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*Audit Report*  
Horizon Power  
2016 Network Quality and Reliability of Supply  
Performance Audit -  
Operation of Compliance Monitoring Systems

September 2016

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## executive summary

Under the Electricity Industry (Network Quality and Reliability of Supply) Code 2005 (the Code), Division 3, Section 26, Horizon Power is required to arrange for an independent audit of the operation of the systems that are in place to monitor its compliance with Part 2 of the Code or an instrument made under Section 14(3). In June 2016 Horizon Power commissioned Qualeng to carry out the audit in respect of the operation of its systems to cover the period 1 July 2015 to 30 June 2016.

Horizon Power supplies electricity services to 38 systems consisting of 34 Non-Interconnected (or islanded) Systems in regional towns and remote communities, three systems (Kununurra, Wyndham and Lake Argyle) connected through a transmission network in the East Kimberley, two rural systems associated with Esperance and Hopetoun, and the North West Interconnected System (NWIS) in the Pilbara. These systems include the Kimberley, Pilbara, Gascoyne, Mid West and Southern Goldfields regions. In addition to its own power generation plant, Horizon Power also purchases electricity from third parties.

The audit was conducted between August and September 2016 and included:

- review of actions resulting from previous audit recommendations;
- identification and review of supporting documents;
- interviews of key personnel;
- review of evidence, data, reports and processes demonstrating the operation and performance of the systems.

The previous audit (2015) had found four Code non-compliances. Of these one was a long term non-compliance with a recommendation that was investigated by Horizon Power in the previous audit period (July 2014 to June 2015). By June 2015 no effective solution had been found by Horizon Power, the non-compliance remained open and no further recommendation was recorded in the previous audit.

The current audit has found that out of the three recommendations made in the previous audit, there had been action on one:

- Documents related to the monitoring of electricity supply quality were in need of review to see whether they were still current and applicable. This action has been progressed and the documents have been updated.

The other actions were not closed and are included in this audit findings (2016).

Horizon Power has a number of systems that monitor its performance against the requirement of the Code:

- the Electricity Network Management and Control system (ENMAC) and the Trouble Call System (TCS) are used to manage and monitor faults through the SCADA system, customer calls and fault detection by field crews;
- Horizon Power relies on customer complaints to identify electricity supply quality issues and non-compliances with outage notifications;
- "Power Quality Investigations" deal with incidents and customer complaints due to electricity supply quality issues;
- customers with special health needs are registered and identified in the system;
- there are procedures for notification of planned outages;
- alternate power supplies are available to mitigate interruptions;
- there are systems in place, through Asset Management Reports, monitoring interruptions over 12 hours, when frequency of interruptions is over 16 per customer per year, planned outages over 4 or 6 hours, electricity supply quality incident numbers and overall duration of interruptions per customer over 4 years;
- remedial projects are initiated where regional systems are not performing.

As well as the two actions open from the previous audit four (4) additional findings were recorded on completion of the audit.

One finding was open from the previous audit, however as the action had not been found feasible by Horizon Power, no recommendation was made at this time:

- Horizon Power system relies on customer complaints to monitor compliance with the electricity supply quality specified in the Code. There was insufficient evidence to show that the monitoring process implemented by Horizon Power ensured that electricity supplied to a customer's electrical installations, as measured at the point of connection of those installations to the network, at all times complied with the standards prescribed by sections 6(2) and 7 of the Code. No records were available of flicker or harmonics measurements at customers connections. No evidence was available to show that incidents investigated had been analysed for flicker or harmonics compliance.

The remaining five (5) findings have been identified as Opportunities for Improvement:

- The "Power Quality Investigation Handbook" is a high level procedure on how to follow the process for electricity supply quality investigations. It lists applicable legislative and regulatory requirements, however it makes no reference to the Code. Horizon Power documentation should provide guidance to testing and investigations related to network quality including for compliance with the Code Quality standards.
- The process provided by Horizon Power's Flicker Allocation Manual and Harmonics

Allocation Manual does not include for testing or monitoring a customer installation to the Code Quality of Supply (QoS) requirements. Customers installations not meeting the allocated limits may then affect other customers supplies in breach of the Code requirements.


- The procedures for the measurement of electricity supply quality in the field do not have sufficient details to instruct or guide the field crews in checking for compliance with the Code QoS, in terms of voltage fluctuations (flicker) and harmonics.
- The system monitors electricity supply quality reactively through customer complaints. No complaint was deemed to be due to QoS as defined by the Code however conclusions from incident testing were not clear in the available documentation:
  - Incident INCD-12001-v resulted in the comment: "loggers to be installed ASAP". Loggers were installed and incident closed however there was no update on the causes of the incident and closure of the incident was recorded but results of the investigation were not evident;
  - 4 causes were noted as "Unknown"
  - 1 cause was shown as "Undefined".
- The system monitoring that notifications are sent to customers 72 hours prior to outages relies on customer complaints for highlighting non-compliance. As indicated by outage complaint figures this is not a sound measure of compliance:
  - except for the Esperance office, there was insufficient evidence to show that the system implemented to provide notifications at least 72 hours before each planned outage was monitored effectively.

Actions have been identified for each of the above Opportunities for Improvement.

Based on the scope of the audit defined in section 26 of the Code, and except for the findings noted above, Qualeng has found that the operation of Horizon Power's systems which monitor compliance with the requirements of the Code, was in compliance with the requirements of Part 2 of the Code, "Quality and Reliability Standards".

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

**Approvals**

Representation	Name	Signature	Position	Date
Auditor:	M Zammit		Lead Auditor / Engineering Manager, Qualeng	22/09/2016

**Issue Status**

Issue No	Date	Description	Approved
A	13/9/2016	First Draft	MZ
1	20/9/2016	First Formal Issue	MZ
2	22/9/2016	Updated Executive Summary and Compliance Summary; minor corrections	MZ

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# 1 *Objectives and Scope of Audit*

## 1.1 INTRODUCTION

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Horizon Power has an Electricity Integrated Regional Licence (EIRL2) (the licence) issued by the Economic Regulation Authority (the Authority) under Sections 7 and 15(2) of the Electricity Industry Act 2004 (WA) (the Act). Under the scope of the licence Horizon Power supplies electricity to approximately 100,000 residents and 10,000 businesses, including major industry. The services are provided to over 46,000 customer connections to an area of approximately 2.3 million square kilometres extending from the Kimberley in the North to Esperance, Norseman and Hopetoun in the South and including the Kimberley, Pilbara, Gascoyne, Mid West and Southern Goldfields regions in Western Australia.

