repairs had been carried out and systems modified/corrected (or there is ongoing work to identify improvements) such that the faults would not be repeated.
6(e)	Risk management is applied to prioritise maintenance tasks	4. Quantitatively Controlled	Through discussion with WAO Powerhouse Operations staff and the Assistant Risk Manager and examination/walkthrough testing of the WAO Process Maintenance Risk Assessment procedure, we observed that Alcoa has applied its documented risk management techniques for quantitatively assessing operational and maintenance activities and for prioritising expenditure in line with Alcoa's business and strategic plans. We also observed that Alcoa's WAO Powerhouse 5 year Plans address maintenance priorities.
6(f)	Maintenance costs are measured and monitored	3. Well defined	Through discussion with the Senior Management Accountant and examination of example Expense Control Reports, we observed that those reports: ▪ are produced on a monthly basis for each site ▪ specifically assess powerhouse actual v budgeted expenditure ▪ identify cost centres that are over budget or problematic, assisting management to monitor areas that are not tracking as expected. We also observed that maintenance costs are recorded in the eAM system.

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	Effectiveness Rating	Findings
7(a)	Adequate system documentation for users and IT operators	4. Quantitatively Controlled	The Service Delivery for Unix and Oracle System Team Leader described that the 'Manage Work Request' and 'System Support Role Definitions' procedures specify that technical support documentation is the responsibility of the Project Leader or the Change Implementer, while user guides are kept up to date by the Functional Support Representative and Key Users. All documents are stored in the Alcoa Performance Support System (APSS) to provide document version control.
7(b)	Input controls include appropriate verification and validation of data entered into the system	4. Quantitatively Controlled	Via discussion with the Regional IPS Security and Risk Manager and examination of ASAT documents, we observed that: ▪ input controls are managed through built-in controls in Oracle 11i and manual processes. The eAM system is part of the Oracle E-Business Suite (**EBS**) ▪ 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.
7(c)	Logical security access controls appear adequate, such as passwords	4. Quantitatively Controlled	Via discussion with the Regional IPS Security and Risk Manager and examination of Alcoa's Security Standards documents, we observed that: ▪ Alcoa's processes and procedures provide for all users to be assigned a unique user account and passwords that adhere to Alcoa's Security Standards. The password requirements for Windows are specified in the Security Access Account Management document. Passwords for the Oracle environment, to which eAM belongs, is synchronised to the Windows environment by using the Password Courion tool ▪ policies in relation to managing user access permission are documented in Security Access Permission. User access permission is reviewed at least once a year.

No	Effectiveness Criteria	Effectiveness Rating	Findings
7(d)	Physical security access controls appear adequate	3. Well defined	Via discussion with the Regional IPS Security and Risk Manager and inspection of the Alcoa Data Centre (located in Booragoon), we observed that the physical security access controls established for the Alcoa Data Centre appear to be adequate, with swipe card access required and entrance overseen by IT staff during work hours. We 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 to avoid suppression release, is installed for the room and is connected to the main building control panel. Consideration has also been given to the use of a gas based fire suppression system to minimise damage to electrical equipment in the data centre, with a determination made by the business that it is not cost effective to install such a fire suppression system.
7(e)	Data backup procedures appear adequate	4. Quantitatively Controlled	Via discussion with the Unix Administrator for the EBS System and consideration of the 'EBS Backups for all Environments Overview' documents, we observed that Alcoa's backup process involves: ▪ full daily back ups of production data ▪ EBS data, which includes eAM, being mirrored to another set of disks using Crontab, before transferring to backup tapes overnight ▪ backup tapes being picked up and stored off-site at Recall. We also sighted evidence of the backup jobs in Crontab and Netbackup, the backup log showing completion of the backup job and backup tapes maintained in a secured store room.
7(f)	Key computations related to licensee performance reporting are materially accurate	Not rated	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.
7(g)	Management reports appear adequate for the licensee to monitor licence obligations	2. Planned and tracked	To date, Alcoa's monitoring of its licence obligations has been limited to annual compliance and performance reports to the Authority. This asset management system review and the recent performance/compliance audit undertaken by Deloitte provide further understanding of Alcoa's licence obligations. While Alcoa's existing operational and management reporting structure and processes are designed to enable Alcoa to monitor its ongoing business performance, its electricity generation licence obligations are not explicitly accommodated in those reporting structure and processes. From discussions with the Audit Manager, we also observed that licence obligations do not form part of the ASAT internal audit tool.

No	Effectiveness Criteria	Effectiveness Rating	Findings	
	Recommendation 4 (a) Establish a mechanism, which enables Alcoa to effectively and continuously monitor its performance against Licence obligations. (b) Consider incorporating licence obligations and asset effectiveness indicators into ASAT.		**Post Review Implementation Plan 4** The Procurement Specialist – Energy and Principal Mechanical Engineer WAO Powerhouse in conjunction with the Audit Manager will develop an ASAT to ensure that licence obligations form part of the powerhouse strategy. This ASAT will be continually monitored and reviewed. This ASAT will be completed annually to meet this end. **Responsible Person:** Procurement Specialist - Energy **Target Date:** 31 July 2009	

8. Risk Management			
Key process: Risk management involves the identification of risks and their management within an acceptable level of risk. **Expected outcome from asset planning strategies:** 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 it powerhouse assets, with the sequence of maintenance task priorities being people & safety as the highest followed by environment, then customer.*			
No	**Effectiveness Criteria**	**Effectiveness Rating**	**Findings**
8(a)	Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system	4. Quantitatively Controlled	Via discussion with the Assistant Risk Manager and consideration of Alcoa's risk management framework and supporting documents, we observed the following: ▪ *Risk Management Policy* - Alcoa models its policies against the Australian/New Zealand Risk Management Standard AS/NZS 4360:2004. The policy outlines the criteria for risk assessments and the steps in the risk management process. ▪ *Alcoa Risk Management Policy Vision* – Alcoa's stated vision is to integrate world's best practice in risk management to support and enhance business activities in all areas of its operations. Within the application of the Alcoa Business System, Alcoa intends to ensure risk management is a fundamental aspect of its decision-making processes. ▪ *Delegation of responsibilities* - Risk Management is the overall responsibility of the Corporate Risk Manager and the Assistant Risk Manager. 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). The Major Hazard SPA 'Letter of Appointment' templates were provided, each of which outlines the key responsibilities of each position. We observed evidence of these risk management activities being applied to WAO Powerhouse planning and management activities (refer to other observations made throughout this report).
8(b)	Risks are documented in a risk register and treatment plans are actioned and monitored	4. Quantitatively Controlled	Via discussion with the Assistant Risk Manager and examination of supporting documents, we observed that 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. Those recommendation summaries are compiled to represent a live risk register for each site, with the recommendation status expected to be reviewed and updated every three to four months.

