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# Horizon Power

## Asset Management Systems Review - Integrated Regional Licence

### Audit Report Rev 2

November 2008

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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# Glossary of Terms

**Table 1 Glossary of Terms**

| Acronym/Term | Description |
|---|---|
| AMP | Asset Management Plan |
| AMS | Asset Management System |
| AMSR | Asset Management System Review |
| AAC | All Aluminium Conductor |
| ACSR | Aluminium Conductor Steel Reinforced |
| AVR | Automatic Voltage Regulator |
| CBD | Central Business District |
| DC | Direct Current |
| DFIS | Distribution Facilities Information System |
| DFMS | Distribution Facilities Management System |
| DMS | Document Management System |
| DQM | Distribution Quotation Management System |
| ENMAC | Proprietary Fully Integrated Advanced Network Mgt. System |
| ENRUP | Esperance Network Regional Upgrade Programme |
| ERA | Economic Regulation Authority |
| EIRL | Electricity Integrated Regional Licence |
| HV | High Voltage |
| IPP | Independent Power Producer |
| kV | Kilovolts |
| MEX | Proprietary Computerised Maintenance Mgt. Software |
| MIMS Ellipse | Proprietary Asset and Work Management System |
| NCS | Network Customer Services |
| OEM | Original Equipment Manufacturer |
| OHS | Occupational Health and Safety |
| PLC | Programmable Logic Controller |
| SAIDI | System Average Interruption Duration Index |
| SAIFI | System Average Interruption Frequency Index |
| SCADA | System Control and Data Acquisition |
| SWIS | South West Interconnected System |
| TCMS | Trouble Call Management System |
| Twisties | Electricity Distribution Network Preformed Helical Terminations |

# Executive Summary

This report documents the outcome of the Asset Management Systems Review (AMSR) on Horizon Power's electrical licence for the period 30 March 2006 to 31 March 2008. The review was conducted in accordance with the Economic Regulation Authority's "Audit Guidelines: Electricity, Gas and Water Licences" and Audit Plan prepared by GHD.

The review covered the 12 elements of Asset Management Systems and included interviews with key Horizon Power staff, reviews of relevant documents and project files, and field visits to selected Pilbara, Kimberley, Gascoyne and Southern district towns. The field visits were used to verify that the policies, procedures and plans were followed by reviewing the distribution, transmission and generation assets.

During the two year audit period, two divisions of the Corporation had asset management responsibilities and, as they operated as separate business entities, were assessed individually:

» The transmission and distribution assets were managed by Network Customer Services, and

» The power stations were managed by Generation.

This report includes the scope of the review, the methodology used, the compliance risk assessment, asset management systems effectiveness, field studies and observations. The report also contains recommendations for improving the asset management systems effectiveness and post review implementation plan.

The conclusion of the review team was that; in the two years since the electrical licence was issued, Horizon Power have generally implemented sound asset management practice as evidenced by the condition of the assets and competence of the staff in applying the asset management systems. The audit team found that Horizon Power had planned and tracked most elements of the asset management systems requirements and in some cases was continuously improving to improve the effectiveness of their processes. Some areas were not well documented and suggested improvements to address the weaker areas of environmental analysis and contingency planning has been included in the Post Review Implementation Plan.

# 1. Asset Management Systems Review Scope

## 1.1 Introduction

This Audit Report is for the Asset Management Systems Review (AMSR) of Regional Power Corporation's (Horizon Power) Electrical Licence EIRL 2 for the period 30 March 2006 to 31 March 2008 in accordance with the "Audit Guidelines: Electricity, Gas and Water Licences, Economic Regulation Authority, September 2006". The AMSR was conducted in accordance with the Audit Plan (Revision 1) approved by the Economic Regulation Authority (ERA) and includes the risk assessment based approach to reviewing the twelve elements of an effective asset management system. The review included interviews with key Horizon Power staff, review of policy, procedure and planning documentation and field verification at selected locations.

Horizon Power's Regional Licence includes generation, distribution, transmission and retail across 37 towns and, except for those areas covered by the South West Interconnected Systems (SWIS), includes all areas of regional Western Australia. As the licence covers such a large area of Western Australia, the field inspection elements of this audit could not practically cover all areas of Horizon Power's operations and a sample audit was completed of the higher risk areas, based on the reported performance data.

## 1.2 Review Objectives

The AMSR was required to assess the measures taken by the licensee for the proper management of assets used in the provision and operation of services and, where appropriate, the construction or alteration of relevant assets. The review focused on the asset management system, including asset management plans, which set out the measures to be taken by the licensee for the proper operation and maintenance of assets. The plans should include the licensee's business strategies to ensure the effective management of assets over at least a five year period.

The scope of the AMSR included an assessment of the adequacy and effectiveness of the asset management system by evaluating the key processes of:

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

- Financial planning.
- Capital expenditure planning.
- Review of the asset management system.[1]

The methodology adopted in the preparation of this report included:

1. Meetings with Horizon Power's key staff to identify internal contacts, and request documents, information and data needed for the review.
2. Review of primary documents and information.
3. Follow-up interviews with generation and network customer services senior staff on asset control measures and risk management processes.
4. Preparation of the Audit Risk Assessment and Audit Plan.
5. Further interviews with key asset management staff.
6. Field visits to selected locations to review the actions detailed in the plans, the condition of the assets, and determine whether local staff complied with the existing policy, procedures and plans.
7. Document the outcomes of the compliance review into this document.
8. Review the draft review report with Horizon Power.
9. Incorporate Horizon Power's Implementation Plan and comments into the draft report.
10. Finalise the Report and close out the review.

## 1.3 Period of the Review

The AMSR covered the period 30 March 2006 to 31 March 2008.

## 1.4 Risk Assessment

The review team conducted a preliminary risk assessment of the Licensee's compliance based on the initial information provided and the interviews on the control measures for the AMSR Audit Plan. As the asset management activities within Horizon Power's organisation are split between Network Customer Services and Generation and the risk exposure and controls measures for the two parts of the business differ, the risk assessment was completed for both divisions separately in the following table.

The review team reviewed the initial risk assessment based on the staff interviews and field inspections. A number of the "Adequacy of the Existing Controls" were amended, however these did not change the outcome of the audit priorities.

A separate business division manages Horizon Power's retail activities. The assets employed by this division are minimal, as the distribution assets are the responsibility of the Network Customer Services division. Therefore, the Retail Division was not considered separately in the risk assessment.

[1] Audit Guidelines – Electricity, Gas and Water Licences – September 2006

The risk assessment scoring system used in Table 1 is included in Appendix A

**Table 2 Initial Risk Assessment of Licence Compliance**

| Asset Management Area | Horizon Power Business Unit | Consequence (1=minor, 2=moderate, 3=major) | Likelihood (A=likely, B=probable, C=unlikely) | Inherent Risk (Low, Medium, High) | Adequacy of existing controls (S=strong, M=moderate, W=weak) | Assessment of Audit Priorities (1 to 5) |
|---|---|---|---|---|---|---|
| 1. Asset planning<br>Asset planning strategies are focused on meeting customer needs in the most effective and efficient manner (delivering the right service at the right price). | Generation | 3 | C | H | M | 2 |
| | Network Customer Services | 3 | C | H | S | 2 |
| 2. Asset creation and acquisition<br>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. | Generation | 2 | B | M | M | 4 |
| | Network Customer Services | 2 | C | M | S | 4 |
| 3. Asset disposal<br>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. | Generation | 2 | B | M | W | 3 |
| | Network Customer Services | 2 | B | M | M | 4 |
| 4. Environmental analysis<br>Environmental analysis examines the asset system environment and assesses all external factors affecting the asset system. | Generation | 3 | B | H | M | 2 |
| | Network Customer Services | 2 | C | M | M | 4 |
| 5. Asset operations<br>Operations functions relate to the day-to-day running of assets and directly affect service levels and costs | Generation | 3 | C | H | S | 2 |
| | Network Customer Services | 3 | C | H | S | 2 |
| 6. Asset maintenance<br>Maintenance functions relate to the upkeep of assets and directly affect service levels and costs. | Generation | 2 | B | M | M | 4 |
| | Network Customer Services | 2 | B | M | S | 4 |
| 7. Asset Management Information System (MIS) An asset management information system | Generation | 2 | A | H | M | 2 |

| Asset Management Area | Horizon Power Business Unit | Consequence (1=minor, 2=moderate, 3=major) | Likelihood (A=likely, B=probable, C=unlikely) | Inherent Risk (Low, Medium, High) | Adequacy of existing controls (S=strong, M=moderate, W=weak) | Assessment of Audit Priorities (1 to 5) |
|---|---|---|---|---|---|---|
| is a combination of processes, data and software that support the asset management functions | Network Customer Services | 2 | B | M | S | 4 |
| 8. Risk management<br>Risk management involves the identification of risks and their management within an acceptable level of risk. | Generation | 3 | A | H | W | 1 |
| | Network Customer Services | 3 | A | H | S | 2 |
| 9. Contingency planning<br>Contingency plans document the steps to deal with the unexpected failure of an asset. | Generation | 3 | A | H | W | 1 |
| | Network Customer Services | 3 | A | H | M | 2 |
| 10. Financial planning<br>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. | Generation | 2 | B | M | M | 4 |
| | Network Customer Services | 2 | B | M | M | 4 |
| 11. Capital expenditure planning<br>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. | Generation | 2 | B | M | M | 4 |
| | Network Customer Services | 2 | B | M | S | 4 |
| 12. Review of AMS<br>The asset management system is regularly reviewed and updated. | Generation | 2 | B | M | W | 3 |
| | Network Customer Services | 2 | B | M | S | 4 |

The final risk assessments detailed in table 1 above verified the priorities established for original Audit Plan. The adequacy of the existing controls for Network Customer Services was found to be better than originally assumed, however the level of risk exposure was unchanged by the revised assessments.

The control measures for Generation were generally as originally assessed for the audit period, confirming the changed business focus of the Licensee within the audit period, where the previous strategy was to devolve the generation business to

Independent Power Producers (IPP). The Asset Management systems and processes had received minimal effort during this period.

## 1.5 Staff Interviews

The following staff will be interviewed during the course of the AMSR to confirm that policy, procedures, plans and guidelines are available, current and implemented:

- Terry Corfield – Technical Regulation Engineer
- Grant Stacy - Manager Regulation
- Amelia Yam – Financial reporting, management accounting and information technology
- Scott Beckwith – Generation asset management systems, data management and SCADA, and major projects
- Andrew Bartlett and Lawrie Kennedy – Generation asset management plan and maintenance systems
- Ziggy Wilk – General Manager: Distribution and transmission networks asset management systems
- David Orr- SCADA and system data analysis
- John Zanello – Asset Management Systems NCS
- Rob Kerrigan - Asset Management Systems NCS
- Nia Nguyen - Asset Management Systems NCS
- Andrew Georgiades - Risk management and audit
- Simon Duggan – IT Systems (Ellipse/MIMS, DFIS, DQM, etc)
- Brett Hovingh – Network Manager Pilbara
- Alan Porter - District Network Officer Pilbara
- Alf Martin – Control Centre Superintendent Karratha
- Greg Wood – District Network Officer Gascoyne
- Chris Lawer - District Network Officer Gascoyne Region
- Barry Saunders – Power Station Supervisor Carnarvon
- Dr Habib Habibullah – Network Manager Kimberley Region
- Kevin Moore - District Network Officer Kimberley
- Larry Sutton – Broome Power Station Supervisor
- MacFarlan Electrical and Jim McKenzie Electrical – Approved Contractors maintaining Derby, Camballin and Fitzroy Crossing
- Phil Keddie - Network Manager South Region
- Aaron Thiel – District Network Officer Esperance

A Record of Interview sheet was used to record the key elements of all meetings. A copy of the pro-forma is attached at Appendix B.

## 1.6 Key Documents and Information Sources

The Review team examined the documents and project files detailed in Appendix C of this document.