Services are provided through 38 systems including 34 Non-Interconnected (or islanded) Systems in regional towns and remote communities, three systems (Kununurra, Wyndham and Lake Argyle) connected through a transmission network in the East Kimberley, two rural systems associated with Esperance and Hopetoun and the North West Interconnected System (NWIS). In addition to power generating plant in Carnarvon, Marble Bar, Nullagine, Kununurra and Wyndham, Horizon Power also owns generating plant that is managed by a third party and purchases electricity from third parties.

Under the terms of the Act Horizon Power is required to comply with the Electricity Industry (Network Quality and Reliability of Supply) Code 2005 (the Code). In accordance with Division 3 "Performance reporting", Section 26 "Annual report on monitoring systems" of the Code, Horizon Power is required to arrange for an independent audit of the operation of the systems that are in place to monitor its compliance with Part 2 of the Code or an instrument under Section 14(3).

In June 2016 Horizon Power commissioned Qualeng to carry out the Performance Audit to cover the period 1 July 2015 to 30 June 2016.

The audit has been conducted and this report prepared in accordance with the Code.

## 1.2 AUDIT OBJECTIVES

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The purpose of the Network Quality and Reliability of Supply (NQRS) audit is to assess and report on the operation of the systems implemented by the licensee to monitor its compliance with Part 2 of the Code or an instrument under section 14(3).

### 1.3 AUDIT SCOPE

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Part 2 of the Code includes 4 Divisions:

1. Division 1, "Quality Standards" for compliance with requirements for quality of supply at the point of connection to the customer, in regard to voltage fluctuations and harmonic distortion.
2. Division 2, "Standards for the interruption of supply to individual customers" provides for the maintenance of supply and management of interruptions to customers, both in terms of the duration and number of interruptions. It includes for:
  - 2.1. Provision of supply with the minimum number and duration of interruptions.
  - 2.2. Consideration of providing alternative supply if the interruption is expected to be significant, its effect substantial or if the customer has special health needs that require continuous supply.
  - 2.3. Allowing planned interruptions if the customer is notified within a suitable time and where the duration does not exceed 6 hours, or 4 hours for temperatures over 30 C or north of the 26th parallel.
  - 2.4. Provides for the distributor to remedy the causes of interruptions or enter into alternative arrangements if the supply has been interrupted more than 12 hours continuously or more than 16 times in the prescribed 12 months and it is considered that the prescribed standard is unlikely to be met for the customer.
3. Division 3, "Standards for the duration of interruptions of supply in particular areas" provides that the average length of interruptions should not exceed 290 minutes in any area of the State, other than the Perth CBD and urban areas and 160 minutes for urban areas other than the Perth CBD (calculated as average of the yearly averages over 4 years).
4. Division 4, "Variations of obligations under this Part" provides for:
  - 4.1. review and approval by the Minister of alternative requirements and
  - 4.2. agreement between the transmitter/distributor and the customer of extensions and modifications to the standards.

The audit was carried out between August and September 2016.

On Horizon Power's behalf the following representatives participated in the audit, contributed to sourcing the documentation and providing evidence to the audit:

- Mr Peter Chomiak, Senior Compliance and Performance Engineer
- Mr Justin Murphy, Manager Asset Management Support
- Mr Gerard Chow, Data Management Officer
- Mr Brett McPharlin, Works Delivery Coordinator, Karratha Depot
- Mr Adrian Ham, Retail Services Manager



- Ms Jodie Lynch, Retail & Community Manager, Broome Customer Office.

The main auditing team members were Mr M Zammit, Lead Auditor and Mr S Campbell, Reviewer.

## 1.4 AUDIT METHODOLOGY

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The audit followed in part the methodology defined in the Authority's "Audit and Review Guidelines: Electricity and Gas Licences", April 2014 including:

- preparation of an audit plan and risk assessment for Qualeng internal control,
- fieldwork and
- reporting.

The audit proceeded through a documentation review, meetings and checks of processes. These were supported by additional queries to clarify aspects of Horizon Power policies and procedures.

## 1.5 LIMITATIONS AND QUALIFICATIONS

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

## 1.6 ACRONYMS AND ABBREVIATIONS

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<b>Abbreviation</b>	<b>Description</b>
CAIDI	Customer Average Interruption Duration Index (ie. Duration of each interruption per customer over the year)
Code	Electricity Industry (Network Quality and Reliability of Supply) Code 2005
ENMAC	Electricity Network Management and Control
HPCC	Horizon Power Control Centre
HV	High Voltage
LV	Low Voltage
NWIS	North West Interconnected System
PQ	Power Quality
PQI	Power Quality Investigation

<b>Abbreviation</b>	<b>Description</b>
QoS	Quality of Supply (as defined in the Code)
SAIDI	System Average Interruption Duration Index (ie. total interruption duration per customer over the year)
SAIFI	System Average Frequency Index (ie. average number of interruptions per customer over the year)
SCADA	Supervisory Control and Data Acquisition
SWIS	South West Interconnected System
TCS	Trouble Call System
THD	Total Harmonic Distortion

## 2 *Licensee's Response to Previous Audit Recommendations*

### 2.1 BACKGROUND

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The previous quality and reliability of supply audit was completed in September 2015. This section reviews Horizon Power's progress on that audit recommendations as well as Horizon Power's planned actions to address any outstanding issues.

The recommendations arising from the previous report and the confirmation and status of actions determined in this audit have been summarised in the following table.

## 2.2 PROGRESS OF ACTIONS FROM 2015 AUDIT

The following table lists the recommendations made in the 2015 Audit and records progress of any actions.

Item No	Code Ref	Requirement	Findings	2015 Recommendations and Opportunities for Improvement	Status
		<b>Systems to monitor compliance with:</b>			
1	Div 1, Sec. 5 - 7	<p><b>Quality and Reliability standards, voltage fluctuations, harmonics:</b></p> <p>A transmitter and a distributor must, so far as is reasonably practicable, ensure that electricity supplied by the transmitter or distributor to a customer's electrical installations, as measured at the point of connection of those installations to the network, at all times complies with the standards including voltage fluctuation (flicker) and harmonics.</p>	<p>▶ A number of documents related to the monitoring of power quality need to be checked to see whether they are still up to date or applicable.</p>	<p><b>1/2015.</b> Review and, if applicable, update documents related to power quality.</p>	Updating of documents related to power quality has been progressed and documents have been updated.
			<p>▶ No procedure addressing power quality measurement in the field was in evidence during the audit.</p>	<p><b>2/2015.</b> Document a procedure for measurement of power quality in the field.</p>	<b>Open, carried to the findings of the 2016 audit.</b>
2	Div 2, Sec. 11	<p><b>General standard of reliability</b></p> <p>System to monitor compliance</p>	<p>▶ Overall there is a reactive system for reporting</p>	<p><b>3/2015.</b> Monitor and maintain records against the</p>	HP system for monitoring advance notification is still