No	Effectiveness Criteria	Effectiveness Rating	Findings
8(c)	The probability and consequences of asset failure are regularly assessed	4. Quantitatively Controlled	As detailed at item 1(g) above, we observed that Alcoa has applied the following mechanisms for identifying and assessing consequence and probability of powerhouse asset failure: ▪ asset integrity audits, which are completed on a five yearly basis, per the Powerhouse & Plant Utilities Asset Integrity Assessment Protocol ▪ other audits (e.g. ASAT), which feed results into Alcoa's Business Improvement System ▪ 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.

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 to the SWIS. 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. There is a potential loss of about 20MW generation on the external grid.

No	Effectiveness Criteria	Effectiveness Rating	Findings
9(a)	Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	3. Well-defined	Through discussion with the Principal Mechanical Engineer WAO Powerhouse and Assistant Risk Manager and review of relevant supporting documentation, we observed that: ▪ as part of Alcoa's overall business continuity management framework, Alcoa has developed a series of system recovery plans, including black/brown start procedures for each powerhouse, in the event of a major failure of site assets or key systems. The primary intent of these plans is to minimise the interruption to Alcoa's refinery operations ▪ system recovery plans are subject to a detailed review when triggered by a major equipment change or reconfiguration, and otherwise subject to high level review through the bi-annual Loss Prevention inspection process. Where relevant and possible, system recovery plans are subject to testing in accordance with timeframes specified in the relevant plan ▪ Alcoa's powerhouse workforce is specifically resourced and trained to respond to powerhouse equipment losses, to minimise the interruption to Alcoa's refinery operations ▪ equipment redundancy (multiple boilers, TAs, compressors etc.) is built into powerhouse operations. We also noted the specific consideration given to relocating a redundant boiler from the Pinjarra Powerhouse to the Kwinana Powerhouse, plus sourcing steam from alternative sources. While Alcoa's system recovery plans and procedures, equipment redundancy and workforce capabilities each contribute to Alcoa's business continuity objectives, they have not been collectively documented to explicitly capture Alcoa's contingency planning strategies and practices in the event of unexpected and unrecoverable failure of a powerhouse asset.

Recommendation 5

(a) Formally document existing contingency planning strategies and practices in the event of unexpected and unrecoverable powerhouse asset failure. Where appropriate, powerhouse and site specific contingency plans should be developed and documented.
(b) Implement a review and where appropriate, testing strategy for all system recovery and contingency plans.
(c) Assign roles and responsibilities for reviewing, testing and implementing contingency plans.

Post Review Implementation Plan 5

The WAO Principal Mechanical Engineer will ensure:

a) documentation exists defining our contingency planning strategies and that this documentation is captured in the Alcoa document storage system
b) a process is in place to annually review the aforementioned contingency plans and keep these current.
c) the people responsible for these reviews of contingency plans are assigned and documented.

Responsible Person: WAO Principal Mechanical Engineer
Target Date: 31 July 2009

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: 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.

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

No	Effectiveness Criteria	Effectiveness Rating	Findings
10(a)	The financial plan states the financial objectives and strategies and actions to achieve the objectives	4. Quantitatively Controlled	Through discussion with the Senior Management Accountant and consideration of Alcoa WA Operations' 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 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 and 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.
10(b)	The financial plan identifies the source of funds for capital expenditure and recurrent costs	4. Quantitatively Controlled	Through discussion with the Senior Management Accountant and consideration of Alcoa WA Operations' financial planning mechanisms, we observed that: ▪ any application for funds made by Alcoa WA Operations are 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.
10(c)	The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets)	4. Quantitatively Controlled	Through discussion with the Senior Management Accountant and consideration of Alcoa WA Operations' financial planning mechanisms, we observed that: ▪ although projections of operating statements and statement of financial position do not occur at powerhouse level, those projections take account of powerhouse operations as part of the entire WA Operations business projections ▪ 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.

No	Effectiveness Criteria	Effectiveness Rating	Findings
10(d)	The financial plan provides firm predictions on income for the next five years and reasonable indicative predictions beyond this period	4. Quantitatively Controlled	Through discussion with the Senior Management Accountant and consideration of Alcoa WA Operations' financial planning mechanisms, we observed that: ▪ two year financial plans are developed at a high level ▪ capital funding plans are developed for periods of up to 10 years. We note that Alcoa's powerhouse operations generate little direct income as their primary objective is to support refinery operations.
10(e)	The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services	4. Quantitatively Controlled	Through discussion with the Senior Management Accountant and Principal Mechanical Engineer WAO Powerhouse, we observed that: ▪ each powerhouse is required to submit a plan that covers labour requirements, maintenance requirements and other operational costs ▪ the maintenance plan is determined based on scheduled work for major items plus base workload. The data is sourced from the maintenance system and with reference to the five year plan for each powerhouse ▪ plans also take account of required powerhouse output to support the refinery i.e. required levels of steam and electric power generation.
10(f)	Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary	4. Quantitatively Controlled	Through discussion with the Senior Management Accountant and Principal Mechanical Engineer WAO Powerhouse and examination of example Expense Control Reports and Operational and Maintenance Cost Reports, we observed that: ▪ operational and maintenance cost reports are produced on a daily basis ▪ Expense Control Reports 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 meet 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.

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.

No	Effectiveness Criteria	Effectiveness Rating	Findings
11(a)	There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates	4. Quantitatively Controlled	Via discussion with the Senior Management Accountant and WAO Capital Program Manager and consideration of Alcoa WA Operations' capital expenditure planning mechanisms, we observed that: ▪ the Alcoa global organisation prepares rolling 3 year and 10 year capital plans that are reviewed by all levels of regional management to enable an annual allocation of funds ▪ all projects above A$250k are specifically identified and a justification is required. As projects are identified by location, responsibilities for progression are clear. As part of a project's justification, there is linkage to the location's and region's strategic plan, which includes asset replacement and cost reduction strategies.
11(b)	The plan provides reasons for capital expenditure and timing of expenditure	4. Quantitatively Controlled	As described at 11(a) above, we observed that: ▪ all projects above A$250k are specifically identified and a justification is required ▪ as part of a project's justification, there is linkage to the location's and region's strategic plan. As described at 1(c) above, we observed that Alcoa WA Operations': ▪ RFA template and procedures outlines the considerations for instigating new projects e.g. environmental considerations, asset alternatives, the approval history, financial and capital requirements, current state assessment and timeline ▪ Expenditure Approval Policy and Procedures outlines the requirement for project evaluations to be undertaken when a project is deemed to have measurable financial benefits to Alcoa's business. Alcoa uses a standard economic evaluation model for these evaluations, as well as a standard set of high level economic assumptions that are published on a quarterly basis.

