



ABN 20 009 454 111

Audit Report
Horizon Power
2023 Network Quality and Reliability
of Supply Audit -
Operation of Compliance Monitoring Systems

September 2023



executive summary

In accordance with 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 2023 Horizon Power commissioned Qualeng to carry out the audit in respect of the operation of its systems over the period 1 July 2020 to 30 June 2023.

Horizon Power supplies electricity services through 38 systems, to the Pilbara through the North West Interconnected System (NWIS), the East Kimberley through a connected network supplying three systems in Kununurra, Wyndham and Lake Argyle, 34 Non-Interconnected (or islanded) Micro Grids in regional towns and remote communities and two rural systems associated with Esperance and Hopetoun. These systems supply 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 July and August 2023 and included:

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

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

- Monthly Asset Management Reports are provided to management and report on compliance with the requirements specified in the Code;
- Power Quality Investigations deal with incidents and customer complaints due to electricity supply quality issues;
- the Trouble Call System (TCS) is used to manage and monitor faults through the SCADA

system, customer calls and fault detection by field crews;

- the duration and frequency of interruptions is monitored and reported in the AMRs;
- customers with special health needs (SHN) are recorded and identified in the system.

The audit found evidence of the operation of the systems for compliance with the Code:

- procedures are in place for notification of planned outages;
- alternative power supplies are available to mitigate interruptions;
- remedial projects are initiated to improve reliability of supply.

Through interviews, discussions and examination of documents the audit noted:

- monitoring of compliance of individual customer supply with power quality requirements relies on customer complaints or calls, testing through the deployment and use of portable power quality analysers, use of available harmonics data from existing AMI (Advanced Metering Infrastructure) devices installed across the networks or field reports to start the investigative process;
- monitoring of the compliance of the notification process relies on customer complaints.

The previous audit (2020) had found:

- no Code non-compliances;
- two Opportunities for Improvement (OFI):
 - the testing of power quality was not always consistent and in accordance with Horizon Power's manuals;
 - Horizon Power system has the capability to identify individual customers subject to over 16 interruptions per year and feeders subject to an interruption of more than 12 hours duration per year, however the process does not track individual customers that are subject to those interruptions.

At the conclusion of the audit Qualeng has concluded that Horizon Power had further progressed its improvement actions in response to the 2020 audit OFIs.

Based on the scope of the audit defined in section 26 of the Code, the audit has found that, except as noted below, 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".

Whilst Horizon Power gives informal consideration and options for interruptions over 4 or 6 hours -

- 1/2023: There is no distinct evidence of systems that monitor the process of considering alternative supply if proposed interruptions are expected to exceed 4 or 6 hours, as applicable, and the effect on a business is likely to be substantial or SHN customers are affected.
- 2/2023: There is not a recognizable process to monitor if remediation is provided or alternative arrangements are made with all those customers that are likely to be subject to more than one instance of significant interruptions over 10 years, as required by the Code.

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	M Zammit	Lead Auditor / Projects Director, Qualeng	13/09/2023

Issue Status

Issue No	Date	Description	Approved
A	11/09/2023	First Draft Issue	MZ
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1 SUMMARY AND RECOMMENDATIONS

1.1 INTRODUCTION

The 2023 audit findings and recommendations are listed in section 1.3.

The previous quality and reliability of supply audit was completed in September 2020. Section 1.2 reviews Horizon Power's progress on that audit recommendations as well as Horizon Power's planned actions to address any outstanding issues.

1.2 PROGRESS OF ACTIONS FROM 2020 AUDIT

The following table lists the recommendations made in the previous (2020) Audit and records progress of any actions.

Table 1: Findings and Recommendations from previous (2020) audit

Item No	Code Ref	Requirement	Operation of the System ▶ Findings / Observations	2020 Recommendations and Opportunities for Improvement	Actions and Status
		Systems to monitor compliance with:			
1	Div 1, Sec. 5 - 7	Quality and Reliability standards, voltage fluctuations, harmonics: 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.		1/2017. The new process documented in the PQ Guides is designed to provide the monitoring of QoS and assess compliance of the electricity supply with the requirements of the Code. At this point the delivery of the program is still in progress and will be subject to a Business Case submission for full implementation. (from 2017 audit)	Action update (2020): Re-programming of existing meters for Total Harmonic Distortion (THD) measurements (993 re-programmed out of 1263, to be completed June 2021) and review of capability of other meters for the measurement of flicker is still in progress. Action (2023) Since the previous audit, the HP metering team have confirmed that all meters (1263) have been reprogrammed with the THD capability.
					CLOSED
1	Div 1, Sec. 5 - 7	Quality and Reliability standards, voltage fluctuations, harmonics:	▶ Measurements were taken however it appeared that testing procedures were not	1/2020. (OFI) The deployment and use of PQ Analysers and the analysis of test data	Local Regional Managers are familiar with the existing PQ analysis guideline, and this is reinforced (when relevant)