Item No	Code Ref	Requirement	Findings	2015 Recommendations and Opportunities for Improvement	Status
		with maintaining the supply with a minimum number and duration of interruptions.	<p>inadequate notifications (relying on customer complaints) except for Esperance office which has a complying paper system. As Horizon Power is relying on others, the customers. for controls (through complaints) there is insufficient evidence that Horizon Power has a system in place monitoring compliance with the requirement of providing notifications at least 72 hours before each planned outage.</p>	<p>requirement of providing notifications at least 72 hours before each planned outage.</p>	<p>primarily reactive. Esperance is the only district with a paper trail ensuring that notifications for planned outages are recorded.</p> <p><b>Open, carried to the findings of the 2016 audit.</b></p>

## 3 Key Findings

### 3.1 SYSTEM TO MANAGE COMPLIANCE WITH PART 2, DIVISION 1, QUALITY STANDARDS (SEC. 5 TO 8)

**Requirement:** The Licensee is required to have systems in place to monitor compliance with:

- quality of supply requirements of the electricity supply at the point of connection to the customer, both in terms of voltage fluctuations (flicker) and harmonic distortion and
- disconnection of customer where there is a possibility of damage to the customer installation.

#### 3.1.1 Quality of Supply - System/Process (sections 5 - 7)

Horizon Power has no proactive process for checking the quality of the electricity supply as required by the Electricity Industry (Network Quality and Reliability of Supply) Code 2005 (the Code). Investigation of power quality (PQ), if any, is reactive and occurs in response to a customer complaint. A customer complaint results in crew attending the case and troubleshooting and/or finding the cause of the event.

The system is supported by the following documents:

- “Power Quality Investigation Handbook”, dated 31 May 2010, to be reviewed on 31 May 2011, however not updated. The Power Quality Investigation (PQI) Handbook states that:
  - “If a reason for the power quality issue cannot be identified, Asset Management must request that Technical Services perform an engineering analysis on the recorded power quality data to assist in determining a reason for the power quality issue.”;
- “Flicker Allocation Manual (HP\_3275278)”, November 2009, due to be revised in 2010, this is a Western Power document that has been adopted by Horizon Power but has not received any updates since 2009. It has directions for calculating flicker allocation limits to a customer load, once the values are calculated then it is up to the customer to ensure that its installation is in compliance with the limits;
- “Harmonics allocation Manual (HP\_3275276)”, November 2009, due to be revised in 2010. As above, this is a Western Power document that has been adopted by Horizon Power but has not received any updates since 2009. It has directions for calculating harmonics allocation limits to a customer load, once the values are calculated then it is up to the customer to ensure that its installation is in compliance with the limits;
- PQ incident data is reported in "Asset Management Reports" on a monthly basis and published on Powerlink, Horizon Power's dashboard, however the data reported is a catch-all that includes issues that do not relate to the Quality of Supply (QoS) requirements of the Code;
- Spreadsheet “0382 AMR Quality PQI Complaints” lists incidents that have been investigated. Rather than NQRS related investigations these appear to be fault finding jobs. None of the checks

recorded included any checks for flicker or harmonics;

- Spreadsheet (SS) “#4358217 Analysis of AMR PQI YTD June 2016 CS10#1906971”;
  - “ERA 2016 Electricity Reporting Datasheets - Network Quality & Reliability Code” and “ERA 2016 Electricity Reporting Datasheets – Distribution”.
- 
- ▶ The “Power Quality Investigation Handbook” is a high level procedure on how to follow the process for “power quality” investigations. It lists applicable legislative and regulatory requirements, however it makes no reference to the Code and to the QoS requirements of the Code.
  - ▶ The process provided by the Flicker Allocation Manual and the Harmonics Allocation Manual does not monitor that a customer installation complies at all times with the allocated limits. The manual has directions for calculating flicker and harmonics limits which will be allocated to a customer load, once the values are calculated then it is up to the customer to ensure that its installation is in compliance with the limits. If the allocated limits are exceeded by one customer installation then other customers supplies may be affected in breach of the Code QoS requirements.
  - ▶ No documented procedure detailing electricity supply quality measurement in the field for compliance with the Code QoS requirements was in evidence during the audit.

#### **Evidence of Voltage Fluctuation (Flicker) and Harmonic Distortion Measurement and Monitoring**

No evidence was available of electricity supply quality checks of flicker and harmonics to check compliance with the Code through the audit period.

- ▶ During the audit period no evidence was available of measurements taken verifying the compliance of the electricity supplied by Horizon Power with the standards prescribed in sections 6(2) and 7 of the Code.
- ▶ Measurement traces were documented however the traces related to voltage, current and power measurements not to QoS requirements (voltage fluctuation (flicker) and harmonics) of the Code.
- ▶ There was no evidence that voltage harmonics had been measured during the audit period.

PQ incident data is reported in "Asset Management Reports" on a monthly basis and published on Powerlink, on Horizon Power's dashboard, however the data reported is a catch-all that includes issues such as low volts, frequency variations, electric shocks etc that do not relate to the QoS requirements of the Code.

None of the electricity supply quality issues raised through the period were deemed to be related to the QoS standards even though some of the causes were interpreted as fluctuations and some of the causes were specified as “Unknown”, “Undefined” and “PQI Default Code”.

Results of PQ Investigations are shown in the spreadsheet (SS) "0382 AMR Quality PQI Complaints". This SS shows the incidents identified as PQI, arisen from customers complaints or crew findings. Some of the causes shown were:

- 4 causes were noted as "Unknown"
- 1 cause was shown as "Undefined"
- 2 causes were shown as "PQI Default Code"
- 1 was shown as "Equipment failure".

The incidents are analysed in the spreadsheet "#4358217 Analysis of AMR PQI YTD June 2016 CS10#1906971". This is a list of incidents and of the trail of fault finding. It was noted that, once the fault was attributed to a cause, no further investigation was initiated even though the cause may be "unknown". Rather than NQRS related investigations these appear to be fault finding jobs.

One job , "INCD-12001-v", start date 11 Sep 2015, had "Incident category" of "SFW PQI Voltage Fluctuation" and "Incident Cause Description" was recorded as "PQI – Default Code".

The job resulted in the comment:

- "loggers to be installed ASAP".

The records note that there was "some flickering but not all the time", also "Last 18mth-2years appliances keep blowing up". The job was closed on the 31 October 2015. There was no record of any follow up investigation.

- ▶ There is evidence to show that the current process needs improvement in regard to compliance with the Code Quality Standards. The evidence was provided by the logging of Incident 12001. At the auditor request data logging traces were provided showing that logging had been performed, however the logs did not indicate that parameters required by the Code (voltage fluctuations (flicker) and harmonics) had been examined. The conclusion of the incident was also not clearly documented and original causes had not been updated with new findings..