## 1.7 Review Team and Resource Allocation

The review team included:

» Norman McKendry, Business Group Manager Energy, GHD Perth

» Mark Bourhill, Manager Asset Management and Offshore Resources, GHD Perth

The team expended 420 hours on the audit review.

# 2. Previous Review

As this is the first Asset Management Systems Review since the Licence was granted on 30 March 2006, a report of the previous review findings is not applicable during this review period.

# 3. Asset Management Systems Effectiveness

## 3.1 Assessment and Measurement of Compliance

The Licensee's compliance with licence requirements was assessed using the following effectiveness rating scales:

**Table 3 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) |

## 3.2 Compliance Levels Observations

The following observations about the level of compliance of the Network Customer Services and Generation divisions were recorded during the staff interviews and documentation reviews. The Asset Management planning documentation reviewed by the review team included corporate policy, plans and procedures, the Network Customer Services plans and procedures and Generation procedures.

The commentary supports the assessment ratings recorded in Table 4, Table 5, Table 6 and Table 7. While the level of policy and procedures documentation was generally good, in a number of cases, the documents had not been reviewed in the past two years since Horizon Power was created or remained in the "Western Power" livery and format.

Network Customer Services have prepared and reviewed a comprehensive Asset Management Master Plan and Regional/District Asset Management Plans (AMP) for the past two years and were preparing the third issue during the review. The Master Plan and AMPs, supported by the corporate policies, procedures and plans, were very well prepared, current and contained the essential information needed to ensure the effective management of the systems over a five year timeframe.

Generation had not prepared an Asset Management Plan during the review period, and were reliant on exiting procedures, plans and policy document from compliance against the Licence requirements. An Asset Management Plan was being prepare and the draft version (70% complete) was shown to the review team.

### 3.2.1 Asset Planning

The Business Plan 2005/2006 established the initial asset management planning framework for Horizon Power and set up the principle planning strategies and objectives for both the NSC and Generation divisions. The Business Plan is customer focused and the recommended actions are targeted at effective and efficient service delivery.

During the period under review Horizon Power's business strategy had been to totally source generation capacity from IPPs and they currently have power procurement contractual arrangements in place with Energy Developments Limited, Worley and enGen. That business strategy has changed recently to reflect a greater focus on ownership and operation of generating capacity within Horizon Power.

The AMP does not at present include planning assumptions related to buying in generation capacity from IPPs versus building and operating that capacity within Horizon Power. These planning assumptions are addressed in separate power procurement studies being conducted by Horizon Power.

**Network Customer Services:**

The asset planning strategies are included in the Master Plan and based on "Fit for Purpose" service level definitions and key performance indications, which are directly linked to meeting the customers needs and expectations. The Regional Asset Management Plans assess asset and system performance over a twelve month period against the key performance indicators and provide an explanation of deficiencies. Recommended remedial actions to improve performance over the following five years are also included. In a number of cases, past problems across all elements of the NCS business are included in the Master Plan and the specific actions to address the regional problems are detailed in the AMPs.

The analysis of asset performance is based on the reliability data collected automatically (from the SCADA systems) and manually from annual programmed load measurement. The analysis also includes review of the asset age profiles and condition ratings against the service levels detailed in the Master Plan. Horizon Power's staff advised that the age details held in DFMS were inaccurate, reflecting in many cases default installation dates when the data was load rather than actual dates. Some staff also agreed that the AMP analysis should include more condition based assessments to predict the optimum refurbishment and replacement cycles. This deficiency has been addressed by engaging a consultant to inspect the condition of network assets and to provide a condition appraisal report during 2008.

In the Esperance Network Regional Upgrade Programme (ENRUP) it may be appropriate to consider in the 2008/09 AMP the technical and resourcing feasibility associated with reintroducing the steel reinforcement programme for wood pole assets.

In most cases, regional staff are using the simplified Business Case template to support and plan each project.

***Recommendations:***

1. Review maintenance and/or replacement priority of areas deemed “Extreme Risk” in the asset risk register.
2. Review the past wood pole steel reinforcement programme for technical appropriateness into the future and possible reintroduction.

**Generation:**

During the period that Generation assets were being transferred to the Independent Power Producers (IPP) or new IPP Power Stations were coming on line, minimal asset management planning was evident. The review team was provided with the Business Case for the proposed Carnarvon Power Station Replacement, which contained analysis and planning based on maintaining the reliability of the supply. The Business Case also demonstrated that Generation is motivated to meet their customer expectations and in response to the reversal of the business strategy relating to total outsourcing of generation capacity they are refocusing on asset management planning. Lifecycle costs of owning and operating the assets was reported in the monthly Power Station Report and aggregated by Corporate to predict operating and maintenance costs over the next five years.

***Recommendation:*** Complete Generation AMP

### 3.2.2 Asset Creation/Acquisition

**Network Customer Services:**

The majority of new assets and acquisitions for Network Customer Services during the audit period were “Customer Funded” in support of new sub-division developments. The majority of projects in the AMPs “Capital Project Lists” are replacement and upgrading of exiting assets to address safety, capability, reliability, and condition issues. In all cases, the project was registered in the DQM system and Region staff prepared a project file, with relevant support documents. The files included Business Cases, estimating and quotation sheets, risk assessments, photographs, drawings and plan sets, commissioning check-sheets, asset handover check-sheets and external correspondence as appropriate.

These project file documents were examined extensively at all Horizon Power sites reviewed. Their identification file numbers were recorded individually for reference in Appendix C. It was noted and discussed with all staff reviewed that greater consistency is required in relation to asset practical completion and hand over certification.

***Recommendation:*** Implement a standard project practical completion and handover certification for all regions.

It was also noted in the Esperance Region specifically that some drawings and plan sets issued for distribution construction were being drawn, technically checked, quality

checked and authorised for release by the same person. The appropriate design drafting controls are required to be in place in Esperance and other Horizon Power Districts to ensure that drawings are independently checked and reviewed before issuing to staff and/or contractors for construction.

Regional staff demonstrated a good level of knowledge in the life cycle costing of projects, sound engineering evaluation and statutory compliance requirements.

***Recommendation:*** Develop policy and procedures to ensure that distribution design drawings are independently checked and reviewed before issuing to staff and/or contractors for construction.

**Generation:**

Generation have not created any new assets during the audit period, as the supply capability has been transferred to IPPs for the majority of towns and many of the exiting power stations have become redundant.

It is important to note that Horizon Power places full responsibility on the IPP for the potential technical impacts (power quality, fault levels, system stability) of a new power station coming onto their network system. A Public Access Regime does not cover Horizon Power and although they are licensed they are not required in their view to issue regulated network access applications as required for new power generation entrants to the SWIS.

As a consequence Horizon Power has not developed documented processes to accept a new IPP power station onto their network. In the absence of a Public Access Regime, Horizon Power does not believe they are required to do this if their supplier is also a licensed generator.

The Business Case for the proposed Carnarvon Power Station included a full project justification, assessment of lifecycle costs and all statutory obligations.

### 3.2.3 Asset Disposal

Horizon Power's procedural document for asset disposal, "Asset Management, Asset Decommissioning and Divestment Procedure, HP/AM/02/001 Rev B, 3 April 2006 " establishes the requirements for maintenance of the Asset Register, establishment of a Disposal Plan, correct disposal of assets and notification requirements for disposal of assets. The field inspections generally witnessed regional staff following the procedure.

OHS and environmental requirements related to the disposal of harmful transformer and switchgear insulating mediums are addressed by the procedure in accordance with this Australian Standard. The procedure is based upon the requirements of Australian Standard - AS 4801:2000 Occupational Health and Safety Management Systems.

**Network Customer Services:**

The majority of disposal assets and equipment for NCS tends to be copper and aluminium cable, timber and steel poles and pole top fittings. Occasionally, a

transformer is replaced for either age or capacity reasons. When the new equipment has been funded as a capital or maintenance program project, the project scope includes the disposal of the replaced asset and the successful contractor is required to dispose of the obsolete equipment.

In the case of maintenance works on poles and cables, the new equipment is supplied from current stocks and the replaced items are returned to the depot and then sold through existing scrap disposal contracts. In some cases, regional staff will stockpile equipment until a commercially viable quantity is available for the disposal contractor.

The procedures were generally followed, although disposal plans of stockpiles of disposal assets were not evident at any of the regional depots.

**Generation:**

The review team reviewed the progress of the power station assets disposal at Broome, Esperance, Fitzroy Crossing, Camballin, and Derby. The disposal is being managed by regional staff as a discrete project. In most cases, the stations have been isolated and the generators removed or relocated for peaking or mobile contingency reserve capability. Completion of the disposal actions has been delayed by land contamination clearance requirements (hydrocarbons and asbestos) and land negotiation (land swap or return to the traditional owners). The Broome Power Station had been retained to provide peak contingency reserve for the new IPP station. Disposal action had been deferred until after the Varanus Island gas crisis had been resolved and the new IPP Power Station had been tested through this coming year's peak load (wet season).

Although disposal plans were not evident for the former power stations, regional staff were practicing sound project management practice and were following disposal procedures in accordance with the Horizon Power, Asset Management, Asset Decommissioning and Divestment Procedure, HP/AM/02/001 Rev B, 3 April 2006.

***Recommendation:*** Prepare Disposal Plans for the obsolete Power Stations

### 3.2.4 Environmental Analysis

**Network Customer Services:**

While the NCS Asset Management Plans include performance and reliability analysis of assets, the document does not provide a forward projection of the opportunities and threats, nor growth trending and environmental influences within each district. For example, Esperance is experiencing rapid growth as a consequence of the mining activities within the district and staff have had to expand the town network capacity by upgrading transformers and feeders to maintain supply to the future residential developments. The impact of these town changes is not mentioned in the Asset Management Plan on the assumption that the work would be provided by "customer funded" projects. However, this is a very reactive approach, which relies on current staff understanding the local environment and does not provide for major system upgrades as has been necessary at Broome.

The Esperance network staff also raised the potential for technology and innovation to provide “non-asset” solutions for some of the reliability problems with the farmlands single phase feeders. A pilot project is to be instigated to evaluate the potential for local generation centres using photovoltaic, wind and small diesel generation plant to supply clusters of farms, and improve the reliability of the long single phase rural feeders.

***Recommendation:*** Develop environmental analysis sections in Horizon Power’s individual Regional AMPs with a direct link to local environment planning data available from the external peak bodies, Western Australian Planning Commission and Landcorp.

**Generation:**

External factors and influences have not been documented within Generation in the past two years, although staff are aware of the local conditions and potential changes.

***Recommendation:*** Develop environmental analysis sections in Horizon Power’s Generation AMP with a direct link to local environment planning data available from the external peak bodies, Western Australian Planning Commission and Landcorp.

### 3.2.5 Asset Operations

**Network Customer Services:**

The asset operations tasks designated for NCS staff include but are not limited to oil sampling of transformers, vegetation inspections, load and voltage readings, thermographic surveys, overhead line inspection/testing and condition monitoring. The task execution frequency and budget is detailed in the District AMPs.

Asset registers are loaded into the MIMS Ellipse and DFMS systems. Full asset details and condition ratings are entered in DFMS, while Ellipse captures the accounting data.

Scheduling of the tasks is included in MIMS Ellipse and instigated by a work order at the due date. Either field operators or contractors complete the tasks and work orders are closed out in MIMS Ellipse by the District administration staff.

Network reliability and quality performance data is analysed in the individual AMPs and appropriately determines asset operations tasks and their priority. Notwithstanding the existence of the current Horizon Power High Voltage (HV) Switching Operations Manual, district network staff could not provide local procedural documents for implementation of planned and emergency electrical asset switching. District staff conceded that some Horizon Power field staff behaviors had contributed to avoidable switching errors and the practice of IPPs liaising directly with electrical contractors had lead to some significant network control problems.