Item No	Code Ref	Requirement	Operation of the System ▶ Findings / Observations	2020 Recommendations and Opportunities for Improvement	Actions and Status
		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.	always followed and results not clearly assessed. The deployment and use of PQ Analysers and the analysis of test data is not consistently understood and not always in accordance with Horizon Power's manuals.	needs to be consistently understood and in accordance with Horizon Power's manuals.	during monthly reliability catch-ups. Once the newly updated guideline is published (following the approval of the overarching Network Planning Guidelines), this will also be rolled out to the Regions to ensure processes contained in the new manual are adhered to, and regular monthly check-ins will continue. Horizon Power continues to investigate other economical ways to monitor PQ. An example is through the Advanced Metering Infrastructure (AMI) program, where Horizon collects customer meter data which provides visibility of downstream network voltages and consumption. CLOSED
	Div 2, Sec. 12	Significant interruptions to small use customers System to monitor compliance with limiting significant interruptions to small use customers (≤ 16 times or ≤ 12	▶ The Horizon Power process does not track individual customers that are subject to over 16 interruptions per FY, or subject to over 12 hours of interruption per FY,	2/2020. (OFI) Identify and provide remediation to the individual customer(s) likely to be subjected to over 16 interruptions per FY, or an interruption of over	Action is in progress and will be reported in the 2023 audit report.

Item No	Code Ref	Requirement	Operation of the System ▶ Findings / Observations	2020 Recommendations and Opportunities for Improvement	Actions and Status
		Hours) and to provide remedial action where breaches occur.	and to date there is not a process to monitor if remediation is provided to all those customers that are likely to be subject to more than one instance of significant interruption over 10 years as required by the Code.	12 hour duration more than once in 10 years. This could be achieved by implementing remediation at relevant feeders or at other more granular level as determined by Horizon Power.	

1.3 SUMMARY AND RECOMMENDATIONS OF THE 2023 AUDIT

The following table presents the summary of the current (2023) audit and lists the findings and recommendations made.

Table 2: Systems Compliance Summary, Findings and Recommendations

Legend: NC = Non compliance

Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System 1. Findings / Non compliances	Recommended Corrective Actions / Opportunities for Improvement (OFI)
	General system 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), satisfies the Code requirements except, as applicable, for findings of non-compliance reported below.	
Div 1, Sec. 5 - 7	System to monitor compliance with, so far as is reasonably practicable, quality standards (voltage fluctuations and harmonics).	✓	✓	The audit found evidence of systems, processes and practices that Horizon Power has in place to monitor compliance with, as far as reasonably practicable, the Code quality of supply (QoS) criteria of the electricity supply at the point of connection to the customer, both in terms of voltage fluctuations (flicker) and harmonic distortion. The system relies on customer complaint to initiate power quality investigations. During the audit period there were no records to indicate any of the faults reported by customers were due to power quality as defined by the Code.	Complies
Div 1, Sec. 8	System to monitor compliance with duty to, so	✓	✓	The audit found evidence of systems, processes and practices to monitor Horizon	Complies

Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System 1. Findings / Non compliances	Recommended Corrective Actions / Opportunities for Improvement (OFI)
	far as is reasonably practicable, disconnect if damage may result due to electricity supply quality.			<p>Power's compliance with the requirement to disconnect a customer where there is a possibility of damage to the customer installation due to the transmitter or distributor inability to comply with QoS standards.</p> <p>During the audit period there were no records to indicate any of the faults, PQ incidents and resulting disconnections were due to issues related to the power quality criteria defined in the Code.</p>	
Div 2, Sec. 9	System to monitor compliance, so far as is reasonably practicable, with maintaining the supply and minimising the number and duration of interruptions.	✓	✓	The audit found evidence of systems, processes and practices to monitor Horizon Power's compliance with the requirement to ensure that, so far as is reasonably practicable, the supply of electricity to a customer is maintained and the occurrence and duration of interruptions is kept to a minimum.	Complies
Div 2, Sec. 10	System to monitor compliance with (1) so far as is reasonably practicable, reduction of effects of any interruption and (2) mandatory consideration of alternative supplies when proposed interruptions is expected to exceed 4 or 6 hours and where it affects business substantially or	NC	✓	<p>(1) The audit found evidence of systems, processes and practices that monitor Horizon Power's compliance with the requirement that it must, so far as reasonable practicable, reduce the effect of any interruptions.</p> <p>(2) Systems are in place to monitor compliance with the requirements to keep the duration of planned interruptions below four to six hours as applicable.</p>	1/2023. In order to comply with the Code, evidence must be available to show that the system must consider if it should supply electricity by alternative means under the conditions prescribed in section 10(2) of the Code.

Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System 1. Findings / Non compliances	Recommended Corrective Actions / Opportunities for Improvement (OFI)
	special health needs (SHN) customers require electricity.			<p>1. There is no clear evidence of systems that monitor the process of considering alternative supply if the planned interruption is expected to be greater than 4 or 6 hours and the effect on a business is likely to be substantial or SHN customers are affected.</p>	
Div 2, Sec. 11	System to monitor compliance with (a) interruption duration, so far as is reasonably practicable, does not exceed 4 or 6 hours and (b) notification of the planned interruption is given to the customer over 72 hours prior to interruption; or if not reasonably practicable, at the earliest practicable time.	✓	✓	(a) Systems are in place to monitor compliance with the requirement to keep the duration of planned interruptions below 4 or 6 hours as applicable. (b) The system relies on customer complaints to show if the notification process is working, failures are not reported to management due to the low number of customer complaints per year In view of the number of outages performed by Horizon Power it can be concluded that, so far as reasonably practicable, the Horizon Power systems comply with the Code requirements.	Complies
Div 2, Sec. 11A	System to monitor compliance with (when the customer is supplied by alternative means and supply has to be restored from the network):	✓	✓	Systems are in place to monitor compliance with the requirements to ensure that interruptions do not exceed 4 or 6 hours and the customer is provided notifications of the outage. Arrangements are put in place with local	Complies

Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System 1. Findings / Non compliances	Recommended Corrective Actions / Opportunities for Improvement (OFI)
	3(a) , so far as reasonably practicable, interruption duration does not exceed 4 or 6 hours, and 3(b) best endeavours used to provide notice of planned interruption.			power producers where there is interconnection between Horizon Power and others as the need arises, however these arrangements are not official or formalized.	
Div 2, Sec. 12	System to monitor mandatory compliance with limiting significant interruptions to small use customers when: (2)(a) interruption is in excess of 12 continuous hours; or (2)(b) in areas other than urban, supply has been interrupted more than 16 times in the preceding year; and the distributor considers that supply is likely to be interrupted in excess of the above criteria, in more than 1 year out of 10 (3)(a) The distributor must remedy the causes; or (3)(b) must enter into an alternative arrangement to	✓	NC	A system is in place to monitor the number of interruptions greater than 12 hours or where the frequency of interruptions exceeds 16. Horizon Power system has the capability to identify individual customers subject to over 16 interruptions per FY and customers subject to over 12 hours of interruption. Horizon Power determined that customers had been subject to interruptions which exceeded the standards prescribed in section 12. Worst cases that were identified in the audit included: <ul style="list-style-type: none"> • customers that were subject to up to 26 interruptions in a year; • 319 customers were subject to interruptions over 12 hours in each of 2 or 3 years of the audit period; • 15 customers were subject to interruptions over 12 hours in each of 2 years of the audit period; 	2/2023. Identify and provide remediation or make alternative arrangements to the customer satisfaction with the individual small use customer(s) likely to be subjected to over 16 interruptions per FY, or an interruption of over 12 hour duration more than once in 10 years.

Code Division, Section	Code Requirement	Evidence of System	Evidence of Process	Operation of the System 1. Findings / Non compliances	Recommended Corrective Actions / Opportunities for Improvement (OFI)
	the small use customer's satisfaction.			<ul style="list-style-type: none"> 8 customers were subject to more than 16 interruptions in each of 2 years of the audit period. The audit concluded that: <ol style="list-style-type: none"> The Horizon Power process does not consider traceability of individual small use customers that are subject to over 16 interruptions per FY, or subject to over 12 hours of interruption per FY, and to date there is not a recognizable process to monitor if remediation is provided to all those customers that are likely to be subject to more than one instance of significant interruption over 10 years as required by the Code. 	
Div 3, Sec. 13	System to monitor compliance with, so far as is reasonably practicable, standards for the duration of interruption of supply in particular areas ($\leq 30, 160, 290$ min).	✓	✓	The audit found that Horizon Power has a system to monitor that the average total length of interruptions per customer for the four years up to the current year do not exceed 290 minutes. There is evidence to show that processes are in place and are performing in compliance with the Code.	Complies
Div. 4, Sec. 15	Systems to monitor compliance where Code provisions may be excluded or modified by agreement.	-	-	Not applicable. No specific customer agreements were in place for deviation from the code during the audit period.	Complies

2 OBJECTIVES AND SCOPE OF AUDIT

2.1 INTRODUCTION

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 110,000 residents, communities and businesses, including major industry. The services are provided to close to 54,000 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 the Pilbara North West Interconnected System (NWIS), Horizon Power Microgrids (formerly known as Horizon Power's Non Interconnected Systems) which are made up from 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 and two rural systems associated with Esperance and Hopetoun.