No	Effectiveness Criteria	Effectiveness Rating	Findings
11(c)	The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan	3. Well-defined	As described at 1(d) above, Alcoa's procedures address the requirement for life cycle costs of powerhouse assets to be assessed and recorded in formal project evaluations. As described at 2(b) above, Alcoa's procedures address the requirement for investment and capital expenditure estimates to be calculated and disclosed within the project evaluation phase. As described at 11(a) above, 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.
11(d)	There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned	4. Quantitatively Controlled	Via discussion with the Senior Management Accountant and WAO Capital Program Manager and consideration of Alcoa WA Operations' capital expenditure planning mechanisms, we observed that the capital planning process is mature, involving the following activities: ▪ each year (and on a project by project basis), the capital plan is reviewed to ensure its alignment with current business and strategic plans ▪ on a monthly basis, regional management review the progress of their capital program, with updated forecast to project and year end ▪ when projects are completed they are reviewed against the approved criteria to test whether the project objectives were met. The WAO Capital Program Manager provided a diagrammatical process flow of the capital planning process.

12. Review of AMS

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.

No	Effectiveness Criteria	Effectiveness Rating	Findings
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	2. Planned and tracked	Asset management processes are centralised in the Financial Shared Services (**FSS**) group for all Alcoa Australian locations. The FSS group covers asset creation, inventory, retirement and the fixed assets system reconciliation processes, which are subject to annual audit and Sarbanes-Oxley (**SOX**) review by a combined team of Alcoa Internal Audit and PwC SOX auditors. Prior to each audit, Alcoa works with each function to determine a risk rating for each ASAT objective. The risk rating indicates the depth of review that will be performed during the audit. A formal process has not been established for reviewing Alcoa's powerhouse asset management plans and strategies independent of broader Alcoa systems and in the context of Licence requirements.
12(b)	Independent reviews (e.g. internal audit) are performed of the asset management system	1. Performed informally	Alcoa's existing auditing and review processes as described at 12 (a) above do not specifically address Powerhouse licence obligations or the related asset management systems.

Recommendation 6

(a) Develop and implement a structured review program, which explicitly accommodates Alcoa's powerhouse asset management systems.

(b) Consideration be given to:

- incorporating Licence obligations into ASAT so that they become part of a regular review process
- conducting an independent review of the contractual arrangement between Alcoa and Western Power.

Post Review Implementation Plan 6

The Procurement Specialist – Energy and Principal Mechanical Engineer WAO Powerhouse in conjunction with the Audit Manager will develop an ASAT to comply with Licence requirements to review and keep current Asset Management Plans and to assess the adequacy of arrangements between Alcoa and Western Power. This ASAT will be completed annually to meet this end.

Responsible Person: Procurement Specialist - Energy

Target Date: 31 July 2009

Appendix A – Review plan

Alcoa of Australia Ltd

2008 Performance Audit and Asset Management System Review - Electricity Generation Licence EGL14

Audit and Review Plan

17 September 2008

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Contents

Introduction

Overview

The Economic Regulation Authority (**the Authority**) has issued Alcoa of Australia Ltd (**Alcoa**) an electricity generation licence (**the Licence)** pursuant to the provisions of the Electricity Act 2004 **(the Act)**. Alcoa is required by the Authority to provide an audit report on its performance pursuant to Section 37 of the Act every 24 months.

Sections 13 and 14 of the Act requires Alcoa to provide the Authority with a performance audit (**the audit**) and asset management system review (**the review**) conducted by an independent expert acceptable to the Authority. Deloitte Touche Tohmatsu (**Deloitte**) is the nominated auditor approved by the Authority for both the audit and review. Deloitte has engaged Maunsell Australia Pty Ltd (**Maunsell**) to provide advice where technical expertise is required.

This plan is prepared in accordance with the Authority's *Audit Guidelines: Electricity, Gas and Water Licences* (**Audit Guidelines**), which describes the expected scope of work and conduct of the audit and review to be approved by Deloitte, Alcoa and the ERA.

In accordance with the Audit Guidelines the document represents the Audit and Review Plan that is to be agreed upon by Deloitte and Alcoa and presented to the Authority for approval prior to the commencement of work.

The period of audit and review is 26 June 2006 to 30 June 2008.

Objectives

The objectives of the performance audit and asset management system review are derived from the Act. The following sections of the Act define the requirements of the licensee:

- section 13(1) of the Act requires Alcoa to provide the Authority with a performance audit conducted by an independent expert acceptable to the Authority. The performance audit is defined as an examination of the measures taken by Alcoa to meet the criteria specified in its Generation Licence.
- section 14(1)(c) of the Act requires Alcoa to provide the Authority with a report by an independent expert acceptable to the Authority as to the effectiveness of the respective asset management systems established for assets subject to its licence.

The audit and review is designed to provide reasonable assurance, meaning that the information is free from material misstatement. The examination will specifically consider the following:

a) process compliance: the effectiveness of systems and procedures in place throughout the audit period, including assessing the adequacy of internal controls

b) outcome compliance: the actual performance against standards prescribed in the licence throughout the audit period

c) output compliance: the existence of the output from systems and procedures throughout the audit period (that is, proper records exist to provide assurance that procedures are being consistently followed and controls are being maintained).

d) integrity of performance: the completeness and accuracy of the performance reporting to the Authority.

e) compliance with any individual licence conditions: the requirements imposed on the specific licensee by the Authority or specific issues for follow-up that are advised by the Authority

Scope

Performance audit

Section 13(2) of the Act states that "A performance audit is an audit of the effectiveness of measures taken by the licensee to meet the performance criteria specified in the Licence".

Performance criteria is further defined in the Licence to mean:

- the terms and conditions of the Licence
- any other relevant matter in connection with the applicable legislation that the Authority determines should form part of the performance audit.

Applicable legislation encompasses the following:

1. the *Electricity Industry Act 2004 (WA).*
2. the following Regulations:
    a. *Electricity Industry (Code of Conduct) Regulations 2005*
    b. *Electricity Industry (Licence Conditions) Regulations 2005*
    c. *Electricity Industry (Licensing Fees) Regulations 2005*
    d. *Electricity Industry (Obligation to Connect) Regulations 2005*
    e. *Electricity Industry (Ombudsman) Regulations 2005*
3. the following Codes:
    a. *Electricity Industry Metering Code 2004*
    b. *Reliability and Quality of Supply Code 2005*

The Authority's *Electricity Compliance Reporting Manual* (**Reporting Manual**) provides further guidance on those aspects of the Licence and Alcoa's performance criteria, which the Authority expects to be reported and included in the scope of the performance audit.