This highlighted the need for local documentation to provide guidelines to Horizon Power staff, contractors and IPPs when interacting with each other during the execution of HV switching operations.

Bio - Security was highlighted as a growing major issue in the Esperance District suggesting it may warrant a separate and more definitive reference in Section 3 of the 2008/09 AMP. While local wash down procedures are well established and practiced to mitigate biological contamination by vehicles, the issue does not currently receive specific attention in the AMP.

***Recommendation:***

1. Prepare localised HV Switching Operations Staff Guidelines and training programmes to complement Horizon Power's existing and overarching HV Switching Operations Manual. The local guidelines will serve to acknowledge the specific switching requirements that have evolved for each district and contribute to a safer and more robust HV operational framework.
2. Prepare a Bio-Security Plan as a definitive section of the 2008/09 AMP.

**Generation:**

Generation has "Specific Operating Procedures" for each power station which includes step by step procedures for the start-up and shut-down of the station and each generating set. The procedures include comprehensive system checks for each piece of equipment within the power station. The operating procedures do not include cleaning and control systems monitoring. These instructions, and detailed operations and maintenance manuals for all equipment, are held within the power station technical publications libraries.

Assets are listed in the "Facilities Description" document and Asset Register information is loaded into the MEX system. Generation intend to transfer the Asset Register to the MIMS Ellipse system.

### 3.2.6 Asset Maintenance

**Network Customer Services:**

As in the previous section, network asset operations reliability and quality performance data is collected and subjected to detailed analysis in the individual district AMPs. The results of this data analysis process are combined with asset condition monitoring data and the resultant findings appropriately determine asset maintenance tasks and their priority.

Programmed maintenance tasks are loaded into the MIMS Ellipse maintenance scheduling system and work orders are printed monthly for completion by field staff. Restoration maintenance activities are detailed in the Regional AMPs and managed as "projects" by district network staff. The maintenance work is allocated and completed by either Horizon Power Field Services or their local Contractor, based on resource availability and capability considerations. Completed work orders are loaded into MIMS Ellipse by the district administration staff.

The review concluded that asset maintenance activities are effective.

**Generation:**

Generation planned maintenance tasks are loaded into MEX software and generated as monthly work orders at the district level by the Power Station Supervisor. Completed tasks are reported via finalised work order to the Supervisor and completed in MEX.

Generation intend to transfer the maintenance scheduling data to MIMS Ellipse.

### 3.2.7 Asset Management Information System

Horizon Power use a variety of software systems to support the Asset Management Functions. Many of the systems are owned by Western Power and Horizon Power accesses them under licensing and support services agreements. Management of the systems is the responsibility of the Information Systems Manager. Information systems security is implemented across all systems and data backup processes are well established and maintained.

The SCADA systems and data historian functionality are used to report load profiles and asset performance. Currently the SCADA systems are not integrated and NCS intend to implement ENMAC to facilitate central control and monitoring from the Karratha Control Centre.

The systems include:

» MIMS Ellipse – Asset registers, maintenance scheduling, cost capture and reporting, and work order management.

» DQM – Distribution Quotation Management System - Project management system, including project scoping cost estimating, equipment and materials planning and project timelines and resourcing.

» DFIS – Distribution Facilities Information System - GIS based as constructed drawings, including asset description details and condition and age data.

» DFMS – Distribution Facilities Management System – asset detail descriptions and historical condition appraisal information.

» DMS – Document Management System – documentation registration and control system.

» TCMS – Trouble Call Management System- customer services interface

» MEX – Maintenance scheduling and work order management (generation only).

While the software systems are not integrated, automated data transfer processes occur between the packages.

**Network Customer Services:**

Regional network staff are well trained and very proficient with all systems and comfortable with swapping from one functional system to another. Training was provided on all systems and user documentation available in the office. Planned work was generally completed on time against the work orders and filed once completed.

**Generation:**

The Generation supervisors used MEX to schedule maintenance tasks and issue work orders for the power stations based on standardized maintenance tasks and frequency cycles. The system works well for the supervisors and provides adequate management reporting. The proposed transfer to MIMS Ellipse will facilitate centralized management and reporting for Generation.

***Recommendation:*** Horizon Power considers investigating options to establish a platform of advanced network management, asset management and work management systems independent of Western Power as a contingency should the use of and support for the current MIMS Ellipse and ENMAC be withdrawn in the future.

### 3.2.8 Risk Management

Horizon Power have adopted a consolidated approach to risk management as enunciated in the "Risk Management Framework, 14 March 2007" and under the responsibility of Manager Risk Management. The process of establishing risk registers and treatment plans is under development, and is currently focused on the higher impact system failure events. A program of risk assessment training and development has been rolled out to the Regional depots with the Governance Framework. Standardised reporting and assessment has been implemented across the business.

**Network Customer Services:**

A NCS Risk Register has been completed with a good level of detail for each risk event, standardized assessments of probability, consequence and inherent risk exposure. Current treatment plans and controls had been identified, residual risk exposure assessed and Action Plans developed to mitigate every risk in the register. Evidence that risk assessment is well practiced in the NCS business was found in the Regional Asset Management Plans and in the majority of the project files reviewed by the review team. Work planning risk assessment had also been standardized and was consistently practiced by Network field staff.

Regional staff review the risk register monthly and reporting of high asset failure risks is elevated as priority to senior management levels. The latest versions of the district AMPs cross reference projects with the risk register as detailed in the short Business Cases, which will alleviate the problem of linking the risk register and the AMP project outcomes. (Refer to the observations on Project Files in Section 4.)

**Generation:**

Generation had not completed a risk assessment within the period of the audit, but had conducted a risk workshop in June 2008 and is working on developing a risk register and management plan based on the "Risk Management Framework" documentation.

***Recommendation:*** Finalise the Generation Risk Assessment and include a section on Risk Management in the Generation AMP specifically related to the lack of emergency HV switchgear maintenance resources available to the Carnarvon operation.

### 3.2.9 Contingency Planning

Horizon Power had prepared “Crisis, Emergency & Business Contingency Management System” and “Emergency Procedure – Severe Storms and Cyclone Response” documents. The Crisis, Emergency & Business Continuity Management System includes three parts covering System Description (Part 1), Crisis Management Plan (Part 2) and Business Unit Emergency Plan (Part 3). The documents detail the organizational responsibilities, assessment protocols, crisis response management team structures and actions, communications planning, and emergency preparation and planning. The document is very suitable for management and response to natural disasters and external threats, but lacks asset and system detail to be considered a Contingency Plan within the Asset Management System. However, they provide the essential guidance and procedures needed to recover from significant events and disasters.

**Network Customer Services:**

Section 3.9 of the Master Plan details the document reference numbers for the major plan “Crisis Management and Recovery Plan, DMS #2044282” and the district contingency plans. However, the Regional/District Managers did not have current copies of their plans, nor had the plans been tested. The Internal Audit report noted that only two contingency plans had been prepared in draft and that the Transmission Primary Plant Failure Contingency Plan” had not been reviewed since May 2006. The district AMPs did not include section on Contingency Planning.

***Recommendations:***

1. Finalise and issue the Regional/District Contingency Plans.
2. Include Contingency Planning in the AMPs.
3. Regularly test the Contingency Plan to validate the plans against field conditions and for response effectiveness.

**Generation:**

Generation had not prepared a Contingency Plan. The AMP, under preparation, referenced the “Emergency Management Plan, Section 12 of Corporate Crisis Management Plan”, which does not include asset and system level response to the loss of equipment or systems. The Power Stations reviewed had a reasonable level of redundancy in the generation sets, but were exposed at the control switchboards and transformer substations.

***Recommendation:***

1. Prepare and issue the Regional/District Contingency Plans.
2. Include Contingency Planning in the AMPs.
3. Regularly test the Contingency Plan to validate the plans against field conditions and for response effectiveness.

### 3.2.10 Financial Planning

Horizon Power has a well established process for preparing the five year financial plans, which culminates in the annual budget submission to Treasury and Finance, five year operations and maintenance budgets and the ten year Capital Investment Plan. The planning process is a bottom-up approach using the information gathered from the Demand Energy Forecast, Strategic Outlook document, NCS AMPs (including inputs from the risk register) and the Generation operating hours, load forecasts and maintenance plans. Performance reporting is also bottom-up from the District Managers to General Manager and Managing Director on monthly variations between forecast and actual expenditure.

Horizon Power are required to produce an Annual Report. The Report includes a Statement of Financial Performance with the Income Statement (profit and loss statement), Balance Sheet, Cash Flow Statement, Statement of Changes in Equity and the Notes to the Financial Report. The Annual Report was independently audited by the Auditor General as being a true and fair view of the Corporation's financial position and compliant to the Australian Accounting Standards.

**Network Customer Services:**

The annual budget cycle uses the capital, maintenance and operating forecasts from the District/Regional Asset Management Plans prepared by the regional network staff and approved by the General Manager. Each region is responsible for managing their capital expenditure through a monthly report, which draws information from the project expenditure systems, and reporting variations for the forecast expenditure.

**Generation:**

Generation staff report on the operating and maintenance costs on a monthly basis via the Power Station Monthly Operational Report. The report include energy generated, fuel consumed, engine run hours and completed maintenance activities. The data in the report is used by corporate staff to prepare the Demand Energy Forecast and to update and generate the planned maintenance program.

### 3.2.11 Capital Expenditure Planning

The Manager Finance consolidates the Capital Projects budgets for both NCS and Generation divisions and monitors achievement of the current years against monthly expenditure targets. The capital expenditure planning processes are detailed in the "Capital Projects Procedures" and the "Gating Phases & Principles".

**Network Customer Services:**

An annual Five Year Capital Project List is prepared by NCS from the projects identified in the region AMPs and supported by approved Business Cases. The AMP contains information on the rational, justification, prioritization, scope of works and cost basis of each project. Projects are approved in accord with a schedule of delegations by District Network Officers, Network Managers, General Manager, Chief Executive Office or Board as appropriate. Generally, district/regional staff are responsible for

project managing each project and held accountable for achieving expenditure and timeliness targets.

**Generation:**

Because of the change in business direction, there was minimal information available to the review team on how Generation planned capital works. The "Gating Process, Carnarvon Generation Project, Business Case" demonstrated that the planning for Capital Projects were well documented, adequately justified by clear argument, the benefit of the project was clearly stated, the expenditure spread was estimated for each financial quarter, and the ongoing operations and maintenance costs had been considered.

### 3.2.12 Review of the Asset Management System

**Network Customer Services:**

The Asset Management Plans and Master Plan have been reviewed annually with undated performance and reliability information. The initial plans were prepared in 2006, and then revised and approved on 29 September 2007. The third issue was being finalised during the review team's regional visits and should be issued within the next couple of months. The five year capital, maintenance and operating budgets have also updated to reflect the changing asset conditional and business pressures.

The management systems were reviewed by the Risk Assurance and Audit Branch in 2007.

**Generation:**

Generation does not have an Asset Management Plan and therefore a review has not taken place during this audit period. The Risk Assurance and Audit Branch reviewed the management systems in 2007.

As stated previously for the period under review Horizon Power's business strategy had been to totally source generation capacity from IPPs and they currently have several power procurement agreements in place. As a consequence there is no Generation AMP in place at present.

This strategy placed the responsibility for generation AMPs on the IPPs contracted to Horizon Power. Given the Company's business strategy has changed recently to reflect a greater focus on ownership and operation of generating capacity it is now mandatory for Horizon Power to develop its own generation AMP.

This is recognized and accepted in the Company with a new Generation AMP currently being developed.

## 3.3 Asset Management Systems Assessments

As NCS and Generation operate as separate divisions during the audit period and had differing levels of effectiveness against the 12 asset management systems elements and effectiveness criteria. Table 4 and 5 detail the review team's assessments for each division.