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 Section 26 "Audit and report on monitoring systems" of the Code, Horizon Power is required to arrange for an independent expert to audit and report on 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). Under sub-section 25A(1)(a), the reporting period is "3 years" or as directed by the ERA.

In June 2023 Horizon Power commissioned Qualeng to carry out the Audit to cover the period 1 July 2020 to 30 June 2023.

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

2.2 AUDIT OBJECTIVES

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).

2.3 AUDIT SCOPE

Part 2 of the Code includes 4 Divisions:

1. Division 1 (sect. 4 to 8), "Quality Standards" for compliance, as far as reasonably practicable, 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. (Sect. 9) Provision of supply with the minimum number and duration of interruptions, as far as reasonably practicable.
 - 2.2. (Sect. 10(1)) Reducing, as far as reasonably practicable, the effect of any interruptions to the customer.
 - 2.3. (Sect. 10(2)) Considering the provision of 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.
 - 2.4. (Sect. 11) Allowing planned interruptions for the purpose of maintaining or altering the transmitter's or distributor's network, if the customer is suitably notified within a stipulated time and the duration does not exceed 6 hours, or 4 hours for temperatures over 30 C or north of the 26th parallel, as far as reasonably practicable.
 - 2.5. (Sect. 11A) Where the electricity is not supplied from the network, interrupting the supply of electricity to restore it from the network, provided the interruption duration and notifications comply with section 11, as far as reasonably practicable.
 - 2.6. (Sect. 12) Requiring 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 the distributor considers that the prescribed standard (i.e. supply without the specified interruptions for 9 years in every 10) 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 to any customer premises should not, as far as reasonably practicable, exceed 290 minutes (calculated as the total annual interruption minutes per customer premises, calculated for each of the last 4 years and then averaged over the 4 years) in any area of the State (for areas that apply to Horizon Power).
4. Division 3A. "Temporary reliability standards for supply to particular areas" (from 1 October 2018 to 30 September 2023/2028) provides for restoration and maintenance to essential services loads and the majority of small use customers of:
 - 4.1. 45 MW to Eastern Goldfields and
 - 4.2. 50 MW to North Country

as soon as is reasonably practicable following the occurrence of a planned or unplanned outage of a transmission element supplying the respective region.

5. Division 4, "Variations of obligations under this Part" provides for:
 - 5.1. review and approval by the Minister of alternative requirements and
 - 5.2. agreement between the transmitter/distributor and the customer of extensions and modifications to the standards.

2.3.1 Sections not applicable to this audit

"Division 3A – Temporary reliability standards for supply to particular areas" does not apply to this audit as the areas are operated by the Electricity Networks Corporation.

2.4 CODE CHANGES DURING AUDIT PERIOD

Version 'd' of the Code was in place at the start of the audit period. During the same period the Code received three revisions:

1. Version (e): commencement date 6 November 2021 (ID 01-e0-00); (superseded version (d) (ID 01-d0-01) of 1 October 2018):
 - 1.1. In section 3 "Terms" definitions were changed for covered networks, distribution systems, network infrastructure facilities, stand-alone power systems; where 'stand alone power system' stands for:
 - where the system supplies electricity to a single customer or not more than a prescribed number of customers; and
 - where the system is not connected to another electricity network (other than that of the customer or customers);
 - 1.2. In Section 1, "Schedule 1 – Information to be published", the definition for 'isolated system' is changed to mean that:
 - it is not connected to the North West interconnected system, or the South West interconnected system, and is not a stand-alone power system that is part of a covered network,clause 3 is changed on reporting for stand-alone power systems.
2. Version (f): commencement date 13 November 2021 (ID 01-f0-00 0); (superseded version (e) (ID 01-e0-00) of 6 November 2021):
 - 2.1. In Section 13A: "Temporary reliability standards for Eastern Goldfields and North Country" the following changed:
 - (1) The reliability standards in this Division apply during the period beginning on 1

October 2018 and ending on 30 September 2028 [was 2023].

3. Version (g): commencement date 1 April 2022 (ID 01-g0-00) (superseding version (f) (ID 01-f0-00) of 13 November 2021):
 - 3.1. 'Notes' were changed to show that the Code change was to be in effect on 1 July 2022.

In regard to annual reporting, Code changes for version (e) were only applicable for the first annual period after the publication of the version, with the period 2021-2022 being the transition period.