The Reporting Manual was revised in March 2008, primarily to accommodate a revision of the Code of Conduct (for the Supply of Electricity to Small Use Customers), effective from 8 January 2008. This revision has little impact on the scope of work required for Alcoa's generation licence audit, with the majority of revision affecting retail licence obligations.

The audit period is 26 June 2006 to 30 June 2008.

Asset Management System Review

Section 14(1)(c) of the Act requires Alcoa to provide the Authority with a report reviewing the effectiveness of the respective asset management systems established for assets subject to its licence. In particular, there are 12 requirements that are to be reported against:

1. asset planning
2. asset creation and acquisition
3. asset disposal
4. environmental analysis (all external factors that affect the system)
5. asset operations
6. asset maintenance
7. asset management information system
8. risk management
9. contingency planning
10. financial planning
11. capital expenditure planning
12. review of Asset Management System

The Authority's Audit Guidelines provide further guidance on those aspects of the asset management system and Alcoa's performance criteria, which the Authority expects to be reported and included in the scope of the review.

Approach

The audit and review will be conducted in three distinct phases, these being a risk assessment, system analysis and testing & review. From the results, a report will be produced to outline findings, overall compliance assessments and recommendations for improvement. Each step of the audit and review is discussed in detail below.

Risk assessment

The audit and review will focus on identifying or assessing those activities and management control systems to be examined and the matters subject to audit. 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 level of risk and materiality of the process will determine the level of audit required e.g. the greater the materiality and the higher the risk, the more effort will be applied.

The table presented below outlines the first step in assessing the risk using the ratings indicated within the Authority's audit guidelines. The inherent risk rating is a 3-point matrix which provides an assessment of the consequence and likelihood of relevant risk events (**Table 1**).

Table 1: Inherent risk rating

Inherent Risk Rating			
Likelihood	Consequence		
	Minor/Tolerable	Moderate	Major
Likely	Medium	High	High
Probable	Low	Medium	High
Unlikely	Low	Medium	High

Each licence obligation is allocated a classification rating by the Authority, which results in a standard consequence risk rating (**Table 2**).

Table 2: Risk Types and Classification

Source: Electricity Compliance Reporting Manual March 2008

Rating	Classification of Non-Compliance	Criteria for classification
1	Major	Classified on the basis that: ▪ the consequences of non-compliance would cause major damage, loss or disruption to customers; or ▪ the consequences of non-compliance would endanger or threaten to endanger the safety or health of a person.
2	Moderate	Classified on the basis that: ▪ the consequences of non-compliance impact the efficiency and effectiveness of the licensee's operations or service provision but do not cause major damage, loss or disruption to customers; or ▪ the regulatory obligation is not otherwise classified as a Type 1 or a Type NR non-compliance.
NR	Minor	Classified on the basis that: ▪ the consequences of non-compliance are relatively minor – i.e. non-compliance will have minimal impact on the licensee's operations or service provision and do not cause damage, loss or disruption to customers; or ▪ compliance with the obligation is immeasurable; or ▪ the non-compliance is required to be reported to the Regulator under another instrument, guideline or code 6; or ▪ the non-compliance is identified by a party other than the licensee ; or ▪ the licensee only needs to use its reasonable endeavours or best endeavours to achieve compliance or where the obligation does not otherwise impose a firm obligation on the licensee. Reclassification of Type NR as a Type 2 may occur in circumstances of: ▪ systemic non-compliance; or ▪ a failure to resolve non-compliance promptly.

Once the level of inherent risk has been determined, the adequacy of existing controls is to be determined. Controls will be assessed and prioritised as high, medium or low in order of their suitability to mitigate the risks identified previously. This will give a level of control risk.

Once assessed, this enables the audit priority to be determined (**Table 3**). Essentially, the higher the level of risk the more substantive the audit testing becomes.

Table 3: Assessment of Audit Priority

Inherent Risk	Control Risk		
	High (weak controls)	Medium	Low (strong controls)
High	Audit Priority 1	Audit Priority 2	
Medium	Audit Priority 3	Audit Priority 4	
Low	Audit Priority 5		

The risk assessment has been discussed with stakeholders to gain their input as to the appropriateness of the comments, such as any factual inaccuracies, and for comment on the ratings. 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 assessments for both the performance assessment and asset management system review are preliminary drafts, not a final report, and no reliance should be placed upon their findings; they are attached at **Appendix A** and **Appendix B** respectively. It is however an invaluable tool for focussing the audit effort.

The following table outlines the audit requirement for each level of audit priority. The 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: Audit Priority Table

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

System analysis

The systems analysis required will be determined utilising the aforementioned audit priority scale. Once the priority level has been defined the testing component will take place by way of interviewing key operational and administrative staff who will outline information that display compliance with the licence. Where required, an observation of processes, procedures and operations and review of key documents will occur to assist in the determination of Alcoa's compliance with Licence obligations.

Testing and review

Using the results of the risk assessment and systems analysis, detailed testing and analysis will be performed to compare those standards maintained by Alcoa with the relevant sections and schedules of the Licence. In assessing the extent of compliance, we will consider the following:

- the control environment: Alcoa's management philosophy and operating style, organisational structure, assignment of authority and responsibilities, the use of internal audit, the use of information technology and the skills and experience of the key staff members.
- information systems: the appropriateness of Alcoa's information systems to record the information needed to comply with the licence, the accuracy of data, the security of data and documentation describing the information system.
- control procedures: the presence of systems and procedures to ensure compliance with the licence, effectiveness of the licensee's internal control structure to detect and correct non-compliance.
- compliance attitude: the action taken by Alcoa in response to any previous audit/review recommendations.

In circumstances where the population of relevant transactions to be tested are large, sampling techniques will be utilised to provide adequate assurance that test results are representative of Alcoa's operations.

To aid the testing, Deloitte have engaged the expertise of Maunsell for assistance with the asset management system review. Maunsell will be particularly involved in the environmental analysis, asset maintenance and asset operation requirements of the asset management system.

Separate work programs for the audit and review, designed to direct and record the specific aspects of our testing and analyses for each licence obligation, have been developed and should be read in conjunction with this audit plan.

Reporting

In accordance with the Audit Guidelines, all aspects of compliance with the Licence will be assessed according to the two rating scales based on the work performed. The first table below is for the licence obligations, (**table 5**) and the second for asset management effectiveness (**table 6**).