**Table 4** **Asset Management Systems Assessments – Network Customer Services**

| Asset Management Area | Effectiveness Criteria | Compliance Rating | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 |
| 1. Asset planning<br>Asset planning strategies are focused on meeting customer needs in the most effective and efficient manner (delivering the right service at the right price). | Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning | | | | | ■ | |
| | Service levels are defined | | | | | ■ | |
| | Non-asset options (eg demand management) are considered | | | | ■ | | |
| | Lifecycle costs of owning and operating assets are assessed | | | ■ | | | |
| | Funding options are evaluated | | | ■ | | | |
| | Costs are justified and cost drivers identified | | | | ■ | | |
| | Likelihood and consequences of asset failure are predicted | | | | ■ | | |
| | Plans are regularly reviewed and updated | | | | | ■ | |
| 2. Asset creation and acquisition<br>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. | Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions | | | | ■ | | |
| | Evaluations include all life-cycle costs | | | ■ | | | |
| | Projects reflect sound engineering and business decisions | | | | | ■ | |
| | Commissioning tests are documented and completed | | | | | ■ | |
| | Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood | | | | | ■ | |
| 3. Asset disposal<br>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. | Under-utilised and under-performing assets are identified as part of a regular systematic review process | | | | | ■ | |
| | The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken | | | | ■ | | |
| | Disposal alternatives are evaluated | | | ■ | | | |
| | There is a replacement strategy for assets | | | | | ■ | |
| 4. Environmental analysis<br>Environmental analysis examines the asset system environment and assesses all external factors affecting the asset system. | Opportunities and threats in the system environment are assessed | | | | ■ | | |
| | Performance standards (availability of service, capacity, continuity, emergency response, etc) are measured and achieved | | | | | ■ | |
| | Compliance with statutory and regulatory requirements | | | | ■ | | |
| | Achievement of customer service levels | | | | | ■ | |
| 5. Asset operations<br>Operations functions relate to the day-to-day running of assets and directly affect service levels and costs. | Operational policies and procedures are documented and linked to service levels required | | | | ■ | | |
| | Risk management is applied to prioritise operations tasks | | | | ■ | | |
| | Assets are documented in an Asset Register including asset type, location, material, plans of components, an assessment of assets' physical/structural condition and accounting data | | | | | ■ | |

| Asset Management Area | Effectiveness Criteria | Compliance Rating | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 |
| | Operational costs are measured and monitored | | | | ■ | | |
| | Staff receive training commensurate with their responsibilities | | | | | ■ | |
| 6. Asset maintenance<br>Maintenance functions relate to the upkeep of assets and directly affect service levels and costs. | Maintenance policies and procedures are documented and linked to service levels required | | | | ■ | | |
| | Regular inspections are undertaken of asset performance and condition | | | | | ■ | |
| | Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule | | | | | ■ | |
| | Failures are analysed and operational/maintenance plans adjusted where necessary | | | | | ■ | |
| | Risk management is applied to prioritise maintenance tasks | | | | | ■ | |
| | Maintenance costs are measured and monitored | | | | | ■ | |
| 7. Asset Management Information System (MIS)<br>An asset management information system is a combination of processes, data and software that support the asset management functions. | Adequate system documentation for users and IT operators | | | | | ■ | |
| | Input controls include appropriate verification and validation of data entered into the system | | | | ■ | | |
| | Logical security access controls appear adequate, such as passwords | | | | ■ | | |
| | Physical security access controls appear adequate | | | | | ■ | |
| | Data backup procedures appear adequate | | | | | ■ | |
| | Key computations related to licensee performance reporting are materially accurate | | | | | ■ | |
| | Management reports appear adequate for the licensee to monitor licence obligations | | | | | ■ | |
| 8. Risk management<br>Risk management involves the identification of risks and their management within an acceptable level of risk. | Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system | | | | | ■ | |
| | Risks are documented in a risk register and treatment plans are actioned and monitored | | | | | ■ | |
| | The probability and consequences of asset failure are regularly assessed | | | | ■ | | |
| 9. Contingency planning<br>Contingency plans document the steps to deal with the unexpected failure of an asset. | Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks | | | ■ | | | |

| Asset Management Area | Effectiveness Criteria | Compliance Rating | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. Financial planning<br>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. | The financial plan states the financial objectives and strategies and actions to achieve the objectives | | | | | | |
| | The financial plan identifies the source of funds for capital expenditure and recurrent costs | | | | | | |
| | The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets) | | | | | | |
| | The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period | | | | | | |
| | The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services | | | | | | |
| | Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary | | | | | | |
| 11. Capital expenditure planning<br>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. | There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates | | | | | | |
| | The plan provide reasons for capital expenditure and timing of expenditure | | | | | | |
| | The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan | | | | | | |
| | There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned. | | | | | | |
| 12. Review of AMS<br>The asset management system is regularly reviewed and updated. | A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current | | | | | | |
| | Independent reviews (eg internal audit) are performed of the asset management system | | | | | | |

**Table 5 Asset Management Systems Assessments – Generation**

| Asset Management Area | Effectiveness Criteria | Compliance Rating | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 |
| 1. Asset planning<br>Asset planning strategies are focused on meeting customer needs in the most effective and efficient manner (delivering the right service at the right price). | Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning | | | | | | |
| | Service levels are defined | | | | | | |
| | Non-asset options (eg demand management) are considered | N/A | | | | | |
| | Lifecycle costs of owning and operating assets are assessed | | | | | | |
| | Funding options are evaluated | N/A | | | | | |
| | Costs are justified and cost drivers identified | N/A | | | | | |
| | Likelihood and consequences of asset failure are predicted | | | | | | |
| | Plans are regularly reviewed and updated | | | | | | |
| 2. Asset creation and acquisition<br>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. | Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions. Horizon Power places full responsibility on the IPP for the potential technical impacts (power quality, fault levels, system stability) of a new power station coming onto their network. Horizon Power is not covered by a Public Access Regime and although they are licensed they are not required to be or in their view to issue regulated network access applications as for the SWIS. | | | | | | |
| | Evaluations include all life-cycle costs | | | | | | |
| | Projects reflect sound engineering and business decisions | | | | | | |
| | Commissioning tests are documented and completed | N/A | | | | | |
| | Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood | | | | | | |
| 3. Asset disposal<br>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. | Under-utilised and under-performing assets are identified as part of a regular systematic review process | | | | | | |
| | The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken | | | | | | |
| | Disposal alternatives are evaluated | | | | | | |
| | There is a replacement strategy for assets | | | | | | |
| 4. Environmental analysis<br>Environmental analysis examines the asset system environment and assesses all external factors affecting the asset system. | Opportunities and threats in the system environment are assessed | | | | | | |
| | Performance standards (availability of service, capacity, continuity, emergency response, etc) are measured and achieved | | | | | | |
| | Compliance with statutory and regulatory requirements | | | | | | |
| | Achievement of customer service levels | | | | | | |

| Asset Management Area | Effectiveness Criteria | Compliance Rating | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 |
| 5. Asset operations<br>Operations functions relate to the day-to-day running of assets and directly affect service levels and costs. | Operational policies and procedures are documented and linked to service levels required | | | ■ | | | |
| | Risk management is applied to prioritise operations tasks | | | ■ | | | |
| | Assets are documented in an Asset Register including asset type, location, material, plans of components, an assessment of assets' physical/structural condition and accounting data | | | | ■ | | |
| | Operational costs are measured and monitored | | | | ■ | | |
| | Staff receive training commensurate with their responsibilities | | | | ■ | | |
| 6. Asset maintenance<br>Maintenance functions relate to the upkeep of assets and directly affect service levels and costs. | Maintenance policies and procedures are documented and linked to service levels required | | | ■ | | | |
| | Regular inspections are undertaken of asset performance and condition | | | | | ■ | |
| | Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule | | | | | ■ | |
| | Failures are analysed and operational/maintenance plans adjusted where necessary | | | | ■ | | |
| | Risk management is applied to prioritise maintenance tasks | | | ■ | | | |
| | Maintenance costs are measured and monitored | | | | ■ | | |
| 7. Asset Management Information System (MIS)<br>An asset management information system is a combination of processes, data and software that support the asset management functions. | Adequate system documentation for users and IT operators | | | ■ | | | |
| | Input controls include appropriate verification and validation of data entered into the system | | | ■ | | | |
| | Logical security access controls appear adequate, such as passwords | | | | | ■ | |
| | Physical security access controls appear adequate | | | | ■ | | |
| | Data backup procedures appear adequate | | | | ■ | | |
| | Key computations related to licensee performance reporting are materially accurate | | | | ■ | | |
| | Management reports appear adequate for the licensee to monitor licence obligations | | | | ■ | | |
| 8. Risk management<br>Risk management involves the identification of risks and their management within an acceptable level of risk. | Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system | | | ■ | | | |
| | Risks are documented in a risk register and treatment plans are actioned and monitored | | ■ | | | | |
| | The probability and consequences of asset failure are regularly assessed | | ■ | | | | |
| 9. Contingency planning<br>Contingency plans document the steps to deal with the unexpected failure of an asset. | Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks | | ■ | | | | |

| Asset Management Area | Effectiveness Criteria | Compliance Rating | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. Financial planning<br>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. | The financial plan states the financial objectives and strategies and actions to achieve the objectives | | | | | | |
| | The financial plan identifies the source of funds for capital expenditure and recurrent costs | | | | | | |
| | The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets) | | | | | | |
| | The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period | | | | | | |
| | The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services | | | | | | |
| | Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary | | | | | | |
| 11. Capital expenditure planning<br>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. | There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates | | | | | | |
| | The plan provide reasons for capital expenditure and timing of expenditure | | | | | | |
| | The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan | | | | | | |
| | There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned | | | | | | |
| 12. Review of AMS<br>The asset management system is regularly reviewed and updated. | A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current | | | | | | |
| | Independent reviews (eg internal audit) are performed of the asset management system | | | | | | |

## 3.4 Asset Management Systems Summary

The following table summarises the Licensee's Asset Management Systems efficiency in each of the twelve asset management processes:

**Table 6 Asset Management Effectiveness Summary - NCS**

| ASSET MANAGEMENT SYSTEM | Not performed | Performed informally | Planned and tracked | Well defined | Quantitatively controlled | Continuously improving | Process Score |
|---|---|---|---|---|---|---|---|
| **Process Effectiveness rating** | **0** | **1** | **2** | **3** | **4** | **5** | |
| Asset planning | | | | | | | **3** |
| Asset creation/ acquisition | | | | | | | **4** |
| Asset disposal | | | | | | | **4** |
| Environmental analysis | | | | | | | **4** |
| Asset operations | | | | | | | **4** |
| Asset maintenance | | | | | | | **4** |
| Asset Management Information System | | | | | | | **4** |
| Risk management | | | | | | | **4** |
| Contingency planning | | | | | | | **2** |
| Financial planning | | | | | | | **4** |
| Capital expenditure planning | | | | | | | **4** |
| Review of AMS | | | | | | | **4** |

**Legend:**

Range of Ratings (Table 4) - Network Customer Services

**Table 7 Asset Management Effectiveness Summary - Generation**

| ASSET MANAGEMENT SYSTEM | Not performed | Performed informally | Planned and tracked | Well defined | Quantitatively controlled | Continuously improving | Process Score |
|---|---|---|---|---|---|---|---|
| **Process Effectiveness rating** | **0** | **1** | **2** | **3** | **4** | **5** | |
| Asset planning | | | | | | | **2** |
| Asset creation/ acquisition | | | | | | | **3** |
| Asset disposal | | | | | | | **1** |
| Environmental analysis | | | | | | | **3** |
| Asset operations | | | | | | | **3** |
| Asset maintenance | | | | | | | **3** |
| Asset Management Information System | | | | | | | **3** |
| Risk management | | | | | | | **1** |
| Contingency planning | | | | | | | **1** |
| Financial planning | | | | | | | **3** |
| Capital expenditure planning | | | | | | | **2** |
| Review of AMS | | | | | | | **2** |

**Legend:**

Range of Ratings (Table 5) - Generation

# 4. Field Studies

The review team travelled to selected areas of the Licensee's operations and checked that the AMS plans, policies and procedures were being practiced in the field. The review team checked that field staff had appropriate levels of skill, training and experience to ensure compliance with licence conditions and effective management of generation, transmission and distribution assets in accordance with the overarching requirements of the *Electricity Industry Act 2004.*

## 4.1 Pilbara Region – Karratha, Dampier, Roebourne and Port Samson

From an asset overview perspective the Pilbara region is broken into two districts, East Pilbara and West Pilbara. The East Pilbara district manages transmission and distribution assets in Port Hedland, Marble Bar and Nullagine. The West Pilbara district manages transmission and distribution assets in Karratha, Roebourne, Point Samson and sections of Dampier.