All the traces examined in the audit showed measurement of voltage, current and power. There was no clear evidence in the cases examined by the audit, of the licensee examination of traces of flicker or measurement of harmonics where customer installation were at risk of damage.

- ▶ The process documentation needs to be more explicit in describing how Horizon Power has to check the electricity supply for compliance with the QoS requirements of the Code.
- ▶ In addition staff need to be made aware that there are specific QoS requirements in the Code and that these need to be monitored to demonstrate compliance, especially when there are supply quality issues.

The audit noted that Horizon Power is progressing with the improvement of the Network Safety Management System to cover the gaps in staff competency.



### 3.1.2 Duty to Disconnect if Quality of Supply may Lead to Damage (section 8)

Horizon Power has procedures in place documenting the process of disconnections:

- “FI 5.1, Customer Defective Electrical Equipment”, provides the instructions to the field crew for disconnecting customer electrical connection when the customer's electrical equipment is found to be faulty;
- “ENMAC Network Management Procedure” provides the procedure for isolating faults on the network to minimise the risks to assets, life or property. Emergency Switching is carried out to isolate a failure on the network that threatens the safety of people, property, environment or Horizon Power's assets. Districts are responsible for Low Voltage (LV) work but any work which affects customer's supplies after normal working hours needs to be notified to Horizon Power Control Centre (HPCC).

### 3.1.3 Summary of electricity quality of supply monitoring findings

The following findings have been made on the operation of systems, processes and practices dealing with monitoring the quality of supply:

**Table 1: Systems to monitor compliance with requirements for quality of supply**

Site	Flicker (Pst < 1.0; Plt < 0.8)	Harmonics (THD < 8%)	Customer Complaints or Faults Related to PQ
All	▶ Reactive system. No measurements available	▶ Reactive system. No measurements available	None of the PQ Incidents or customer complaints were assessed as electricity supply quality incidents related to the Code.

**Findings:**

- 1/2016.** The “Power Quality Investigation Handbook” is a high level procedure on how to follow the process for “power quality” investigations. It lists applicable legislative and regulatory requirements, however it makes no reference to the Network Quality and Reliability of Supply Code. There must be guidance, in Horizon Power documents, for electricity supply quality investigations to examine the compliance with the QoS compatibility limits of the Code (Those limits have been set to prevent damage to customer equipment and there should be more awareness of the requirements).
- 2/2016.** The process provided by the Flicker Allocation Manual and the Harmonics Allocation Manual does not include for testing or monitoring a customer installation. Customers installations not meeting the allocated limits may then affect other customers supplies in breach of the Code requirements.
- 3/2016.** The procedures for the measurement of electricity supply quality in the field do not have sufficient details to instruct or guide the field crews in checking for compliance with the Code QoS, in terms of voltage fluctuations (flicker) and harmonics.
- 4/2016.** The system monitored electricity supply quality reactively through customer complaints. No complaint was deemed to be due to quality of supply as defined by the Code however there was no evidence that findings or actions from incident investigations were conclusively followed up:
- Incident INCD-12001-v resulted in the comment: “loggers to be installed ASAP”. Loggers were installed and incident closed however there was no update on the causes of the incident and closure of the incident was recorded but results were not evident;
  - 4 other incident causes were noted as “Unknown”
  - 1 cause was shown as “Undefined”.

One finding from the previous audit was also confirmed:

There was insufficient evidence to show that the process implemented by Horizon Power to ensure that electricity supplied to a customer’s electrical installations, as measured at the point of connection of those installations to the network, at all times complies with the standards prescribed by sections 6(2) and 7 of the Code. There was no evidence of compliance of electricity supply voltage flicker and harmonic distortion to the QoS requirements specified under sections 6 and 7 of the Code. No records were available of flicker or harmonics measurements at customers connections.

## 3.2 SYSTEM TO MANAGE COMPLIANCE WITH PART 2, DIVISION 2, STANDARDS FOR INTERRUPTION OF SUPPLY

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The Licensee has to comply with requirements for the management of interruptions to customers, both in term of the duration and number of interruptions. The requirements are for the Licensee to:

- Maintain the supply with the minimum number and duration of interruptions.
- Reduce the effects of interruptions; provide alternative supply if the proposed interruption is expected to be significant, its effect substantial or if the customer has special health needs that require continuous supply.
- Ensure that where interruptions are planned, where practicable the customer is notified within a suitable time and the duration does not exceed 6 hours, or 4 hours for temperatures over 30 C or north of the 26th parallel.
- Remedy the causes of interruptions or enter into alternative arrangements if the supply has been interrupted more than 12 hours continuously or more than 16 times in the prescribed 12 months and it is considered that the prescribed standard is unlikely to be met for the customer.

### 3.2.1 Maintain the supply with a minimum number and duration of interruptions (Sec. 9)

**Requirement:** The licensee must establish systems to monitor compliance with the requirement to ensure, so far as is reasonably practicable, that the supply of electricity to a customer is maintained and the occurrence and duration of interruptions is kept to a minimum.

A system is in place to monitor the number and duration of interruptions and to ensure that interruptions are minimised. Processes are in place to manage planned and unplanned outages. Performance is monitored on the Horizon Power Dashboard and through Asset Management Reports.

Events are recorded in the TCS system and can generate work activities which are entered into Horizon Power's work management system Ellipse.

Faults and interruptions notified by customers are handled through the fault contact centre, a Customer Service Officer will take the details of the call, addresses, meter numbers etc and follow a Flow Sheet/Decision Making Tree. The call information is analysed through a "Fault Call Analyser" to ensure that calls relating to the same fault create a single "job" per event, which is directed to HPCC, and do not result in doubling up of reports.

Some calls can be classified as "Life Threatening Calls" (LTC) and the jobs are cross checked with HPCC to ensure that the call has been received.

HPCC then has the task of ensuring despatch of the job to the repair crews.