Table 5: Operational/performance compliance rating scale

Name	Rating	Description
Compliant	5	Compliant with no further action required to maintain compliance
Compliant	4	Compliant apart from minor or immaterial recommendations to improve the strength of internal controls to maintain compliance
Compliant	3	Compliant with major or material recommendations to improve the strength of internal controls to maintain compliance
Non-compliant	2	Does not meet minimum requirements
Significantly non-compliant	1	Significant weaknesses and/or serious action required

Table 6: Asset management review effectiveness rating scale

Effectiveness	Rating	Description
Continuously improving	5	Continuously improving organisation capability and process effectiveness
Quantitatively controlled	4	Measurable performance goals established and monitored
Well-defined	3	Standard processes documented, performed and coordinated
Planned and tracked	2	Performance is planned, supervised, verified and tracked
Performed informally	1	Base practices are performed
Not performed	0	Not performed (indicate if not applicable)

The performance audit report will also be structured to address all key components expected by the Audit Guidelines, including tabulation of risk ratings and the overall compliance rating for each licence condition and key asset management system function.

General Information

All aspects of the audit and 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. We will endeavour to complete these procedures as readily as possible.

Key Contacts

The key contacts for this audit are:

- Nick Eaton — Procurement Specialist - Energy
- Richard Le Tessier — Principal Mechanical Engineer WAO Powerhouse
- Debbie May — Senior Management Accountant WA Operations
- Ian Lockley — Environmental Manager Pinjarra
- Catherine Chappell — Audit Manager
- Steve Hopkinson — Metering

Staffing

Deloitte staff that will be involved with this assignment are:

- Richard Thomas — Partner
- Andrew Baldwin — Account Director
- Sebastian Diedrichs — Manager
- Shaun Sia — Manager (IT)
- Ben Fountain — Analyst
- Matt Thomson — Partner, Energy Advisory Group (Quality Assurance Review)

Maunsell staff involved in the asset management system review will be:

- Stephen Brown — Business Unit Leader – Electrical
- Tanuja Sanders — Project Manager (Mechanical)
- Keith Gilby — Distribution Services Manager (advisory role)

Timing

The initial risk assessment phase was completed on 22 August 2008. The draft audit plan and detailed work plan were submitted on 3 September 2008.

The remainder of the fieldwork phase is scheduled to be performed in September 2008.

Appendices

Appendix	
A	Performance audit risk assessment
B	Asset management system review risk assessment

Appendix A - Performance audit risk assessment

Licence Conditions				Risk Assessment				
No	Obligations under Condition	Description	Type	Consequence	Likelihood	Inherent Risk	Control Risk	Audit Risk/Priority
10 ELECTRICITY INDUSTRY ACT - LICENCE CONDITIONS AND OBLIGATIONS								
81	Electricity Industry Act section 13(1)	A licensee must, not less than once every 24 months, provide the Authority with a performance audit conducted by an independent expert acceptable to the Authority.	NR	Minor	Unlikely	Low	Low	Priority 5
82	Electricity Industry Act section 14(1)(a)	A licensee must provide for an asset management system.	NR	Minor	Unlikely	Low	Low	Priority 5
83	Electricity Industry Act section 14(1)(b)	A licensee must notify details of the asset management system and any substantial changes to it to the Authority.	2	Moderate	Unlikely	Medium	Medium	Priority 4
84	Electricity Industry Act section 14(1)(c)	A licensee must provide the Authority with a report by an independent expert as to the effectiveness of its asset management system every 24 months, or such longer period as determined by the Authority.	NR	Minor	Unlikely	Low	Low	Priority 5
85	Electricity Industry Act section 17(1)	A licensee must pay to the Authority the prescribed licence fee within one month after the day of grant or renewal of the licence and within one month after each anniversary of that day during the term of the licence.	NR	Minor	Unlikely	Low	Low	Priority 5
86	Electricity Industry Act section 31(3)	A licensee must take reasonable steps to minimise the extent or duration of any interruption, suspension or restriction of the supply of electricity due to an accident, emergency, potential danger or other unavoidable cause.	NR	Minor	Unlikely	Low	Low	Priority 5

Licence Conditions				Risk Assessment				
No	Obligations under Condition	Description	Type	Consequence	Likelihood	Inherent Risk	Control Risk	Audit Risk/Priority
87	Electricity Industry Act section 41(6)	A licensee must pay the costs of taking an interest in land or an easement over land.	2	Moderate	Unlikely	Medium	Medium	Priority 4
11 ELECTRICITY LICENCES - LICENCE CONDITIONS AND OBLIGATIONS								
103	Generation Licence condition 12.2	A licensee must amend the asset management system before an expansion or reduction in generating works, distribution systems and transmission systems and notify the Authority in the manner prescribed, if the expansion or reduction is not provided for in the asset management system.	2	Moderate	Unlikely	Medium	Medium	Priority 4
104	Generation Licence condition 12.3	A licensee must not expand the generating works, distribution systems or transmission systems outside the licence area.	2	Moderate	Unlikely	Medium	Medium	Priority 4
105	Generation Licence condition 13.1	A licensee and any related body corporate must maintain accounting records that comply with the Australian Accounting Standards Board Standards or equivalent International Accounting Standards.	2	Moderate	Unlikely	Medium	Low	Priority 4
106	Generation Licence condition 14.4	A licensee must comply with any individual performance standards prescribed by the Authority.	2	Moderate	Unlikely	Medium	Medium	Priority 4
107	Generation Licence condition 15.2	A licensee must comply, and require its auditor to comply, with the Authority's standard audit guidelines dealing with the performance audit.	2	Moderate	Unlikely	Medium	Low	Priority 4

Licence Conditions				Risk Assessment				
No	Obligations under Condition	Description	Type	Consequence	Likelihood	Inherent Risk	Control Risk	Audit Risk/Priority
108	Generation Licence condition 16.4	A licensee must comply, and must require the licensee's expert to comply, with the relevant aspects of the Authority's standard guidelines dealing with the asset management system.	2	Moderate	Unlikely	Medium	Low	Priority 4
109	Generation Licence condition 17.1	A licensee must report to the Authority, in the manner prescribed, if a licensee is under external administration or there is a significant change in the circumstances upon which the licence was granted which may affect a licensee's ability to meet its obligations.	2	Moderate	Unlikely	Medium	Medium	Priority 4
110	Generation Licence condition 18.1	A licensee must provide the Authority, in the manner prescribed, any information the Authority requires in connection with its functions under the Electricity Industry Act.	2	Moderate	Unlikely	Medium	Medium	Priority 4
111	Generation Licence condition 19.2	A licensee must publish any information it is directed by the Authority to publish, within the timeframes specified.	2	Moderate	Unlikely	Medium	Medium	Priority 4
112	Generation Licence condition 20.1	Unless otherwise specified, all notices must be in writing.	2	Moderate	Unlikely	Medium	Medium	Priority 4
14 ELECTRICITY INDUSTRY METERING CODE - LICENCE CONDITIONS AND OBLIGATIONS								
309	Electricity Industry Metering Code clause 3.5(6)	A network operator may only impose a charge for providing, installing, operating or maintaining a metering installation in accordance with the applicable service level agreement between it and the user.	2	Moderate	Unlikely	Medium	Low	Priority 4