The review team considered that, with the geographic spread of Horizon Power's activities, it was impractical within the audit timeframe to inspect all licence areas. The team identified from the Performance and Reliability Reports that the West Pilbara Region Network Customer Services had the highest risk of non-compliance and therefore would be the focus of the audit field studies in the Pilbara Region.

Both Horizon Power and the ERA in the agreed Audit Plan supported this approach.

### 4.1.1 Network Customer Services

Network Customer Services site interviews and inspections were conducted within the Pilbara Region over the two days 19-20 June 2008. The site representatives and primary interviewees were Brett Hovingh, Network Manager and Alan Porter, District Network Officer.

The following asset management key processes were the focus of the interviews and inspections in the Pilbara Region:

- Asset Creation and Acquisition
- Asset Operations
- Asset Maintenance
- Asset Management Information System
- Asset Disposal
- Contingency Planning
- Risk Management

The effectiveness criteria related to these key processes as detailed in Appendix B were in most cases demonstrated as quantitatively controlled and continuously improving for the Pilbara Region.

Asset management plans for the region are complete and well documented. Work package planning and preparation is consistent, well documented and recorded. Assignment of work packages to Horizon Power staff and contractors is also consistent, well documented and recorded.

Risk assessment processes including job safety are consistently and effectively applied to the field asset management processes listed above.

The Horizon Power five step Project Gating Process governs field asset management related capital and operating expenditure activity. The five steps are:

1. Approve selected asset improvement opportunity/project for further investigation
2. Internally approve business case
3. Final Investment decision
4. Approve project completion
5. Project review

The review team considers steps 1-3 are being consistently well managed and executed. Documentation related to steps 4-5 was found to be incomplete in several cases. In particular work package execution monitoring and practical completion notices were not evident in those instances. Reviews of work package effectiveness in relation to progress against the declared objectives within the Asset Management Plan were also not evident in those instances.

***Recommendation:*** Field staff to be reminded of their adherence accountability to Horizon Power's five step Project Gating Process.

The following additional observations were recorded during the discussions with Brett Hovingh:

1. N-1 Inventory Contingency Plans require greater visibility in the AMP.
2. Hardening (undergrounding) the network is an imperative within the Pilbara Region and bulk asset replacement is also a clear parallel strategy.
3. Condition monitoring information requires more visibility in the AMP.
4. Asset Environment influences require more visibility in the AMP, particularly for the rapid growth of Karratha and the impact on networks assets.

## 4.2 Gascoyne District – Carnarvon

From an asset overview perspective the Gascoyne District along with the Midwest and Esperance districts forms Horizon Power's Southern Region. The Gascoyne District manages the network assets in Carnarvon, Exmouth, Denham, Gascoyne Junction and Coral Bay.

The review team identified from the Performance and Reliability Reports that Carnarvon Network Customer Services had the highest risk of non-compliance and therefore would be the focus of the audit field studies the Gascoyne District.

Horizon Power and the ERA in the agreed Audit Plan supported this approach.

### 4.2.1 Network Customer Services

Network Customer Services site interviews and inspections were conducted in Carnarvon on 25 June 2008. The site representative and primary interviewee was Greg Wood, District Network Officer.

The following asset management key processes were the focus of the interviews and inspections in Carnarvon:

- Asset Creation and Acquisition
- Asset Operations
- Asset Maintenance
- Asset Management Information System
- Asset Disposal
- Contingency Planning
- Risk Management

The effectiveness criteria related to these key processes as detailed in Appendix B were in most cases planned and tracked or well defined for Carnarvon.

The Network Customer Services (NCS) Asset Management Plan (AMP) is well accepted and valued by Carnarvon field staff. There is clear evidence of ownership and individual commitment from staff irrespective of whether or not they have made a direct contribution to the AMP development.

The AMP is being translated into effective high quality local work packages. These packages are consistent with NCS requirements across its operational centres and detail clearly the work objectives and their link to the AMP. The logic for the work package is mostly well defined along with timing, resources to be deployed and the appropriated capital/operating budget.

Distribution Quotation Management (DQM), Distribution Facilities Information System (DFIS) and Distribution Facilities Management System (DFMS) are effectively employed to generate local asset inspection programmes and capital/operating work packages.

There is concern within the Carnarvon team that the current AMP objectives cannot be practically achieved in the declared five-year timeframe. Continuity of resources and timeliness of funding are cited as the main issues impacting planned network task execution.

The rate of asset failure in Carnarvon is also seriously impacting progress of the planned network asset management programme for the area. Asset failures are well understood and their locations documented as extreme risk areas.

These areas were inspected by the review team and are characterised by the following asset conditions:

» Condemned poles

» Heavily steel reinforced poles

» Termite infested poles

» Termite infested cross arms

» Terminally oxidised AAC, Cu and ACSR distribution conductors

» Damaged insulation

Of greatest concern is the general condition of AAC and Cu distribution conductors in Carnarvon. The conductors were assessed as an extreme risk in the NCS Risk Register and the operational areas visited exhibited clear evidence of conductor bird caging and stranding which is leading to unpredictable breaking of the asset. District staff advised the review team that the corroded conductor problems were also evident in Denham. Management actions required to address these asset failures have been summarised in the NCS Risk Register and developed in further detail as specific projects within the NCS Gascoyne AMP. Specific maintenance and replacement projects are being raised within the bounds of economic, resource and technical limitations.

While the problem with corroded conductors is acknowledged in the Risk Register (Item 4 - Conductor), the treatment controls and action plan address problems with “street lighting” conductors and recommends scheduled inspections and mitigation action in the 2008/09 Asset Management Plan. The review team were advised that a condition inspection program has been completed. However, the specific problems observed in Carnarvon were not mentioned in the Risk Register and the inclusion of a capital investment item in the 2007/08 regional Asset Management Plan South Region (Section 5.3.3) for “CBD Carnarvon Upgrade” is unlikely to cover the size of the problem in the Gascoyne Region distribution conductors. The issue is significant and should have been included in the “Lifecycle Reinforcement/Replacement” section of the AMP and a bulk asset replacement and undergrounding programme should have been included in the 2007/08 AMP. The problem should also have been included as a dedicated item in the Risk Register.

With regard to asset operations, District staff conceded that some Horizon Power field staff behaviors had contributed to avoidable switching errors during HV electrical switching on distribution assets.

***Recommendation:*** Investigate the “Extreme Risk” assets currently listed in the Carnarvon Network in the NCS Risk Register with the view to accelerated bulk asset replacement of conductors and timber poles exposed to severe termite and salt environments.

### 4.2.2 Generation Services

Generation Services site interviews and inspections were conducted in Carnarvon on 25 June 2008. The site representative and primary interviewee was Barry Saunders, Power Station Supervisor.

The following asset management key processes were the focus of the interviews and inspections in Carnarvon:

» Asset Creation and Acquisition

» Asset Operations

» Asset Maintenance

» Asset Management Information System

» Asset Disposal

» Contingency Planning

» Risk Management

The effectiveness criteria related to these key processes as detailed in Appendix B were in most cases planned and tracked or well defined for Carnarvon.

Generation Services operational monthly reporting is very comprehensive and this is routinely evident at the Carnarvon power station. It is noted that the analysis of reported data and the ensuing major asset maintenance/overhaul scheduling is undertaken in Horizon Power's Perth Office.

Carnarvon based staff undertake routine maintenance and scheduling of this activity. The Power Station Supervisor uses the MEX software application to programme and schedule routine power station maintenance.

The power station comprises three Wartsila and four Mirrlees generating units. The Original Equipment Manufacturer (OEM) conducts all scheduled maintenance and overhauls on the Wartsila units. Horizon Power staff and contractors conduct all scheduled maintenance and overhauls on the Mirrlees units.

Asset management within the power station is generally very good, given the assets were due to be retired and Horizon Power's strategic forward planning includes a replacement Power Station on a new site.

Opportunities for further improvement in power station asset management were observed as follows:

1. There is no fire protection system evident in the Wartsila Control Room. The operation of the three generating units is potentially vulnerable to fire or explosion with the 6,600 Volt electrical switchgear located in the same room as the AVR, PLC and DC control systems.
2. The site diesel fuel supply is maintained at minimum level, which may not be appropriate to contingency planning for major gas fuel interruptions such as the current Apache crisis at Varanus Island. The Wartsila units are gas fuel only.

3. Security gating to the main power station assets was not secured at all times.
4. At the time of audit there was no Horizon Power staff or on call contract maintenance resource available for the 6,600 Volt J&P Mirrlees Generator Switchgear. This requirement is crucial to the continuous operation of the power station in the event of asset failure.
5. At the time of audit there was no maintenance resource available for the 6,600/22,000 Volt generator step up transformer switchyard. This requirement is crucial to the continuous operation of the power station in the event of asset failure
6. At the time of audit there was no N -1 contingency provision for the 6,600/22,000 Volt generator step up transformer assets. There is no spare step up transformer available for the existing assets.
7. At the time of audit there was no maintenance resource available for the 22,000 Volt Distribution Switchboard within the power station complex. Records revealed circuit breaker maintenance in some cases had not been undertaken for six years. This is to be viewed in the context of the current frequency of NCS asset failures in Carnarvon and the associated circuit breaker fault operations.

## 4.3 Kimberley Region – Broome, Derby, Camballin and Fitzroy Crossing

The Kimberley Region is broken into two districts, the West Kimberley and East Kimberley. The West Kimberley manages distribution assets in Broome, Derby, Camballin and Fitzroy Crossing.

The review team initially identified from the Performance and Reliability Reports that the Kimberley Region Network Customer Services was a low risk area of non-compliance and would therefore not be a focus of the review field studies.

The ERA considered it appropriate that the audit address some of Horizon Power's remote asset operations and directed the West Kimberley Region be included in the review.

The inclusion of the West Kimberley Region is reflected in the agreed Audit Plan.

### 4.3.1 Network Customer Services

Network Customer Services site interviews and inspections were conducted in the West Kimberley over the three days 9 -11 July 2008. The site representatives and primary interviewees in Broome were Dr Habiib Habibullah, Network Manager and Kevin Moore, District Networks Officer.

The site representatives and primary interviewees for the Derby, Fitzroy Crossing and Camballin locations were Luke Plant and Stuart McKenzie from the District contractor firms MacFarlan Electrical and Jim McKenzie Electrical respectively

The following asset management key processes were the focus of the interviews and inspections in the West Kimberley:

- Asset Creation and Acquisition
- Asset Operations
- Asset Maintenance
- Asset Management Information System
- Asset Disposal
- Contingency Planning
- Risk Management

The effectiveness criteria related to these key processes as detailed in Appendix B were demonstrated, well defined and quantitatively controlled for the West Kimberley District.

The asset creation and acquisition requirements of the AMP are being translated into effective high quality local work packages. These packages are consistent with NCS requirements across its operational centres and detail clearly the work objectives and their link to the AMP. The logic for the work package is mostly well defined along with timing, resources to be deployed and the appropriated capital/operating budget.

Both Horizon Power staff and remote alliance electrical contracting firms demonstrate consistent execution of these work packages.