Evidence of the operation of the system is provided by:

- Electricity Network Management And Control (ENMAC), overall system that stores all major assets information for transmission and generation. It includes the Ellipse system with routine maintenance data for Maintenance Schedule Tasks and incorporates the Trouble call System (TCS);
- the “ENMAC Network Management Procedure HP3178414” provides the instructions for the management of planned and unplanned work on the network, including responding to incidents, fault and emergency switching, after hour work, despatching of jobs to tablets and repair crews;
- Trouble call System (TCS), electronic system that manages the faults detected by the SCADA system, customer calls, calls from emergency services or faults detected by crews;
- the “Priority Restoration Basic Process Flow (HP\_3652541)” provides for prioritisation of critical customers in the event of an outage;
- Incident Report Form, to record details of attendance to faults;
- "ENMAC TCS Call Taking to be processes (HP\_3191123)" (2009) Procedures which include the process for responding to faults and unplanned outages including incident recording, incident management and response;
- “CS - framework process map - planned outage claims” (2012);
- monthly “Asset Management Reports” (such as “#4349815 June2016 MONTHLY\_HP\_-\_ASSET\_MANAGEMENT\_REPORT\_HP\_3230974”) which monitor the interruption performance;
- “Electricity delivery reliability spreadsheet - asset strategy (HP\_3222371)” (from CS10 #1912059) SS reports on the reliability parameters such as SAIDI, SAIFI and produces summary images such as “Reliability Summary Table”, “Performing Systems Table”, “Year To Date Graph” that are published on the Horizon Power Dashboard “Powerlink”;
- Annual Reports for 2015-16 and 2014-15 which outline the projects initiated to address quality and reliability of supply;
- “[CS10#2375670v10] Crisis and Emergency Management Plan, Rev 5 – Sep 2013” includes strategies for mitigation of loss of supply including rotational load shedding, communication with critical infrastructure managers to ensure least effect on customers and implementing appropriate plans to move staff and customers where affected;
- “EMP04/002 - Emergency cyclone severe storm and flood procedure (HP3066717)”;
- “Communications Crisis Plan and templates-DM#3268792-Dec 2012”;
- “[CS10#622450v2] Critical Customer Procedure (HP\_3159928)”.

The audit reviewed the monitoring provided by the Asset Management Reports (December 2015 and June 2016):

- the "Asset Management Report" (AMR) contains a section, the “Regulatory P1 - Comply with all regulations, codes and standards” which includes:

- the number of interruptions over 12 hours duration by region and year to date (YTD) compared to the previous period;
- the number of customers with more than 16 interruptions in the year by region;
- the number of planned outages over 4 or 6 hours duration (as applicable) by region and YTD compared to the previous period;
- the number of outstanding Incidents over 7 days old in TCS.

This period has seen a deterioration in performance in two of the above criteria:

- customers with over 16 hours interruptions went up by 153% year on year;
- planned outages outside charter (ie. over 4 or 6 hour duration) increased by 85%.

In section “Reliability P5 – Performing Systems” of the Asset Management Report:

- the SAIDI, SAIFI and CAIDI performance, (ie. the average total duration of outages for each customer served, the number of interruptions that a customer experiences and the average length of each interruption per customer respectively) over the period.

There has been an improvement in the overall reliability performance, against this, more systems have been defined as “Non-Performing System” by Horizon Power.

**Summary:**

**Table 2: Systems to monitor compliance with requirement to maintain supply the occurrence and duration of interruptions to a minimum**

Site	Procedures dealing with outages	Systems and Procedures monitoring performance
All	Yes	Yes

**3.2.2 Reduction of effects of interruptions and provision for alternative supplies for proposed interruptions (Sec. 10)**

**Requirement:** The licensee must establish systems to monitor compliance with its duty to reduce the effect of any interruptions, consider providing alternative supply for proposed interruptions if the interruption is greater than 4 or 6 hours, or there is a substantial effect on the business or there are special health needs customers.

**Reduce the effect of any interruptions**

Horizon Power has systems in place to monitor compliance with its duty to reduce the effects of any interruption:

- the Trouble call System (TCS), electronic system is used to manage the faults detected by the SCADA system, customer's calls or by line crews;
- "ENMAC TCS Call Taking to be processes (HP\_3191123)" (2009) procedures include the process for responding to faults and unplanned outages including incident recording, incident management and response;
- "Priority Restoration Basic Process Flow" (HP\_3652541);
- "Incident Report Form";
- the "ENMAC Network Management Procedure HP3178414" provides the instructions for the management of planned and unplanned work on the network, including responding to incidents, fault and emergencies;
- the "Crisis Management Plan" includes responses to loss of supply including rotational load shedding, communication with critical infrastructure managers to ensure least effect on customers and implementing appropriate plans to move staff and customers where affected;
- "EMP04/002 - Emergency cyclone severe storm and flood procedure HP\_3066717".

Through a review of the documentation and discussion with Horizon Power staff the audit found that:

- a process is in place to monitor and respond to outages and emergencies;
- TCS creates incident records in response to calls and alarms generated by faults and defines the process for managing the incidents and their closure;
- outages and responses are recorded;
- in anticipation of severe weather events the emergency cyclone severe storm and flood procedure sets up actions to ensure staff and asset preparedness, including preliminary inspections, restoration plans, coordination of Independent Power Producers (IPP) to be available and provide power if required and arrangements for back up plant;
- priorities of responses are documented in the "Critical Customer Procedure" so that critical customers are identified and their electricity supply is maintained as far as reasonably possible;
- a range of alternative supplies is considered to maintain the service;
- the "Critical customer Procedure" provides for advance notification of outages to be given to customers from 3 weeks to 3 days prior to the outage.

Monitoring of the performance of the system is provided by a number of reports which are then summarised monthly in the Asset Management reports (AMR). Individual weekly and monthly reports are published on Horizon Power's public drive.

The AMRs report on:

- interruptions over 12 hours duration by region and Year to Date (YTD) compared to the previous period;

- the number of customers with more than 16 interruptions in the year by region;
- the number of planned outages over 4 or 6 hours duration (as applicable) by region and YTD compared to previous period;
- the number of outstanding Incidents over 7 days old in TCS.

The “Electricity Delivery Reliability Spreadsheet - Asset Strategy (HP\_3222371)” produces gif files which are published on Horizon Power intranet Dashboard “Powerlink”. These include:

- a reliability summary which summarises the reliability parameters such as SAIDI, SAIFI and CAIDI;
- a “Performing Systems Table” which reports the above parameters by systems (associated with towns) and highlights “Performing” and “Non-Performing Systems”;
- “Year To Date Graphs” showing the progressive SAIDI/SAIFI and CAIDI for the year against the four year trend.

### **Provision of Alternative Supply, Special Health Needs Customers and Commercially Sensitive Loads**

Horizon Power has systems in place to reduce the effect of planned interruptions. Planned interruptions have to follow a documented process which requires advance submission, recording and approval of each outage.

The following procedures and documents support the system:

- “Critical Customer Procedure”, the document is dated March 2009 and due for revision in 2014, The procedure defines the critical customers in a sliding scale matrix, starting with “Very Critical” Customers, such as Major Hospitals, Sewerage Treatment Plants, as the top rated category C1 and requiring advance notification of an upcoming outage three weeks in advance of the outage date, Special Health Needs (SHN) Customers are also identified in the procedure;
- the “ENMAC Network Management Procedure HP3178414” provides the instructions for the management of planned work. It includes for notification of planned work to be submitted to HPCC at least three days prior to planned work commencement with the preparation and submission of a DNAR (District Network Access Request);
- the DNAR identifies if “Key or Sensitive” customers are affected by the outage.