Licence Conditions				Risk Assessment				
No	Obligations under Condition	Description	Type	Consequence	Likelihood	Inherent Risk	Control Risk	Audit Risk/Priority
319	Electricity Industry Metering Code clause 3.11(3)	A Code participant who becomes aware of an outage or malfunction of a metering installation must advise the network operator as soon as practicable.	2	Moderate	Unlikely	Medium	Medium	Priority 4
331	Electricity Industry Metering Code clause 3.16(5)	A network operator or a user may require the other to negotiate and enter into a written service level agreement in respect of the matters in the metrology procedure dealt with under clause 3.16(4) of the Code.	2	Moderate	Unlikely	Medium	Low	Priority 4
342	Electricity Industry Metering Code clause 3.27	A person must not install a metering installation on a network unless the person is the network operator or a registered metering installation provider for the network operator doing the type of work authorised by its registration.	2	Moderate	Unlikely	Medium	Low	Priority 4
349	Electricity Industry Metering Code clause 4.4(1)	A network operator and affected Code participants must liaise together to determine the most appropriate way to resolve a discrepancy between energy data held in a metering installation and data held in the metering database.	NR	Minor	Unlikely	Low	Medium	Priority 5
350	Electricity Industry Metering Code clause 4.5(1)	A Code participant must not knowingly permit the registry to be materially inaccurate.	NR	Minor	Unlikely	Low	Medium	Priority 5
351	Electricity Industry Metering Code clause 4.5(2)	If a Code participant (other than a network operator) becomes aware of a change to or an inaccuracy in an item of standing data in the registry, then it must notify the network operator and provide details of the change or inaccuracy within the timeframes prescribed.	2	Moderate	Unlikely	Medium	Low	Priority 4

Licence Conditions				Risk Assessment				
No	Obligations under Condition	Description	Type	Consequence	Likelihood	Inherent Risk	Control Risk	Audit Risk/Priority
363	Electricity Industry Metering Code clause 5.4(2)	A user must, when reasonably requested by a network operator, use reasonable endeavours to assist the network operator to comply with the network operator's obligation.	NR	Minor	Unlikely	Low	Low	Priority 5
365	Electricity Industry Metering Code clause 5.5(3)	A user must not impose any charge for the provision of the data under this Code unless it is permitted to do so under another enactment.	2	Moderate	Unlikely	Medium	Low	Priority 4
376	Electricity Industry Metering Code clause 5.16	A user that collects or receives energy data from a metering installation must provide the network operator with the energy data (in accordance with the communication rules) within the timeframes prescribed.	2	Moderate	Unlikely	Medium	Medium	Priority 4
377	Electricity Industry Metering Code clause 5.17(1)	A user must provide standing data and validated (and where necessary substituted or estimated) energy data to the user's customer, to which that information relates, where the user is required by an enactment or an agreement to do so for billing purposes or for the purpose of providing metering services to the customer.	2	Moderate	Unlikely	Medium	Medium	Priority 4
378	Electricity Industry Metering Code clause 5.18	A user that collects or receives information regarding a change in the energisation status of a metering point must provide the network operator with the prescribed information, including the stated attributes, within the timeframes prescribed.	2	Moderate	Unlikely	Medium	Medium	Priority 4

Licence Conditions				Risk Assessment				
No	Obligations under Condition	Description	Type	Consequence	Likelihood	Inherent Risk	Control Risk	Audit Risk/Priority
379	Electricity Industry Metering Code clause 5.19(1)	A user must, when requested by the network operator acting in accordance with good electricity industry practice, use reasonable endeavours to collect information from customers, if any, that assists the network operator in meeting its obligations described in the Code and elsewhere.	NR	Minor	Unlikely	Low	Low	Priority 5
380	Electricity Industry Metering Code clause 5.19(2)	A user must, to the extent that it is able, collect and maintain a record of the address, site and customer attributes, prescribed in relation to the site of each connection point, with which the user is associated.	NR	Minor	Unlikely	Low	Low	Priority 5
381	Electricity Industry Metering Code clause 5.19(3)	A user must, after becoming aware of any change in a site's prescribed attributes, notify the network operator of the change within the timeframes prescribed.	2	Moderate	Unlikely	Medium	Medium	Priority 4
382	Electricity Industry Metering Code clause 5.19(4)	A user that becomes aware that there is a sensitive load at a customer's site must immediately notify the network operator's Network Operations Control Centre of the fact.	2	Moderate	Unlikely	Medium	Medium	Priority 4
384	Electricity Industry Metering Code clause 5.19(6)	A user must use reasonable endeavours to ensure that it does notify the network operator of a change in an attribute that results from the provision of standing data by the network operator to the user.	NR	Minor	Unlikely	Low	Medium	Priority 5
390	Electricity Industry Metering Code clause 5.21(5)	A Code participant must not request a test or audit unless the Code participant is a user and the test or audit relates to a time or times at which the user was the current user or the Code participant is the IMO.	2	Moderate	Unlikely	Medium	Medium	Priority 4

Licence Conditions				Risk Assessment				
No	Obligations under Condition	Description	Type	Consequence	Likelihood	Inherent Risk	Control Risk	Audit Risk/Priority
391	Electricity Industry Metering Code clause 5.21(6)	A Code participant must not make a test or audit request that is inconsistent with any access arrangement or agreement.	2	Moderate	Unlikely	Medium	Medium	Priority 4
409	Electricity Industry Metering Code clause 5.27	Upon request, a current user must provide the network operator with customer attribute information that it reasonably believes are missing or incorrect within the timeframes prescribed.	2	Moderate	Unlikely	Medium	Low	Priority 4
416	Electricity Industry Metering Code clause 6.1(2)	A user must, in relation to a network on which it has an access contract, comply with the rules, procedures, agreements and criteria prescribed.	2	Moderate	Unlikely	Medium	Medium	Priority 4
418	Electricity Industry Metering Code clause 7.2(1)	Code participants must use reasonable endeavours to ensure that they can send and receive a notice by post, facsimile and electronic communication and must notify the network operator of a telephone number for voice communication in connection with the Code.	NR	Minor	Unlikely	Low	Low	Priority 5
420	Electricity Industry Metering Code clause 7.2(4)	A Code participant must notify its contact details to a network operator with whom it has entered into an access contract within 3 business days after the network operator's request.	2	Moderate	Unlikely	Medium	Low	Priority 4
421	Electricity Industry Metering Code clause 7.2(5)	A Code participant must notify any affected network operator of any change to the contact details it notified to the network operator at least 3 business days before the change takes effect.	2	Moderate	Unlikely	Medium	Low	Priority 4