2.5 AUDIT CONDUCT

The audit was carried out between July and August 2023.

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

- Jeremy Claudius, Planning Manager
- Gerard Chow, Data Management Officer
- Milarie Dogello.

2.6 AUDIT METHODOLOGY

The audit methodology provided for:

- 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.

2.6.1 Audit Terminology, Observations, Opportunities for Improvement and Findings

The audit report uses three terms to qualify the assessment of the evidence:

Observation:	The reporting and assessment of evidence.
Opportunity for Improvement:	Where it is assessed that resolution of a deficiency requires consideration.

Finding and recommendation: Where it is assessed that a deficiency is not in compliance with the Code.

2.7 LIMITATIONS AND QUALIFICATIONS

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

2.8 ACRONYMS AND ABBREVIATIONS

Abbreviation	Description
ACT	Electricity Industry Act 2004 (WA)
AMI	Advanced Metering Infrastructure
AMP	Asset Management Plan
Authority	Economic Regulation Authority
CAIDI	Customer Average Interruption Duration Index (i.e. Duration of each interruption per customer over the year)
Code	Electricity Industry (Network Quality and Reliability of Supply) Code 2005
EO	Electric Office
FY	Financial Year
HP	Horizon Power
HPCC	Horizon Power Control Centre
HV	High Voltage
IPP	Independent Power Producer
Licence	Electricity Integrated Regional Licence (EIRL2)
LS	Life Support
LV	Low Voltage
NQRS	Network Quality and Reliability of Supply
NWIS	North West Interconnected System

Abbreviation	Description
OBS	Observation
OCS	Outage Capture System
POA	Power On Advantage (Horizon Power system)
POF	Power On Fusion (Horizon Power system)
PQ	Power Quality
PQI	Power Quality Investigation
PQIH	Power Quality Investigation Handbook
PQIM	Power Quality Investigation Manual
PUO	Public Utilities Office
QoS	Quality of Supply (as defined in the Code)
SAIDI	System Average Interruption Duration Index (i.e. total interruption duration per customer over the year)
SAIFI	System Average Frequency Index (i.e. average number of interruptions per customer over the year)
SCADA	Supervisory Control and Data Acquisition
SWIS	South West Interconnected System
TCS	Trouble Call System (Horizon Power system)
THD	Total Harmonic Distortion
YTD	Year to Date

Key Findings

3 SYSTEMS TO MANAGE COMPLIANCE WITH PART 2, DIVISION 1 - QUALITY STANDARDS (SEC. 5 TO 8)

3.1 QUALITY OF SUPPLY - SYSTEM/PROCESS (SECTIONS 5 - 7)

Requirement: A transmitter or distributor is required to have systems in place to monitor:

- compliance at all times with, so far as is reasonably practicable, quality of supply (QoS) requirements of the electricity supply at the point of connection to the customer, both in terms of voltage fluctuations (flicker) and harmonic distortion.

Summary

The audit found evidence of systems, processes and practices that Horizon Power has in place to monitor compliance with, as far as reasonably practicable, QoS criteria of the electricity supply at the point of connection to the customer, both in terms of voltage fluctuations (flicker) and harmonic distortion.

The system relies on customer complaints, testing through the deployment and use of portable power quality analysers, use of available harmonics data from existing AMI (Advanced Metering Infrastructure) devices installed across the networks or field reports to initiate power quality investigations.

During the audit period there were no records to indicate any of the faults reported were due to power quality as defined by the Code.

Table 3: Systems to monitor compliance with requirements for quality of supply: Voltage Fluctuations (Flicker) and Harmonics Measurements (2nd order to nth and THD %)

Site	Flicker (Pst < 1.0; Plt < 0.8)	Harmonics (THD < 8%)	Customer Complaints or Faults Related to PQ
All	Reactive system relying on customer complaints.	Reactive system relying on customer complaints.	There was monitoring of customer complaints potentially related to Code PQ requirements.

Findings

The audit did not record any findings.

Documentation

- “Power Quality Investigation Handbook” (PQIH), approved 5/9/2017, was due to be reviewed in August 2022
- “Power Quality Investigation Manual”, (PQIM), number HPC-5DG-07-0001-2017, approved 6 September 2017, was due to be reviewed in September 2022
- Harmonic Limit Allocation Guideline (DM39763127) Draft
- Distortion limits allocation for customers with distorting loads
- “Customer Fault Notes and Electric Shock Process” (DM 39826095), version 3, March 2023
- “Power Quality Testing and Reporting Requirements for LV EG and Load Connections”, Standard/Document Number: HPC-2DJ-13-0003-2020, issued as a draft on 24/09/2020, appears last updated 4/01/2021
- monthly "Asset Management Reports" (AMR)
- Flicker Allocation Template
- Harmonic Allocation template.