There is a process for providing notifications to Special Health Need (SHN) Customers and for ensuring that the notification is acknowledged by the customer:

- A process is in place ensuring that each customer application that identifies Special Health Needs (SHN) is flagged, these applications are subject to medical confirmation but the default is to keep the customer as SHN up to 12 months from the application date if no confirmation is received. The information is uploaded daily to a circulation list that include depots and pertinent groups. The

“Life Support Register” list is automatically generated daily from the CRM system (Velocity) and delivered to an e-mail circulation list that include depots and pertinent groups;

- Once an outage is planned, Customer Services check both the Life Support Register and the network map to cross check applicable SHN Customers;
- each SHN Customer is contacted by phone two weeks before the outage by the Customer Services Officer and the call and response documented on the customer database;
- the Horizon Power Control Centre (HPCC) is also advised so that there is additional awareness of the customer conditions.

Discussion with Horizon Power's staff showed that outage procedures include mitigation of the interruption through:

- using alternative electricity supply, such as using alternative feeders;
- using Independent Power Providers (IPP) or
- mobile equipment to provide alternative power generation;
- alternative processes that are identified in the procedures are the use of Live Line techniques to avoid interruptions of supply to critical customers.

Monitoring of the operation of the systems is provided by AMRs which report on the number of planned outages over 4 or 6 hours duration (as applicable) by region and YTD. The performance is compared year on year on a monthly basis and colour coded to show improvement or deterioration.

## Summary

**Table 3: Systems to monitor compliance with duty to reduce the effect of interruptions and provide alternative supply for planned interruptions**

Site	Reduce the Effect of Interruptions	Alternative Supply	Special Health Needs Customers
All	Yes	Yes	Identified

### 3.2.3 Planned interruptions acceptable if less than 4 or 6 hours and if notified (Sec. 11)

**Requirement:** The licensee must establish systems to monitor compliance with the requirement to maintain planned outages not exceeding 4 or 6 hours and providing notifications at least 72 hours before each planned outage.

Horizon Power has a system to manage and monitor planned outages. While a process is in place to



provide advance notifications to customers, except for the Esperance office, there is no recording or monitoring of compliance with the Code.

### **Planned Outages Not Exceeding 4 or 6 Hours**

Monitoring of planned outages exceeding 4 or 6 hours is provided by the following documents:

- "0387 AMR Planned Outages Outside Charter" report listing outages exceeding 4 or 6 hours as totals per town and District, and individually by outage;
- monthly AMRs which report on "Planned Outages Outside of Charter" (ie. over 4 or 6 hours duration, as applicable).

Over the audit period the number of "Planned Outages Outside of Charter" were significantly higher than last year's total (100 in 2015 - 2016 compared to 54 in the previous period).

### **Planned Outage Notifications**

The notification system is supported by several documents:

- "Customer Services Policy", CS10 2001125 (appears to be a draft) states that unless it is an emergency, Horizon Power will give a minimum of 3 working days' notice before planned interruptions. Notice will be either through newspaper advertisements, individual notices placed in letterboxes/mail boxes, telephone, facsimile and SMS and email. An estimate is to be provided for when the power supply will be returned to normal;
- "Framework Process Map - Notification of Planned Outages (HP\_3722547)" defined the notification process. At Esperance the process requires that Notification Requests be in writing through the "[CS10#2640632v1] Rural Outage Notification Request" or the "[CS10#2640814v1] Town Works Notification Request". The "Notification Requests" are sent to Business Service Officers (BSO) to initiate customer notification. In other Regions the initiation is verbal or managed by Crew Leaders.
- "ENMAC Network Management Procedure" provides for notification of planned work to be submitted to HPCP at least three days prior to planned work commencement through the preparation and submission of a DNAR (District Network Access Request);
- "Critical Customer Procedure", the document is dated March 2009 and due for revision in 2014. The procedure defines the critical customers in a sliding scale matrix, starting with "Very Critical" Customers such as Major Hospitals, Sewerage Treatment Plants, as the top rated category C1 requiring longer notification periods.

Reporting of non compliance with the notification requirements relies on customer making complaints.

In total there were only six (6) complaints for failure to provide sufficient notification of planned interruptions.

However the audit noted that over the audit period there were only 17 claims for outages over 12

hours, when in fact there were over 160 interruptions over 12 hours and some of the interruptions affected up to 40 premises. On this basis the monitoring of notification performance based on customers' complaints does not appear to be based on sound methodology.

There was evidence to show the application of the procedure in the Esperance Region.

- ▶ Except for the Esperance office, there is insufficient evidence to show that the system implemented to provide notifications at least 72 hours before each planned outage is monitored effectively.

### Summary

**Table 4: Systems to monitor compliance with planned outages not exceeding 4 or 6 hours and providing notifications at least 72 hours before each planned outage**

Site	Notification $\geq$ 72 hours prior	Duration $\leq$ 4h or 6h (as practicable)
All	<ul style="list-style-type: none"> <li>▶ Except for the Esperance office reporting is reactive in response to customer complaints and there was insufficient evidence to show that effective monitoring is in place.</li> </ul>	<p>Monitored</p> <p>100 planned outages &gt; 4 or 6 hours</p>

**5/2016.** Except for the Esperance office, there is insufficient evidence to show that the system implemented to provide notifications at least 72 hours before each planned outage is monitored effectively. Monitoring of notification performance through customers' complaints does not appear to be adequate as demonstrated in outage statistics.

### 3.2.4 Significant interruptions (over 12 hours duration or more than 16) to small use customers (Sec.12)

**Requirement:** The licensee must establish systems to monitor compliance with the requirement to remedy the causes of interruptions or make alternative arrangements where significant interruptions (duration over 12 hours or more than 16 interruptions in the preceding year) occurred for small use customers and where the Licensee considers that the prescribed standard (9 years out of 10) is unlikely to be met.

The audit has found that there is a system for monitoring compliance with the requirements to remedy the causes of significant interruptions or make alternative arrangements so that the prescribed standard is met.

Monitoring of interruptions over 12 hours duration is performed through data received in the work management system and TCS. The data is analysed in spreadsheet reports:

- “0386 AMR Customers Affected” reports on the customers interrupted for over 12 hours on a monthly basis, by district and YTD;
- monthly AMRs report on the YTD network performance by districts in the section “Regulatory P1 - Comply with all regulations, codes and standards”;

Monitoring of frequency of interruptions to customers is performed through data queries on the work management system and TCS. Areas that have received more than 16 interruptions in the year are highlighted. The data is analysed in spreadsheet reports:

- “0416 AMR Customers \_3E 16 Interruptions” also identified as “CS10# 1888291 - 0416 AMR (Asset Management Report) >16 OUTAGE 3) DETAIL REPORT (HP\_3615403)”, which reports on the customers interrupted over 16 times in the year by district and YTD;
- monthly AMRs report on the YTD progressive totals in the section “Regulatory P1 - Comply with all regulations, codes and standards”.