Licence Conditions				Risk Assessment				
No	Obligations under Condition	Description	Type	Consequence	Likelihood	Inherent Risk	Control Risk	Audit Risk/Priority
422	Electricity Industry Metering Code clause 7.5	A Code participant must not disclose, or permit the disclosure of, confidential information provided to it under or in connection with the Code and may only use or reproduce confidential information for the purpose for which it was disclosed or another purpose contemplated by the Code.	2	Moderate	Unlikely	Medium	Medium	Priority 4
423	Electricity Industry Metering Code clause 7.6(1)	A Code participant must disclose or permit the disclosure of confidential information that is required to be disclosed by the Code.	2	Moderate	Unlikely	Medium	Medium	Priority 4
424	Electricity Industry Metering Code clause 8.1(1)	Representatives of disputing parties must meet within 5 business days after a notice given by a disputing party to the other disputing parties and attempt to resolve the dispute under or in connection with the Electricity Industry Metering Code by negotiations in good faith.	NR	Minor	Unlikely	Low	Medium	Priority 5
425	Electricity Industry Metering Code clause 8.1(2)	If a dispute is not resolved within 10 business days after the dispute is referred to representative negotiations, the disputing parties must refer the dispute to a senior management officer of each disputing party who must meet and attempt to resolve the dispute by negotiations in good faith.	NR	Minor	Unlikely	Low	Medium	Priority 5
426	Electricity Industry Metering Code clause 8.1(3)	If the dispute is not resolved within 10 business days after the dispute is referred to senior management negotiations, the disputing parties must refer the dispute to the senior executive officer of each disputing party who must meet and attempt to resolve the dispute by negotiations in good faith.	NR	Minor	Unlikely	Low	Medium	Priority 5

Licence Conditions				Risk Assessment				
No	Obligations under Condition	Description	Type	Consequence	Likelihood	Inherent Risk	Control Risk	Audit Risk/Priority
427	Electricity Industry Metering Code clause 8.1(4)	If the dispute is resolved by representative negotiations, senior management negotiations or CEO negotiations, the disputing parties must prepare a written and signed record of the resolution and adhere to the resolution.	2	Moderate	Unlikely	Medium	Medium	Priority 4
428	Electricity Industry Metering Code clause 8.3(2)	The disputing parties must at all times conduct themselves in a manner which is directed towards achieving the objective of dispute resolution with as little formality and technicality and with as much expedition as the requirements of Part 8 of the Code and a proper hearing and determination of the dispute, permit.	NR	Minor	Unlikely	Low	Medium	Priority 5

Appendix B - Asset management system review 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	Control Risk	Audit Priority
1 (a)	Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning	Minor	Unlikely	Low	Low	Priority 5
1 (b)	Service levels are defined	Minor	Probable	Low	Low	Priority 5
1 (c)	Non-asset options (e.g. demand management) are considered	Minor	Unlikely	Low	Medium	Priority 5
1 (d)	Lifecycle costs of owning and operating assets are assessed	Moderate	Unlikely	Medium	Medium	Priority 4
1 (e)	Funding options are evaluated	Minor	Unlikely	Low	Medium	Priority 5
1 (f)	Costs are justified and cost drivers identified	Moderate	Unlikely	Medium	Medium	Priority 4
1 (g)	Likelihood and consequences of asset failure are predicted	Major	Unlikely	High	Low	Priority 2
1 (h)	Plans are regularly reviewed and updated	Minor	Unlikely	Low	Medium	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	Control Risk	Audit Priority
2 (a)	Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions	Moderate	Unlikely	Medium	Medium	Priority 4
2 (b)	Evaluations include all life-cycle costs	Moderate	Unlikely	Medium	Medium	Priority 4
2 (c)	Projects reflect sound engineering and business decisions	Moderate	Unlikely	Medium	Low	Priority 4
2 (d)	Commissioning tests are documented and completed	Moderate	Unlikely	Medium	Medium	Priority 4
2 (e)	Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood	Major	Unlikely	High	Medium	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	Control Risk	Audit Priority
3 (a)	Under-utilised and under-performing assets are identified as part of a regular systematic review process	Minor	Unlikely	Low	Low	Priority 5
3 (b)	The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken	Minor	Unlikely	Low	Medium	Priority 5
3 (c)	Disposal alternatives are evaluated	Minor	Unlikely	Low	Low	Priority 5
3 (d)	There is a replacement strategy for assets	Moderate	Unlikely	Medium	Medium	Priority 4