Observations

Through interviews and discussions with the Planning Manager, the Data Management Officer and examination of documents and records, the audit found evidence that a process is in place for the monitoring of quality of electricity supply for compliance with the requirements of the Code:

The system operates through as set of documented procedures:

- The “Power Quality Investigation Handbook” (PQIH), approved 5/9/2017, was due to be reviewed in August 2022:
 - this document details the process for executing power quality investigations (PQI) through Horizon Power’s systems Ellipse and TCS.
- The “Power Quality Investigation Manual”, (PQIM), approved 6 September 2017, was due to be reviewed in September 2022:
 - this document defines the procedure for undertaking power quality investigations (PQI) when a complaint is made by a customer.

- The “Power Quality Testing and Reporting Requirements for LV EG and Load Connections” document defines the requirements for power quality testing and review of customer installations to be performed prior to the formal approval of inverter embedded generation systems.
- “Harmonic Limit Allocation Guideline” provides guidance on the planning of the control of harmonics in the network; this document is still in draft.
- “Customer Fault Notes and Electric Shock Process” covers the treatment of reports of electric shocks, suspected defects and faults within consumers installations and the approach to bring the issues to the customer attention in order to get them repaired.

The audit found evidence of system and process performance:

- Various Asset Management Reports (AMR) were reviewed and showed continuous monitoring of data from testing and feedback from customers to reporting of power quality investigations:
 - AMS reports publish power quality complaints per 10,000 customers, by month and by region. The maximum figure found in the period 2022-23 was 22.99/10,000. Monthly figures were steady.
 - AMRs reported PQIs and provided reference to incident investigation.
 - The audit followed the trail of sample incidents and found traceability and resolution.
- The system relies on customer complaints, testing through the deployment and use of portable power quality analysers, use of available harmonics data from existing AMI (Advanced Metering Infrastructure) devices installed across the networks or field reports to initiate power quality investigations.
- The audit reviewed the “Reliability Incidents for Current Month-to-Date and Previous Month (Incident Level) to 19 June 2023” which covered the period 1 May to 19 June 2023:
 - the report covered all districts: East and West Kimberley, East Pilbara, Esperance, GMW Central, Coast and North, West Pilbara
 - only one incident was identified as PQI in June 2023, but cause found as indeterminate and supply restored.
- During the audit period there were no records to indicate any of the faults reported were related to non-compliance with the power quality criteria defined in the Code.

3.2 DUTY TO DISCONNECT IF QUALITY OF SUPPLY MAY LEAD TO DAMAGE (SECTION 8)

Requirement: A transmitter or distributor is required to have systems in place to monitor::

- compliance with, so far as is reasonably practicable, requirement to disconnect a customer where there is a possibility of damage to the customer installation due to the transmitter or distributor inability to comply with QoS standards (as per sections 5 - 7).

Summary

The audit found evidence of systems, processes and practices to monitor Horizon Power's compliance with the requirement to disconnect a customer where there is a possibility of damage to the customer installation due to the transmitter or distributor inability to comply with QoS standards.

During the audit period there were no records to indicate any of the faults, PQ incidents and resulting disconnections were due to issues related to the power quality criteria defined in the Code.

Findings

The audit did not record any findings.

Documentation

- Fault note and electric shock process combined (v3)
- Power Quality Investigation Handbook (PQIH)
- Power Quality Investigation Manual (PQIM)
- Customer Fault Notes and Electric Shock Process
- Power Quality Testing and Reporting Requirements for LV EG and Load Connections
- Field Instruction "FI 9.01 - Customers' Electrical Equipment".

Observations

Through interviews and discussions with the Planning Manager, the Data Management Officer and examination of documents and records the audit found that instructions and processes are in place for the monitoring PQ incidents and to disconnect the supply if there is a possibility of damage to the customer installation:

- the PQIH contains procedures for the field crews to disconnect customer electrical connections when the customer's electrical equipment is found to be faulty.
- PQ incident response is initiated following customer telephone calls, customer complaints, alarms, using the AMI results, using the Network Conditions Monitoring Tool or when crews attend faults in the field and identify the issue as power quality related.
- When attending incidents the process requires that consideration is given as to whether or not the customer supply should be de-energised or disconnected to prevent safety incidents or damage to the installation or property, unless it is in the interest of the customer to maintain supply.
- The process is also intended to address the likelihood of potentially unsafe installation being re-connected prior to confirmation that the defect has been rectified and it is safe to do so.

- The process is reported through the Trouble Call System (TCS), the work management system and Ellipse.