Horizon Power reports the end of year figures in the "2015 code report - Network Quality and Reliability of Supply". At the end of the audit period there were a total of 681 premises interruptions over 12 hours compared to 6394 in the previous period.

Over the audit period there were 268 instances of premises that experienced more than 16 interruptions compared to 106 in the previous period.

## **Remediation**

Horizon Power has focused on improving township's systems with poor reliability. In the previous periods the townships of Wyndham, Onslow and Kununurra had been identified as poor performers. Last year Carnarvon, Denham and Exmouth had reliability issues. Measures had been taken over successive periods to improve the system reliability:

- Carnarvon is now performing satisfactorily after the commissioning and initial teething problems at Mungullah Power Station. There have been no generation incidents and only network faults in the past 12 months;
- Wyndham had received an auto start generator providing back up power when the IPP or the feeder break down;
- Onslow is supplied by an IPP. Mobile generators have been employed to provide back up power

when interruptions are experienced and incident frequency has been reduced;

- Kununurra receives its supply from an IPP and the supply was unreliable; remediation projects have been completed and have improved its reliability.

In this audit period Broome, Esperance, Hopetoun and Onslow reliability has deteriorated.

### Summary

**Table 5: Systems for monitoring compliance with interruption duration not to exceed 12 hours**

Site	2016 > 12 hours	9 Years out of 10 (≤ 12 hours)	Causes of Interruption Remedied / Alternative Arrangements
		<b>Compliance</b>	
All	681 premises affected	Not available	Major causes were identified for interruptions > 12h.  Main contributors to interruptions were identified and alternative arrangements implemented.

**Table 6: Systems for monitoring compliance with interruption frequency not to exceed 16 per customer per period**

Site	2016 > 16#	9 Years out of 10 (≤16#)	2015 > 16#	Causes of Interruption Remedied / Alternative Arrangements
		<b>Compliance</b>		
All	268 premises	Not available	106 premises	Major causes were identified; there is evidence of remediation.

### 3.3 SYSTEM TO MANAGE COMPLIANCE WITH PART 2, DIVISION 3, STANDARDS FOR THE DURATION OF INTERRUPTION OF SUPPLY IN PARTICULAR AREAS (SEC. 13)

**Requirement:** The licensee must establish systems to monitor compliance with the Code requirement to ensure that the average total length of interruptions per customer for the four years up to the current year for areas other than the Perth CBD do not exceed 160 minutes in

urban areas or 290 minutes in any other area of the State.

There is a process for monitoring compliance with the requirement to ensure that the average length of interruptions for the four years up to the current year does not exceed 290 minutes.

Horizon Power’s system monitors both the length of interruption of supply to each customer in every town as well as setting targets for each town to achieve a complying supply for the entire network. Internal criteria such as “Performing Systems” had decreased slightly from 32 in 2013-14, to 31 in 2014-15 and 28 for the audit period.

The overall four year average is 359 minutes for the four years up to 30 June 2016, which is higher than the required figure however the figure is inclusive of interruptions due to external factors outside of Horizon Power's control. The figure for the 2016 audit period is 284 minutes which is an improvement from last period figure of 501 minutes.

Horizon Power also calculates the length of interruptions per customer excluding major external events such as storms cyclones, floods, vehicle, vandalism etc and defines the resulting data as "Normalised Data". Horizon Power views the normalised data as a measure of network performance which is within its control. In this audit period Esperance fires which occurred between the 17 – 23 November 2015 were identified as a major event.

Once the external causes are removed the audit period figure the reliability figure improved from 284 to 199 minutes (compared to last period figure of 153 minutes).

The average over the last four years, inclusive of 2016, was greater than 290 min in 11 out of 36 systems (including 34 town sites and the NWIS and Kununurra systems) which is an improvement over last year’s figure of 13.

**Summary**

**Table 7: Systems to monitor compliance with requirement for interruption not to exceed 290 minutes average per customer over 4 years.**

Site	2016 ( ≤ 290 m)	4 Year Average (Avg over 4 years ≤ 290 min)
	For reference only	Figures have been calculated over 4 years up to 2016.
All sites	284	359

### 3.4 PROVISIONS MAY BE EXCLUDED OR MODIFIED BY AGREEMENT WITH CUSTOMERS (SEC 15)

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**Requirement:** A customer and a transmitter or a distributor may agree in writing that a provision of this Part is excluded or modified in relation to the supply of electricity by the transmitter or distributor to the customer and the agreement must set out the matters that the parties consider are the advantages and disadvantages.

Horizon Power has entered into agreement with a limited number of customers to interrupt the supply by following a documented procedure. Horizon Power benefits through demand management and the customer through financial benefits.

## 4 *Audit Summary and Recommendations*

Under Section 26 "Annual report on monitoring systems" of the Code, Horizon Power is required to arrange for an independent audit of the operation of the systems that are in place to monitor its compliance with Part 2 of the Code. or an instrument under Section 14(3).

The audit has found that Horizon Power's systems monitoring compliance with Part 2 of the Code are in general compliance with the requirements of the Code, except as noted below.

There were four non-compliances and three recommendation arising from the 2014 - 2015 audit. The audit found that two of the actions arising from the recommendations are still open and have been included in this year findings:

- The procedures for the measurement of electricity supply quality in the field, in terms of voltage fluctuations (flicker) and harmonics, do not have sufficient details.
- The system monitoring that notifications are sent to customers 72 hours prior to outages relies on customer complaints for highlighting non-compliance. As indicated by outage complaint figures this is not an effective measure of compliance. Except for the Esperance office, there is insufficient evidence to show that the system implemented to provide notifications at least 72 hours before each planned outage is monitored effectively.

There were no "Opportunity for Improvement" raised in the previous audit.

In addition to the actions still open from the previous audit, the audit made four (4) findings which are listed in Table 8 below, which provides a summary of the findings and recommendations of the report in regard to the system operation. The table rates the various element as complying (✓), non-complying (✗), actions in progress, observations or opportunities for improvement (OFI).

Throughout the audit it was evident that staff were aware of the Code requirements and there was commitment to improvement of the system compliance.

Based on the scope of the audit defined in section 26 of the Code, Qualeng has found that, except for the findings recorded below, the system and processes within Horizon Power are in compliance with the requirements of Part 2 of the Code, "Quality and Reliability Standards".