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	Control Risk	Audit Priority
4 (a)	Opportunities and threats in the system environment are assessed	Moderate	Unlikely	Medium	Medium	Priority 4
4 (b)	Performance standards (availability of service, capacity, continuity, emergency response, etc) are measured and achieved	Minor	Probable	Low	Medium	Priority 5
4 (c)	Compliance with statutory and regulatory requirements	Moderate	Unlikely	Medium	Low	Priority 4
4 (d)	Achievement of customer service levels	Moderate	Unlikely	Medium	Medium	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	Control Risk	Audit Priority
5 (a)	Operational policies and procedures are documented and linked to service levels required	Moderate	Unlikely	Medium	Medium	Priority 4
5 (b)	Risk management is applied to prioritise operations tasks	Moderate	Unlikely	Medium	Low	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	Minor	Unlikely	Low	Low	Priority 5
5 (d)	Operational costs are measured and monitored	Moderate	Unlikely	Medium	Low	Priority 4
5 (e)	Staff receive training commensurate with their responsibilities	Moderate	Unlikely	Medium	Low	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	Control Risk	Audit Priority
6 (a)	Maintenance policies and procedures are documented and linked to service levels required	Moderate	Unlikely	Medium	Low	Priority 4
6 (b)	Regular inspections are undertaken of asset performance and condition	Moderate	Unlikely	Medium	Medium	Priority 4
6 (c)	Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule	Moderate	Unlikely	Medium	Medium	Priority 4
6 (d)	Failures are analysed and operational/maintenance plans adjusted where necessary	Moderate	Unlikely	Medium	Medium	Priority 4
6 (e)	Risk management is applied to prioritise maintenance tasks	Minor	Probable	Low	Medium	Priority 5
6 (f)	Maintenance costs are measured and monitored	Moderate	Unlikely	Medium	Low	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	Control Risk	Audit Priority
7 (a)	Adequate system documentation for users and IT operators	Minor	Unlikely	Low	Medium	Priority 5
7 (b)	Input controls include appropriate verification and validation of data entered into the system	Minor	Unlikely	Low	Medium	Priority 5
7 (c)	Logical security access controls appear adequate, such as passwords	Minor	Unlikely	Low	Low	Priority 5
7 (d)	Physical security access controls appear adequate	Minor	Unlikely	Low	Low	Priority 5
7 (e)	Data backup procedures appear adequate	Moderate	Unlikely	Medium	Medium	Priority 4
7 (f)	Key computations related to licensee performance reporting are materially accurate	Minor	Unlikely	Low	Medium	Priority 5
7 (g)	Management reports appear adequate for the licensee to monitor licence obligations	Minor	Unlikely	Low	Medium	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	Control Risk	Audit 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	Moderate	Unlikely	Medium	Medium	Priority 4
8 (b)	Risks are documented in a risk register and treatment plans are actioned and monitored	Moderate	Probable	Medium	Medium	Priority 4
8 (c)	The probability and consequences of asset failure are regularly assessed	Moderate	Unlikely	Medium	Low	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	Control Risk	Audit Priority
9 (a)	Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks	Major	Unlikely	High	Medium	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	Control Risk	Audit Priority
10 (a)	The financial plan states the financial objectives and strategies and actions to achieve the objectives	Minor	Unlikely	Low	Low	Priority 5
10 (b)	The financial plan identifies the source of funds for capital expenditure and recurrent costs	Minor	Unlikely	Low	Medium	Priority 5
10 (c)	The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets)	Moderate	Unlikely	Medium	Low	Priority 4
10 (d)	The financial plan provides firm predictions on income for the next five years and reasonable indicative predictions beyond this period	Minor	Probable	Low	Medium	Priority 5
10 (e)	The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services	Minor	Unlikely	Low	Low	Priority 5
10 (f)	Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary	Moderate	Unlikely	Medium	Medium	Priority 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
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	Control Risk	Audit Priority
11 (a)	There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates	Moderate	Unlikely	Medium	Medium	Priority 4
11 (b)	The plan provides reasons for capital expenditure and timing of expenditure	Minor	Probable	Low	Medium	Priority 5
11 (c)	The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan	Moderate	Unlikely	Medium	Medium	Priority 4
11 (d)	There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned	Minor	Unlikely	Low	Medium	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	Control Risk	Audit 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	Unlikely	Low	Medium	Priority 5
12 (b)	Independent reviews (eg internal audit) are performed of the asset management system	Minor	Unlikely	Low	Medium	Priority 5

Appendix B – References

Alcoa staff participating in the audit

- Procurement Specialist - Energy
- 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
- Assistant Risk 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 participating in the audit

Name	Position	Hours
Richard Thomas	Partner	13
Andrew Baldwin	Account Director	72.5
Ben Fountain	Analyst	145
Shaun Sia	Manager (IT)	4.5
Jin Sua	Support Analyst	18
David Wylde	Support Manager	8
Quality Assurance Review performed by Deloitte Risk Services and Assurance & Advisory Services partners		7

Maunsell staff participating in the review

Name	Position	Hours
Stephen Brown	Business Unit Leader - Electrical	55
Tanuja Sanders	Project Manager - Mechanical	65.5

Key documents and other information sources examined

Organisation References

- Asset Integrity assessment protocol
- WA Powerhouse organisation Structure
- WA Powerhouse shutdown planner
- Wagerup and Pinjarra Generator Life Assessment Report
- AOA - Dealing with a disaster or Crisis at an Alcoa Operating Location
- AOA – Emergency/Disaster/Crisis Communication document
- AOA - Risk Classifications document
- AOA - Asset Strategy Manager Disaster Recovery Plan
- AOA - Computing Disaster Recovery Strategy
- Alcoa Internal Audit work papers - fixed capital
- Capital planning process flow-chart
- Risk management overview (AOA) AOARM1001
- Risk management policy (AOA) AOARM1013
- Letter of appointment - Engineering SPA Rev4
- Letter of appointment - Maintenance SPA Rev2
- Letter of appointment - Operations SPA Rev2
- Alcoa (WAO) Management Systems Manual
- Aspects and impacts register 2007
- Log an environmental incident – employee portal screen shot
- Alcoa Pinjarra gas emissions report (June 07)
- Alcoa Pinjarra gas emissions report (May 08)
- Alcoa WAO ASAT audit schedule 2007-2008
- Freehills engagement letter dated 01.03.2003
- Freehills legislative update Q2 2008
- Evaluation of compliance with environmental obligations (Alcoa Policy)
- Alcoa expense approval guide
- Request for approval example
- AS/NZS 3788:2006 commissioning requirements
- Duct burner system commissioning tests
- HRSG including blowdown commissioning tests
- User and technical support documentation (eAM)
- IS Security access permission protocols
- Data Centre Backup Manual
- EBS Backups for all Environments Overview (AOA)
- Daily Tape Management – Procedures and Standards (AOA)
- Post project review template (Alcoa)
- Data Conversion Considerations Guideline (AOA)
- Project Management ASAT procedure
- Security Access Account Management Standard (AOA)
- Security Access Permissions Standard (AOA)
- Numerous emails from Alcoa representative in response to specific enquiries

Pinjarra References

- Pinjarra powerhouse asset strategy
- Pinjarra 5Yr Plan 2008
- Pinjarra steam turbine inspection report - asset life assessment
- Pinjarra generator report 2008
- Pinjarra boiler inspection report by HRL
- Pinjarra main steam header report by HRL - asset life assessment
- Main steam header metallurgy report
- Deaerator inspection report
- ECR (Aug2008) – reporting tool
- Pinjarra recommendation summary (Risk Register)

Wagerup References

- Wagerup powerhouse asset strategy
- Wagerup 5Yr Plan 2008
- Wagerup Boiler (#1) Report by HRL (external consultants)
- Wagerup Boiler (#2) by HRL (external consultants)
- ECR (Apr 2008) – reporting tool
- Wagerup recommendation summary (risk register)

Kwinana References

- Kwinana 5Yr Plan 2008
- Kwinana powerhouse asset strategy
- Kwinana metallurgical report - asset life report
- Kwinana boiler asset life report - Oxide
- Kwinana boiler asset life report - Metallurgy
- Kwinana boiler asset life report - Overhaul Report (D Raymond)
- Kwinana Deaerator Study – asset life report
- Kwinana compressor reports
- ECR (Sep06) – reporting tool
- Kwinana recommendation summary (risk register)