The audit found evidence of disconnections of customers and recording of reasons for disconnections. As identified in section 3.1, the file “Reliability Incidents for Current Month-to-Date and Previous Month (Incident Level) to 19 June 2023” reports on all incidents in the districts. Only one incident was identified as PQI in June 2023, but at the conclusion of the investigation the cause was found as “indeterminate” and the supply restored..

During the audit period there were no records to indicate any of the faults, PQ incidents and resulting disconnections were due to issues related to the power quality criteria defined in the Code.

4 SYSTEMS TO MANAGE COMPLIANCE WITH PART 2, DIVISION 2 - STANDARDS FOR INTERRUPTION OF SUPPLY

A transmitter or distributor must establish systems to monitor compliance with requirements to minimise interruptions to customers, both in term of the duration and number of interruptions. The requirements are for the transmitter or distributor to:

- Maintain the supply, so far as is reasonably practicable, with the minimum number and duration of interruptions (Sec. 9).
- Reduce, so far as is reasonably practicable, the effects of interruptions (Sec. 10(1)).
- 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 (Sec. 10(2)).
- Ensure that where interruptions are planned, so far as is reasonably practicable, the duration does not exceed 6 hours, or 4 hours for temperatures over 30 C or north of the 26th parallel and the customer is notified within a suitable time (Sec. 11).
- Ensure that when the customer is supplied by alternative means, where interruptions are planned and supply has to be restored from the network, so far as is reasonably practicable, interruption duration does not exceed 6 hours, or 4 hours for temperatures over 30 C or north of the 26th parallel and notifications for planned interruption are provided (Sec. 11A).
- 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 (Sec. 12).

4.1 DUTY TO MAINTAIN THE SUPPLY WITH A MINIMUM NUMBER AND DURATION OF INTERRUPTIONS (SEC. 9)

Requirement: The transmitter or distributor must establish systems to monitor the compliance with the requirement to ensure that, so far as is reasonably practicable:

- the supply of electricity to a customer is maintained; and
- the occurrence and duration of interruptions is kept to a minimum.

Summary

The audit found evidence of systems, processes and practices to monitor Horizon Power's compliance with the requirement to ensure that, so far as is reasonably practicable, the supply of electricity to a customer is maintained and the occurrence and duration of interruptions is kept to a minimum.

Interruption data is recorded in work management systems and reported in asset management reports

(AMR). AMRs highlight the compliance criteria and the performance of Horizon Power’s networks against the criteria. Trends are analysed and performance improvement actions are noted.

Table 4: Systems to monitor compliance with requirement to maintain supply and to maintain the occurrence and duration of interruptions to a minimum

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

Findings

The audit did not record any findings.

Documentation

- Horizon Power Crisis & Emergency Management Plan 2022
- Kimberley Distribution Network Contingency Plan 2022
- Severe Weather & Bushfire Response Plan - 2022 (EMP04002)-1
- Communications Crisis and Emergency Management Plan - November 2021
- Ops Non-Performing Systems Action Plan (DM#25136998)-June 2023
- Asset Management Reports (AMR)
- AMR Excel Detailed Report (DM#5389397)-June 2023
- Reliability Incidents for Current Month-to-Date and Previous Month (Incident Level)
- 0307c(i) TCS 12-Month Reliability Incidents (Incident Level) (DM#3257126)-June 2023
- System Reliability Template (for regions comments) (DM#22999354)-June 2023
- PS Monthly Board Report Non-Performing & Just Performing Systems (DM#21443545)-June 2023
- Ops Performance Summary & Regions (DM#28531814)-June 2023.

Observations

Through interviews and discussions with the Planning Manager, the Data Management Officer, the Customer Service Process Manager and examination of documents and records the audit found that:

- Procedures are in place to address and register both planned and unplanned interruptions.

- Interruptions are identified through systems and processes which record customer's telephone calls, automatic fault alarms, emergency switching, emergency work as well as planned interruptions.
- All the interruptions are logged in work management systems and data is recorded as more information and actions details are reported.
- The data is classified, analysed and then relevant details are reported in asset management reports (AMRs) against targets which are consistent with the Code requirements.
- Interruptions that exceed the Code requirements receive additional enquiry to check the causes and if rectification is required.
- Plans for contingencies are in place and include preparations to limit the impact of weather, natural disasters and a range of other events.

AMRs report monthly on reliability performance for the month and for the year to date, providing a summary and detailed statistics and information on interruptions, reported by systems and townships. The monitoring includes both tracking of number and duration of interruptions.

The AMRs identify both performing and non-performing systems and monitor trends in performance. They also report on the causes for each feeder performance or lack thereof and on actions that are taken to address the lack of performance.

AMRs are provided to Regional Managers, Asset Managers and an extensive list of stakeholders for review of performance and for asset planning.