**Table 8: Systems Compliance Summary**

Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System Findings / Observations	Recommended Corrective Actions / Opportunities for Improvement (OFI)
	<b>General system</b> Systems monitoring compliance with the requirements of the Code.	✓	✓	Operation of the systems which monitor Horizon Power's compliance with the Network Quality and Reliability of Supply Code (the Code), complies with the Code requirements except for the findings reported below.	
Div 1, Sec. 5 - 7	System to monitor compliance with quality and Reliability standards: voltage fluctuations, harmonics.	OFI	OFI	<ul style="list-style-type: none"> <li>The “Power Quality Investigation Handbook” is a high level procedure on how to follow the process for “power quality” investigations. It lists applicable legislative and regulatory requirements, however it makes no reference to the Code.  Horizon Power documentation should provide guidance to testing and investigations related to network quality, including for compliance with the Code Quality of Supply (QoS) standards.</li> </ul>	<p><b>1/2016. (OFI)</b> There must be guidance, in Horizon Power documents, for electricity supply quality investigations to examine the compliance with the Quality of Supply (QoS) compatibility limits of the Code (Those limits have been set to prevent damage to customer equipment and there should be more awareness of the requirements).  Where legislation and regulations are listed, the Code should be included.</p>
				<ul style="list-style-type: none"> <li>The process provided by the Flicker Allocation Manual and the Harmonics Allocation Manual does not include for testing or monitoring a customer installation. Customers installations not meeting the allocated limits may then affect other customers supplies in breach of the requirements of the Code.</li> </ul>	<p><b>2/2016. (OFI)</b> Review and update the process and documentation to ensure compliance with the Code.</p>



Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System Findings / Observations	Recommended Corrective Actions / Opportunities for Improvement (OFI)
		OFI	OFI	<p>Reference to the measurement of electricity supply quality has been included in the “Guideline: Technical Maintenance Instruction for Distribution Transformer and LV Feeder Load Readings” however there should be further information on the measurement of electricity supply quality compliance with the QoS requirements of the Code.</p> <ul style="list-style-type: none"> <li>▶ The procedures for the measurement of electricity supply quality in the field, in terms of voltage fluctuations (flicker) and harmonics, do not have sufficient details to instruct or guide the field crews</li> </ul>	<p><b>3/2016. (OFI)</b> Document a procedure for measurement of electricity supply quality in the field, to comply with the QoS Code requirements.</p>
		×	×	<ul style="list-style-type: none"> <li>▶ There was insufficient evidence to show that the monitoring process implemented by Horizon Power ensured that electricity supplied to a customer’s electrical installations, as measured at the point of connection of those installations to the network, at all times complied with the standards prescribed by sections 6(2) and 7 of the Code. No records were available of flicker or harmonics measurements at customers connections. No evidence was available to show that incidents investigated had been analysed for flicker or harmonics compliance.</li> </ul>	<p>No further recommendation made.</p> <p>A recommendation was open since the 2011-12 period to provide monitoring of compliance of electricity supply quality in respect of flicker and harmonics at customer connections. Horizon Power has assessed options and concluded that at this point solutions are too costly.</p>

Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System Findings / Observations	Recommended Corrective Actions / Opportunities for Improvement (OFI)
		✓	OFI	<p>The system monitors electricity supply quality reactively through customer complaints. No complaint was deemed to be due to quality of supply as defined by the Code. Action from incident INCD-12001 required use of data loggers. Readings were taken over 7 days starting 15/9/2015 however no records of voltage fluctuations or harmonics were evident.</p> <p>▶ <b>Conclusions from incident testing are not clear in the available documentation:</b></p> <ul style="list-style-type: none"> <li>• Incident INCD-12001-v resulted in the comment: “loggers to be installed ASAP”. Loggers were installed and incident closed however there was no update on the causes of the incident and closure of the incident was recorded but results were not evident;</li> <li>• 4 causes were noted as “Unknown”</li> <li>• 1 cause was shown as “Undefined”.</li> </ul>	<p><b>4/2016. (OFI)</b> The process for incident investigation and monitoring of the incident logging process needs to be strengthened:</p> <ul style="list-style-type: none"> <li>○ the follow-up/recording system needs to be improved so that there is clear understanding of causes and reasons for closure of incidents.</li> </ul>
Div 1, Sec. 8	System to monitor compliance with duty to disconnect if damage may result due to electricity supply quality.	✓	✓	Fault responses are documented. Responsibility to disconnect customers remains with the service crew. Field Instruction covers disconnection where fault is due to customer.	

Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System Findings / Observations	Recommended Corrective Actions / Opportunities for Improvement (OFI)
Div 2, Sec. 9	System to monitor compliance with maintaining the supply and minimise the number and duration of interruptions.	✓	✓	Procedures and processes are in place to monitor and to attend to faults and interruptions and restore supply as early as possible. Monthly reports are in place to monitor compliance.	
Div 2, Sec. 10	System to monitor compliance with reduction of effects of any interruption and consideration of alternative supplies for proposed interruptions where it affects business or special health needs customers	✓	✓	Monthly reports are in place to monitor compliance. Priority of crews attending interruptions is to restore supply.  Alternative supply is used to reduce the effect of interruptions.  There is a formal system for managing special health needs customers.	
Div 2, Sec. 11	System to monitor compliance with length (less than 4 or 6 hours) and notifications for planned interruptions.	✓  OFI	✓  OFI	There is a system for monitoring length of proposed interruptions. Planned outages lasting over 4 or 6 hours (as applicable) are reported and causes identified.  ▶ The system monitoring that notifications are sent to customers 72 hours prior to outages relies on customer complaints for highlighting non-compliance. As indicated by outage complaint figures this is not an effective measure of compliance:  Except for the Esperance office, there is insufficient evidence to show that the system implemented to provide notifications at least 72 hours before each planned outage is monitored effectively.	<b>5/2016.</b> (OFI) The process of monitoring adherence to the process of notification should be strengthened through the annual internal auditing of a sample of work packages, where some regions may be reviewed on a random rotational basis.

Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System Findings / Observations	Recommended Corrective Actions / Opportunities for Improvement (OFI)
				The audit noted that Horizon Power will be reviewing the work package process under the Electricity Network Safety Management System (ENSMS) development approved in June 2016.	
Div 2, Sec. 12	System to monitor compliance with limiting significant interruptions to small use customers ( $\leq 16$ times or $\leq 12$ Hours) and to provide remedial action where breaches occur.	✓	✓	A system is in place to monitor the number of interruptions greater than 12 hours or where the frequency of interruptions exceeds 16.	
		✓	✓	Remedial actions have been taken to remove some of the causes of major interruptions.	
Div 3, Sec. 13	System to monitor compliance with standards for the duration of interruption of supply in particular areas ( $\leq 30, 160, 290$ min)	✓	✓	There are systems in place to monitor compliance. Monthly reports monitor the duration of interruptions. The average over four years is 359 min which is above the 290 min limit. Removal of major event days reduces the figure to acceptable levels which implies that external factors have affected Horizon Power's performance.	
Div. 4, Sec. 15	Systems to monitor compliance with provisions may be excluded or modified by agreement	✓	✓	Complies.	