Progress with major network expansion projects such as High Voltage cabling under the Broome Airport to feed new load growth to the north of the town and the development of the Bilingurr Zone Substation is in line with the AMP targets.

High priority programmes such as replacement of network preformed helical termination twisties is also well advanced in line with AMP objectives with over 50% now completed in the West Kimberley.

The electrical contracting firms in Derby, Fitzroy Crossing and Camballin have replaced and disposed of most of the aerial copper conductor in those areas in accordance with the AMP. This was confirmed during the audit site inspections.

Representatives in both Derby and Broome expressed concern about transmission network design at the new EDL power stations and the impact on asset operations. Electricity supply system frequency control and asset failures related to fault level ratings of equipment were the two main concerns raised. It is noted that a new 33kV switch room is part of the Bilingurr substation development.

Concern was also raised about the alleged EDL practice of switching off West Kimberley electricity distribution feeders for electrical contractors. It was confirmed that the Field Services Coordinator Broome and MacFarlan Contracting in Derby, Fitzroy Crossing and Camballin were the authorised switching operators for West Kimberley.

While Horizon Power has a HV Switching Operations Manual, the implementation by contractors and IPP operators, and coordination between the parties was not in evidence during the review. Planned and Emergency Switching Programmes are available and confirmed to be in use, but an over arching system of control was not in

evidence. This is considered to be a significant safety and asset operational issue. The development and implementation of Instructions and Procedures on HV switching control and management is needed for network operational interaction between Horizon Power field staff, contractors and IPPs.

District staff conceded that the practice of IPPs liaising directly with electrical contractors had lead to some significant network control problems.

This highlighted the need for local documentation to provide guidelines to Horizon Power staff, contractors and IPPs at all times when interacting with each other during the execution of HV switching operations. The overarching switching operations recommendation to Horizon Power as made in Section 3.2.5 is suggested for the Kimberley as a specific high priority given the detailed concerns expressed by staff in this area during the review.

***Recommendation:*** Localised HV Switching Operations Staff Guidelines and training programmes are established to complement Horizon Power's existing and overarching HV Switching Operations Manual. The local guidelines will serve to acknowledge the specific switching requirements that have evolved in the Kimberley and contribute to a safer and more robust HV operational framework.

### 4.3.2 Generation Services

A Generation Services site interview and inspection was conducted in the West Kimberley on 11 July 2008 at the old Broome Power Station site. The site representative and interviewee in Broome was Larry Sutton, Power Station Supervisor.

Review of the IPP assets at Broome, Derby, Fitzroy Crossing and Camballin were out of scope. They were viewed for operational information only in relation to their interface with Horizon Power assets but no inspections or interviews were conducted.

The old power station is on full time standby with all Mirrlees generating assets well maintained. Mr Sutton and a small team of permanent staff are carrying out routine generator and switchgear maintenance.

## 4.4 Southern Region - Esperance

From an asset overview perspective the Esperance District along with the Midwest and Gascoyne districts forms Horizon Power's Southern Region. The Esperance District manages the network assets of Esperance, Hopetoun and Norseman.

The review team initially identified from the Performance and Reliability Reports that the Esperance District Network Customer Services was a low risk area of non-compliance and would therefore not be a focus of the review field studies.

The ERA considered it appropriate that the review address some of Horizon Power's great southern asset operations and directed the Esperance District be included in the review.

The inclusion of the Esperance District is reflected in the agreed Audit Plan.

### 4.4.1 Network Customer Services

Network Customer Services site interviews and inspections were conducted in the Esperance District over the two days 14-15 July 2008. The site representatives and primary interviewees in Esperance were Phil Keddie, Network Manager and Aaron Thiel, District Network Officer.

The following asset management key processes were the focus of the interviews and inspections in the Esperance District:

» Asset Creation and Acquisition

» Asset Operations

» Asset Maintenance

» Asset Management Information System

» Asset Disposal

» Contingency Planning

» Risk Management

The effectiveness criteria related to these asset management key processes as detailed in Appendix B were demonstrated as mostly quantitatively controlled and continuously improving within the Esperance District.

Well developed and structured local processes for AMP Project prioritisation, funding approval, establishment in DQM, as constructed DFIS updating, financial/design review and practical completion in MIMS were evident at audit.

Given the size of the Esperance network asset (approximately 3,000 km of overhead distribution powerlines) it is commendable that annual and four yearly interval pole inspections are up to date.

The audit confirmed these processes combined with the ENRUP programme are effectively addressing the asset management objectives declared in Sections 4 and 5 of the 2007 South AMP.

The revised 2008/09 AMP was provided for review and confirmed that while seven of the District's fifteen feeders remained non-compliant with SAIDI and SAIFI targets, underlying reliability of the network was improving significantly as a result of meeting AMP objectives over the review period.

Some of those objectives included in the new AMP are:

1. Addition of further reclosers, sectionalisers, motorised pole-top switches and feeder interconnections to the network has accelerated progress of the AMP objectives.
2. 3,157 out of a targeted 6,000 Twisties and Service Leads have been replaced.
3. Undergrounding has been made a priority in old copper conductor areas.

Mitigation of equipment failure, lightning strikes and vegetation in powerlines remain the major challenges on non-compliant network feeders in the Esperance District, however planned distribution undergrounding and definitive projects to address these issues should see the objectives of the 2008/09 AMP met in the year ahead.

Wood pole steel reinforcement programmes have been suspended as a result of lack of resources available to perform this work.

Bio - Security is a major issue in the Esperance District suggesting it may warrant a separate and more definitive reference in Section 3 of the 2008/09 AMP.

The review included extensive examination of local project files. They are generally of a high standard and the following observations only are made.

» Risk management requirements of the AMP are in most cases noted as a requirement of the project Short Form Business Case, but invariably were not included on the project file.

» Project file design drawings are drawn by local Horizon Power staff, but not independently checked and reviewed before being issued for construction.

» Where appropriate, the project(s) could be better linked to the declared AMP objectives.

# 5. Conclusions and Recommendations

## 5.1 Observations

- Network Customer Services (NCS) demonstrated a well managed and highly structured approach to asset management systems through their Asset Management Plan.
- The effectiveness of the asset management systems in place was verifiable in the NCS areas reviewed.
- Adherence to the twelve key ERA asset management process requirements by NCS is verifiable in the areas reviewed.
- Generation Services are taking a similar asset management approach and demonstrating best endeavours, however due to a recent change in Horizon Power's generation business strategy they are trailing NCS.
- Recommended areas for attention are:
  - Provision for expanded and more definitive environmental requirements in the NCS AMP.
  - Provision for expanded and more definitive contingency planning requirements in the NCS AMP.
  - Provision for expanded and more definitive asset condition monitoring requirements in the NCS AMP.
  - Generation Services would benefit from a similar approach to the NCS AMP to develop their asset management systems.
  - Generation Services current provisions for older power station switchgear maintenance are inadequate.
  - Generation Services current provisions for fire protection and security in the Carnarvon Power Station are inadequate.
  - NCS distribution network locations currently rated as 'Extreme Risk'. Consideration of accelerated bulk asset replacement programmes is recommended. Public safety may be a significant issue.
  - High Voltage Switching Operations Framework. The review identified several areas of switching error (Carnarvon) and unauthorised switching of assets (West Kimberley) in the Horizon Power network.

## 5.2 Changes to the Licence

A number of the Generating Works listed in current licence has been transferred to IPPs. Horizon Power is preparing a request to the Economic Regulation Authority to amended Section 3.1 of Schedule 1 of the Licence.

## 5.3 Review Sign-Off

This review report was prepared to evaluate Horizon Power's Asset Management Systems effectiveness as detailed in the Electrical Licence EIRL 2 for the period 30 March 2006 to 31 March 2008. The review was undertaken in a manner consistent with Australian Auditing Standards for Performance Auditing (AUS 806 and AUS 808) and within the scope of the "Audit Guidelines: Electricity, Gas and Water Licenses, Economic Regulation Authority". The assessment, findings and recommendations contained in this report were based on the information and documents provided by Horizon Power's staff, and the professional endeavors of the review team members.

Norman McKendry

Business Group Manager Energy

GHD Pty Ltd

28 November 2008

Mark Bourhill

Manager Asset Management

# 6. Post Review Implementation Plan

The following post review implementation plan was agreed with Horizon Power to address the improvement recommendations included in this report:

**Table 8 Post Review Implementation Plan**

| Issue | Action | By Whom | When |
|---|---|---|---|
| Asset Planning | Investigate the "Extreme Risk" assets listed in the Risk Register with the view to accelerated bulk asset replacement of conductors and timber poles exposed to severe termite and salt environments. This recommended action is considered to be a priority in Carnarvon, where in-service conductor and pole assets are currently exhibiting structural failure. | Brett Hovingh<br>Scott Beckwith | Apr 2009 |
| | Review the past wood pole steel reinforcement programme and practices for technical appropriateness into the future and possible reintroduction to the Esperance District as part of the 2008/09 AMP. | Scott Beckwith | Apr 2009 |
| | Finalise the Generation AMP. | Brett Hovingh<br>Scott Beckwith | Apr 2009 |
| Asset Creation and Acquisition | Develop policy and procedures to ensure that distribution design drawings are independently checked and reviewed before issuing to staff and/or contractors for construction. | Brett Hovingh<br>Scott Beckwith | Jun 2009 |
| | Implement a standard project practical completion and handover certification for all regions. | Brett Hovingh | Apr 2009 |
| Asset Disposal | Prepare disposal plans for obsolete power stations and redundant depot stockpiled assets. | Justin Murphy<br>Brett Hovingh<br>Scott Beckwith | Jun 2009 |
| Environmental Analysis | Develop environmental analysis sections in Horizon Power's individual NCS Regional AMPs with a direct link to local environment planning data available from the external peak bodies, Western Australian Planning Commission and Landcorp. | Brett Hovingh<br>Scott Beckwith | Apr 2009 |

| Issue | Action | By Whom | When |
|---|---|---|---|
| | Develop environmental analysis sections in Horizon Power's Generation AMP under preparation with a direct link to local environment planning data available from the external peak bodies, Western Australian Planning Commission and Landcorp. | Scott Beckwith | Apr 2009 |
| Asset Operations | Amend the existing HV Switching Operations Manual to include "Instructions and Procedures" that effectively guide the electricity network operational interaction between Horizon Power Electrical Switching Operators, Electrical Contractors and IPPs.<br>Prepare localised HV Switching Operations Staff Guidelines and training programmes to complement Horizon Power's existing and overarching HV Switching Operations Manual. The local guidelines will serve to acknowledge the specific switching requirements that have evolved for each district and contribute to a safer and more robust HV operational framework. | Shane Eeles | Jun 2009 |
| | Prepare a Bio-Security Plan as a definitive section of the Esperance 2008/09 AMP | Phil Keddie | Apr 2009 |
| | Review fire protection requirements and segregation of primary switchgear from control systems in Power Station Control Rooms. | Brett Hovingh<br>Scott Beckwith | Jun 2009 |
| | Review the Carnarvon Power Station minimum diesel fuel stock holdings. | Scott Beckwith | Apr 2009 |
| Asset Maintenance | Provide greater visibility to condition monitoring in the NSC Regional AMPs and link directly to asset risk registers to ensure asset maintenance/replacement programmes are given high priority in areas where unacceptable risks have been identified and recorded by Horizon Power or its agent(s). | Brett Hovingh<br>Scott Beckwith | Apr 2009 |
| | Review the maintenance resource requirements of the Carnarvon Power Station 6.6kV Generator Switchgear, 22kV Distribution Switchgear and 6.6/22kV Transformers. Check other Horizon Power owned power station operations for appropriate levels of switchgear maintenance resourcing. | Brett Hovingh<br>Scott Beckwith | Jun 2009 |

| Issue | Action | By Whom | When |
|---|---|---|---|
| Asset Management Information System | Horizon Power considers investigating options to establish a platform of advanced network management, asset management and work management systems independent of Western Power as a contingency should the use of and support for the current MIMS Ellipse and ENMAC be withdrawn in the future. | Brett Hovingh<br>Scott Beckwith<br>David Orr | Jun 2009 |
| Risk Management | Complete the Generation Risk Assessment; prepare the Risk Register and Risk Mitigation Plan.<br>Secure the availability of emergency HV switchgear maintenance/repair resources for Carnarvon Power Station. Resources do not exist at present and risk to continuous operation is high.<br>Prepare risk assessments and management plans for regional and district level systems, and include risks in the Risk Register. | Brett Hovingh<br>Scott Beckwith<br>Justin Murphy | Apr 2009 |
| Contingency Planning | Finalise and issue the NCS Regional/District Contingency Plans.<br>Include Contingency Planning in the NCS AMPs.<br>Regularly test the Contingency Plans. | Brett Hovingh<br>Scott Beckwith | Apr 2009 |
| | Prepare Power Station Contingency Plans.<br>Include Contingency Planning in the Generation AMP.<br>Regularly test the Contingency Plans. | Brett Hovingh<br>Scott Beckwith | Apr 2009 |
| | Review the N-1 contingency provision for 6.6/22kV transformers at Carnarvon Power Station. | Scott Beckwith | Apr 2009 |
| Review of AMS | Review and update asset management planning documentation including corporate policy, plans and procedures that were developed for Network Customer Services and Generation Services during the Horizon Power inception but have not been reviewed for the past two years. Some documentation remains in the Western Power livery and format.<br>Special attention is required to achieve greater consistency with asset practical completion and hand over certificates. Field staff to be reminded of their adherence accountability to Horizon Power's five step Project Gating Process. | Scott Beckwith<br>Brett Hovingh | Jun 2009 |
| Changes to the Licence | Delete the Power Stations included in the Licence that have been transferred to IPPs. | Frank Buttigieg | Feb 2009 |

Appendix A

# Risk Assessment Scoring System

Extracted from the Appendix 1 “Audit Guidelines: Electricity, Gas and Water Licences, Economic Regulation Authority”

**Consequence ratings**

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

**Likelihood ratings**

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

**Inherent risk rating**

| Likelihood | Consequence | | |
|---|---|---|---|
| | 1. Minor | 2. Moderate | 3. Major |
| A. Likely | Medium | High | High |
| B. Probable | Low | Medium | High |
| C. Unlikely | Low | Medium | High |

**Description of inherent risk ratings**

| Level | Description |
|---|---|
| High | Likely to cause major damage, disruption or breach of licence obligations |
| Medium | Unlikely to cause major damage but may threaten the efficiency and effectiveness of service |
| Low | Unlikely to occur and consequences are relatively minor |

**Adequacy ratings for existing controls**

| Level | | Description |
|---|---|---|
| 3 | Strong | Strong controls that are sufficient for the identified risks |
| 2 | Moderate | Moderate controls that cover significant risks; improvement possible |
| 1 | Weak | Controls are weak or non-existent and have minimal impact on the risks |

**Assessment of audit priority**

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

Appendix B

# Record of Interview Template

## Asset Management System Key Processes and Effectiveness Criteria

Assessment of  ……Conducted on……

Interviewee……..

**Asset management system key processes and effectiveness criteria**

| Key process | Effectiveness criteria | Compliance Assessment | Comments |
|---|---|---|---|
| **1. Asset planning**<br><br>Asset planning strategies are focused on meeting customer needs in the most effective and efficient manner (delivering the right service at the right price).<br><br>**Outcome**<br><br>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 process and objectives reflect the needs of all stakeholders and is integrated with business planning<br>» Service levels are defined<br>» Non-asset options (eg demand management) are considered<br>» Lifecycle costs of owning and operating assets are assessed<br>» Funding options are evaluated<br>» Costs are justified and cost drivers identified<br>» Likelihood and consequences of asset failure are predicted<br>» Plans are regularly reviewed and updated<br>**Example of Review Approach**<br>» Assess the adequacy of the asset planning process<br>» Assess the adequacy of the asset management plan<br>» Assess whether the asset management plan is up-to-date and implemented in practice<br>» Assess whether the plan clearly assigns responsibilities and whether these have been applied in practice | | |

| Key process | Effectiveness criteria | Compliance Assessment | Comments |
|---|---|---|---|
| **2. Asset creation and acquisition**<br><br>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.<br><br>**Outcome**<br><br>A more economic, efficient and cost-effective asset acquisition framework which will reduce demand for new assets, lower service costs and improve service delivery. | » Full project evaluations are undertaken for new assets, including comparative assessment of non-asset solutions<br>» Evaluations include all life-cycle costs<br>» Projects reflect sound engineering and business decisions<br>» Commissioning tests are documented and completed<br>» Ongoing legal/environmental/safety obligations of the asset owner are assigned and understood<br>**Example of Review Approach**<br>» Assess the adequacy of policies and procedures covering the creation and acquisition of assets<br>» Select a sample of creations/ acquisitions over the review period and confirm that adequate procedures have been followed and actual costs are as predicted | | |
| **3. Asset disposal**<br><br>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.<br><br>**Outcome**<br><br>Effective management of the disposal process will minimise holdings of surplus and under-performing assets and will lower | » Under-utilised and under-performing assets are identified as part of a regular systematic review process<br>» The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken<br>» Disposal alternatives are evaluated<br>» There is a replacement strategy for assets<br>**Example of Review Approach**<br>» Assess the adequacy of policies and procedures covering the identification of under-performing assets, disposal of assets and replacement strategy<br>» Determine whether a regular review of the usefulness of assets is performed | | |

| Key process | Effectiveness criteria | Compliance Assessment | Comments |
|---|---|---|---|
| service costs. | » Select a sample of disposals over the review period and confirm that adequate procedures have been followed | | |
| **4. Environmental analysis**<br><br>Environmental analysis examines the asset system environment and assesses all external factors affecting the asset system.<br><br>**Outcome**<br><br>The asset management system regularly assesses external opportunities and threats and takes corrective action to maintain performance requirements. | » Opportunities and threats in the system environment are assessed<br>» Performance standards (availability of service, capacity, continuity, emergency response, etc) are measured and achieved<br>» Compliance with statutory and regulatory requirements<br>» Achievement of customer service levels<br>**Example of Review Approach**<br>» Review achievement of performance and service standards over the audit period<br>» Investigate any breaches and assess corrective action taken<br>» Review the adequacy of reporting and monitoring tools | | |
| **5. Asset operations**<br><br>Operations functions relate to the day-to-day running of assets and directly affect service levels and costs.<br><br>**Outcome**<br><br>Operations plans adequately document the processes and knowledge of staff in the operation of assets so that | » Operational policies and procedures are documented and linked to service levels required<br>» Risk management is applied to prioritise operations tasks<br>» 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<br>» Operational costs are measured and monitored<br>» Staff receive training commensurate with their responsibilities<br>**Example of Review Approach** | | |

| Key process | Effectiveness criteria | Compliance Assessment | Comments |
|---|---|---|---|
| service levels can be consistently achieved. | » Assess the adequacy of policies and procedures covering operations functions<br>» Assess the adequacy of staff resourcing and training<br>» Confirm the policies and procedures have been followed during the review period by testing of asset register, observation of operational procedures, analysis of costs, etc<br>» Assess the significance of exceptions identified and whether adequate corrective action has been taken | | |
| **6. Asset maintenance**<br>Maintenance functions relate to the upkeep of assets and directly affect service levels and costs.<br>**Outcome**<br>Maintenance plans cover the scheduling and resourcing of the maintenance tasks so that work can be done on time and on cost. | » Maintenance policies and procedures are documented and linked to service levels required<br>» Regular inspections are undertaken of asset performance and condition<br>» Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule<br>» Failures are analysed and operational/maintenance plans adjusted where necessary<br>» Risk management is applied to prioritise maintenance tasks<br>» Maintenance costs are measured and monitored<br>**Example of Review Approach**<br>» Assess the adequacy of policies and procedures covering maintenance functions<br>» Confirm the policies and procedures have been followed during the review period by testing of maintenance schedules, analysis of costs, etc<br>» Assess the significance of exceptions identified and whether adequate corrective action has been taken | | |

| Key process | Effectiveness criteria | Compliance Assessment | Comments |
|---|---|---|---|
| **7. Asset Management Information System (MIS)**<br><br>An asset management information system is a combination of processes, data and software that support the asset management functions.<br><br>**Outcome**<br><br>The asset management information system provides authorised, complete and accurate information for the day-to-date running of the asset management system.<br><br>The focus of the review is the accuracy of performance information used by the licensee to monitor and report on service standards. | » Adequate system documentation for users and IT operators<br>» Input controls include appropriate verification and validation of data entered into the system<br>» Logical security access controls appear adequate, such as passwords<br>» Physical security access controls appear adequate<br>» Data backup procedures appear adequate<br>» Key computations related to licensee performance reporting are materially accurate<br>» Management reports appear adequate for the licensee to monitor licence obligations<br>**Example of Review Approach**<br>» Assess the adequacy of policies and procedures covering the general control and security of the computer systems used to provide management information on service standards/licence obligations<br>» Confirm that management reports on service standards/licence obligations are being reviewed and significant exceptions to service standards are promptly followed up and actioned | | |
| **8. Risk management**<br><br>Risk management involves the identification of risks and their management within an acceptable level of risk.<br><br>**Outcome** | » Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system<br>» Risks are documented in a risk register and treatment plans are actioned and monitored<br>» The probability and consequences of asset failure are regularly assessed | | |

| Key process | Effectiveness criteria | Compliance Assessment | Comments |
|---|---|---|---|
| An effective risk management framework is applied to manage risks related to the maintenance of service standards. | **Example of Review Approach**<br>» Assess the adequacy of policies and procedures covering risk management and contingency planning<br>» Assess whether the risk management policies and procedures have been applied in practice<br>» Assess the adequacy of staff understanding and training on risk management | | |
| **9. Contingency planning**<br>Contingency plans document the steps to deal with the unexpected failure of an asset.<br>**Outcome**<br>Contingency plans have been developed and tested to minimise any significant disruptions to service standards. | » Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks<br>**Example of Review Approach**<br>» Determine whether contingency plans have been developed and are current<br>» Determine whether contingency plans have been tested. If so, review the results to confirm that any improvements identified have been actioned. | | |
| **10. Financial planning**<br>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.<br>**Outcome**<br>A financial plan that is reliable and provides for the long-term | » The financial plan states the financial objectives and strategies and actions to achieve the objectives<br>» The financial plan identifies the source of funds for capital expenditure and recurrent costs<br>» The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets)<br>» The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period | | |

| Key process | Effectiveness criteria | Compliance Assessment | Comments |
|---|---|---|---|
| financial viability of the services. | » The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services<br>» Significant variances in actual/budget income and expenses are identified and corrective action taken where necessary<br>**Example of Review Approach**<br>» Obtain an understanding of the financial planning, budgeting and reporting process and assess its effectiveness<br>» Obtain a copy of the current financial plan (including budget/actual) and assess whether the process is being followed | | |
| **11. Capital expenditure planning**<br>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.<br>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. | » There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates<br>» The plan provide reasons for capital expenditure and timing of expenditure<br>» The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan<br>» There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned<br>**Example of Review Approach**<br>» Obtain an understanding of the capital expenditure planning process and assess its effectiveness<br>» Obtain a copy of the capital expenditure plan for the current year and assess whether the process is being followed | | |

| Key process | Effectiveness criteria | Compliance Assessment | Comments |
|---|---|---|---|
| **Outcome**<br>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. | | | |
| 12. Review of AMS<br>The asset management system is regularly reviewed and updated<br>Outcome<br>Review of the Asset Management System to ensure the effectiveness of the integration of its components and their currency. | » A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current<br>» Independent reviews (eg internal audit) are performed of the asset management system<br>**Example of Review Approach**<br>» Determine when the asset management plan was last updated and assess whether any significant changes have occurred<br>» Determine whether any independent reviews have been performed. If so, review results and action taken<br>» Consider the need to update the asset management plan based on the results of this review | | |

Appendix C

# Documents and Files Reviewed

# Documents and Files Reviewed by the Review team

**Documents**

- Audit Guidelines: Electricity, Gas and Water Licences, Economic Regulation Authority, September 2006.
- Standards Australia, AS/NZS 4380:2004, Risk Management.
- Integrated Regional Licence, Regional Power Corporation, September 2007.
- Horizon Power Organisation Chart 2007.
- Horizon Power, Role Descriptions for:
  - General Manager – Network Customer Services;
  - Technical Manager – Network Customer Services;
  - Manager Generation Services – Generation and Technical Services;
  - Generation Asset Manager – Generation Services; and
  - Generation Operations Manager - Generation Services.
- Horizon Power, Network Customer Services, Network Asset & Works Management Plan, Master Plan, 2007/08.
- Horizon Power, Network Customer Services, Network Management Plan, Pilbara Region, 2007/08.
- Horizon Power, Network Customer Services, Network Management Plan, North West Interconnected System, 2007/08.
- Horizon Power, Network Customer Services, Network Management Plan, Kimberley Region, 2007/08.
- Horizon Power, Network Customer Services, Network Management Plan, South Region, 2007/08.
- Horizon Power, Risk Management Framework, 14 March 2007.
- Horizon Power, NCS Risk Register, DMS 3075656v3.
- Horizon Power, IA 026 Review of Asset Management System & Plan for Network Services Assets, Internal Audit Plan.
- Horizon Power, IA 027 Review of Asset Management System & Plan for Generation Assets, Internal Audit Plan.
- Horizon Power, Network Quality and Reliability of Supply, Annual Report 2006/07.
- Horizon Power, Electricity Industry (Network Quality and Reliability of Supply) Code 2005, Audit Report, 20 August 2007.
- Horizon Power, Customer Charter.
- Horizon Power, 2007, December year to date, Report on Performance, General Release.
- Horizon Power, Annual Report 2007.
- Extract from the Integrated Regional Licence Application, Section 6 Technical Information.
- Network Asset and Work Management Process.

- Horizon Power, Asset Management, Asset Decommissioning and Divestment Procedure, HP/AM/02/001 Rev B, 3 April 2006.
- Horizon Power Crisis, Emergency & Business Continuity System, Part 1 – System Description, DMS3071997, 13 June 2008.
- Horizon Power Crisis, Emergency & Business Continuity System, Part 2 – Crisis Management Plan, DMS3107344V1, 13 June 2008.
- Horizon Power Crisis, Emergency & Business Continuity System, Part 3 – Business Unit Emergency Management Plan, DMS3071996, 13 June 2008.
- Horizon Power, Emergency Procedure, Severe Storm and Cyclone Response, HP/EMP/04/002, DMS3066717, Revision F, 6 July 2007.
- Horizon Power, Emergency Management Plan, Section 12 of Corporate Crisis Management Plan, HP/EMP/01/001 Rev B 3 April 2006.
- Horizon Power, Business Plan 2005/2006, DMS2644122, 28 November 2005.
- Horizon Power, Asset Management, Capital Projects Procedure, RPD/AM/08/002 Rev B, 3 April 2006.
- Horizon Power, Gating Process, Carnarvon Generation Project, Business Case, DMS 3043141v1.
- Horizon Power, Gating – Phases & Principles.
- Regional Branch, Maintenance Procedure, Generation Maintenance Guidelines, RPD/OP/06/038, 25 October 2004.
- Horizon Power, Administration Procedure, Power Station Monthly Operational Report, HP/AP/06/001 Rev A, 3 April 2006.
- Horizon Power, Operational Procedure, Specific Operating Procedures for Carnarvon Power Station, HP/OP/06/003, 3 April 2006.
- Networks Business Unit Horizon Power, Asset Management, Carnarvon Power Station Facilities Description, HP/AM/06/004 Rev B, 3 April 2006.
- Power Station Maintenance Programme 2007/2008 – 2011/2012, #3021243V1 file AM/77 (53)V1.

**Project Files**

- KA/119/09, Lot 219 & 1151 Nairn St, 55m HV & 55m LV & 500kVA Transformer near McCourt.
- KA/175/07, Australian Laboratory Services, Lot 1535 Pyramid Rd, Karratha.
- KA/384/07, Replace 2 Cast Pot Heads, Millstream West FDR, Bulgarra.
- KA/58/08, Replace LV Crossarm on Pole 7083, Anderson LIA.
- KA/50/08, Install Supplied 240m LV Cable & 150m Conduit at Gas Ridge.
- KA/187/07, Replace Pts & Pole No 6939, Coolawanlad Rd.
- AM/119/ER010117 (DQM)V1, North River Tower Crossing – North River Feeder, Gascoyne River Off End of Marmion Street.
- AM/119/ER010122 (DQM)V1, Upgrade South Carnarvon Feeder – Replace Suspension Arms.

- AM/119/ER010128 (DQM)V1, Feeder No 4 – Denham Power station (Connections Network).
- AM/119/ER010114 (DQM)V1, South River Tower Crossing – Bibawarra Rd.
- AM/119/ER010107 (DQM)V1, Reconductor White Phase Babbage Island from Norwest Sea Flood to Pelican Point
- AM/119/ER010111 (DQM)V1, Gateway LV Replacement
- AM/119/ER010119 (DQM)V1, Wise Street LV Upgrade
- AM/119/ER010109 (DQM)V1, Short Form Business Case to Replace Rotten Wires
- AM/119/ER010116 (DQM)V1, Install New Pad Mount 315kVA TX and Underground Supplies Morgantown Area
- AM/119/ER010110 (DQM)V1, Grandberry Tx Replacement
- AM/119/ER010108 (DQM)V1, Burkets – HV Reconstruction – North River Road
- AM/119/ER010118 (DQM)V1, Borefields Automation Project – South River Borefield
- AM/119/ER010113 (DQM)V1, Carnarvon Boulevard (Woolworths) Distribution Board Upgrade
- AM/119/ER010121 (DQM)V1, Replace LV Overhead Copper Conductor with 150mm ABC
- AM/119/ER010123 (DQM)V1, Mango Mitigation South River Rd – Remove Private Meter and Switchboard off HP Poles
- WO GS000742, Intermediate Pole Change, 14 McLeod St, Carnarvon
- WO GS000743, Intermediate Pole Change, 48 Smallcross St, Carnarvon
- WO GS000744, Intermediate Pole Change, Butchers St Kindergarten, Carnarvon
- WO GS000752, Gascoyne Junction Maintenance
- WO GS000653, Realign Mini Pillar move metro stay Lot 201 Richardson St, Carnarvon
- WO GS000658, Live Line Washing All Feeders except Lake McLeod 07/08 Season, Carnarvon
- WO GS000533, Patrols and Removal of Crows Nests, Lake McLeod 33kV Line
- WO 00014008, TX Upgrade Pole and Stay Replacement Pelican Point Carnarvon
- WO 00014072, Mini Pillar Relocation, 81 Whitlock St, Carnarvon
- WO 00014246, LV Mains Replacement, 6 Crowther St, Carnarvon
- WO GS000648, Replace Poles and Stays, South River Feeder
- WO CF000041, Replace Pts 158 NWC Highway
- WO GS000686, Urgent Repairs for Thermographic Survey, Denham
- WO GS000661, Carry Out Annual; Inspection, Denham Wind Farm Transformer, Denham
- WO GS000691, Change 1 Backstay to Metro Stay Pole #673386 Lot 301 Spaven Way, Denham
- WO GS000654, Maintenance Kennedy St Feeder, Exmouth
- WO GS000655, Maintenance Nimitz Feeder, Exmouth
- WO SE002458, Carry Out Annual Inspection, Exmouth Wind Farm Transformer
- WO GS000687, Urgent Repairs for Thermographic Survey, Exmouth

- WO GS000727, Urgent Maintenance Change Transformer Charles Knife Learmonth Feeder, Exmouth
- WO GS000495, 46 Kennedy Street Install Outrigger Stay
- ED/85/1(86)V3, Electricity Distribution Reporting – Fault Reports, 01-06-06 to 31-10-07
- AM/119.ESO1006 (DQM)V1, Subdivision LeGrand Estate Stage 5
- AM/119.ESO1011 (DQM)V1, Hopetoun Subdivision Stage 3B
- AM/119.ESO1017 (DQM)V1, Tuart Forrest Stage 3
- AM/119.ESO1010 (DQM)V1, Hopetoun Subdivision Stage 3A
- AM/119.ESO1018 (DQM)V1, L774 Canning Drive, Esperance
- AM/119.ESO1019 (DQM)V1, Tuart Forrest Grove Stage 4
- AM/119/ERO10102 (DQM)V1, Pole & Pillars L151 Chambers Street, L 300 Gibson Way, L 504 Chapman Street
- AM/119/ERO10105 (DQM)V1, 3 North Road Pillar
- AM/119/ERO10124 (DQM)V1, Replace Damaged Steel Standards in Esperance CBD
- AM/119/ERO10125 (DQM)V1, No 31 Pink Lake Road
- AM/119/ERO10126 (DQM)V1, Relocate Hopetoun Reclosers
- AM/119/ERO10153 (DQM)V1, Underground Twilight Beach Road
- AM/119/ERO10154 (DQM)V1, Underground Pink Lake Road Stage 1
- AM/119/ERO101038 (DQM)V1, Additional Underground Roberts Street, Norseman
- AM/119/ERO10138 (DQM)V1, Westnacott Street Underground
- AM/119/ERO10132 (DQM)V1, Install New TX and Underground Milner St
- AM/119/ERO10131 (DQM)V1, Dean Street Transformer
- AM/119/ERO10130 (DQM)V1, Underground TX ESP0006 and Circuits, Burton Road
- AM/119/ERO10095 (DQM)V1, LV Upgrade Norseman Road
- AM/119/ERO10133 (DQM)V1, Wegner Drive Transformer
- AM/119/ERO10076 (DQM)V1, Install New Transformer in Gray Street, Underground Brockman Street
- AM/119/ERO10135 (DQM)V1, Underground NF41 Tranformer Crokers Caravan Park
- AM/119/ERO10136 (DQM)V1, Underground Davis Road
- AM/119/ERO10078 (DQM)V1, Replace HV Pole, Norseman
- AM/119/EPO10663 (DQM)V1, Water Corporation, Bore 22
- AM/119/EPO10662 (DQM)V1, 150 Pink Lake Rd, Esperance
- AM/119/EPO10663 (DQM)V1, 134 Johns St, Esperance
- AM/119/EPO10665 (DQM)V1, Lot 276 9 Price Street, Hopetoun
- AM/119/EPO10666 (DQM)V1, Shire of Esperance – Helms Drive (Install Light)

- AM/119/EPO10667 (DQM)V1, Shire of Esperance – Barook Road (Install Light)
- AM/119/EPO10668 (DQM)V1, Shire of Esperance – Eleven Mile Beach Road – Spencer (Install Light)
- AM/119/EPO10669 (DQM)V1, Shire of Esperance – Eleven Beach Mile Road – East Sanctuary (Install Light)
- AM/119/EPO10670 (DQM)V1, Shire of Esperance – Eleven Beach Mile Road – West Sanctuary (Install Light)
- AM/119/EPO10169 (DQM)V1, P-Pillar (Cust Cost) New TX Pole – Relocate TX to Mainline (HP Cost) – Loc 203 Fisheries Road M61
- AM/119/EPO10170 (DQM)V1, P-Pillar Lot 507 Forrest St, WAWA Sewerage Pump No 6
- AM/119/EPO10171 (DQM)V1, P-Pillar Lot 842 Dean St WAWA Sewerage Pump

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