As identified in section 3.1 the file "Reliability Incidents for Current Month-to-Date and Previous Month (Incident Level)" provides granular recording of all incidents in the districts and summary of their resolution.

4.2 DUTY TO REDUCE THE EFFECTS OF INTERRUPTIONS AND PROVISION FOR ALTERNATIVE SUPPLIES FOR PROPOSED INTERRUPTIONS (SEC. 10)

Requirement: The transmitter or distributor must establish systems for monitoring its compliance with its duty to:

- reduce the effect of any interruptions, so far as is reasonably practicable, and,
- without limiting the above, the licensee must consider providing alternative supply for proposed interruptions if the interruption is:
 - greater than 4 or 6 hours
 - the effect on a business is likely to be substantial; or
 - there are special health needs customers that require electricity for the operation of

health equipment.

4.2.1 Reduce the effect of any interruptions (SSec 10(1))

Requirement: The transmitter or distributor must establish systems for monitoring its compliance with the requirement that:

- the transmitter or distributor must, so far as is reasonably practicable, reduce the effect of any interruptions.

Summary

The audit found evidence of systems, processes and practices that monitor Horizon Power's compliance with the requirement that it must, so far as is reasonably practicable, reduce the effect of any interruptions.

Monthly AMRs report on Horizon Power's interruption performance, customer complaints and improvement actions.

Several systems are in place to proactively prevent or reduce the effect of interruptions ranging from crisis and emergency management plans, contingency plans and response plans to manage severe weather events, natural disasters and pandemics.

Findings

The audit did not record any findings.

Documentation

- Ops Non-Performing Systems Action Plan" (DM#25136998)-June 2023
- System Reliability Template (for regions comments) (DM#22999354)-June 2023
- PS Monthly Board Report Non-Performing & Just Performing Systems (DM#21443545)-June 2023
- "Life Support Dashboard PowerBI App-Screenshot"
- Life Support Dashboard Weekly Check (26 June 2023)
- 0307c(i) TCS 12-Month Reliability Incidents (Incident Level) (DM#3257126)-June 2023
- Crisis & Emergency Management Plan (2022)
- Severe Weather & Bushfire Response Plan
- Kimberley Distribution Network Contingency Plan 2022

- Operations Master Priority Restoration Feeders (HP 3680948) (DM1809334).

Observations

Through discussions with the Planning Manager and the Data Management Officer and review of documentation and evidence, the audit found that, as reported in section 4.1, Horizon Power has plans, systems and processes in place to monitor the duration and number of interruptions.

Horizon Power has monitoring, reporting and improvement processes in place to keep track of operational activities and reduce the effect of interruptions on customers:

- Live system monitoring allows the prioritization of responses to address interruptions.
- Interruption data is reported against the Code and planning criteria with the objective of maintaining compliance with the Code and with reliability targets.
- AMRs report on interruption performance, including interruptions over 12 hour duration, interruption frequency over 16 in a year, planned outages duration exceeding Code criteria, response to incidents that exceed seven days.
- “Ops Non-Performing Systems Action Plan”, reports on non-performing systems, outage causes and actions to rectify defects and improve performance.
- The System Reliability Template (for regions comments) showed that non-performing systems are analysed systematically and incidents are identified together with details of the investigations, causes and rectification.
- PS Monthly Board Report Non-Performing & Just Performing Systems, presents graphs of customer interruption performance for non-performing and just-performing systems, together with summaries of major incidents and improvement actions.
- 0307c(i) TCS 12-Month Reliability Incidents (Incident Level) shows incident details for the year and provides further analysis of ‘Incidents of Note’ that need to be reported to the Board.

Horizon Power has plans, procedures and processes to respond and mitigate significant occurrences of weather events, natural events such as bushfires, earthquakes, tsunamis, equipment failure, crisis and other threats to supply. Plans provide for recording of mitigation activities.

Plans include:

- Horizon Power - Crisis & Emergency Management Plan 2022.
- Plans like the Kimberley Distribution Network Contingency Plan 2022, which include the identification of available external providers for mutual assistance, back up generation in case of loss and spares.
- Preparation prior to major events includes, among others, the use of both internal and external, facilities, resources and alternative power supplies to mitigate the effects of events.

- Operations Master Priority Restoration Feeders” provides for prioritisation of restoration of supply to critical services and customers.

The response plans indicated both advance preparation based on monitoring by external agencies such as the Weather Bureau, or responses to reports of failures such as provided by Horizon Power’s Control Centre (HPCC).

In terms of procedures:

- Horizon Power has procedures in place to reduce the effect of interruptions on customers, procedures included:
 - A notification process to advise customers of planned or emergency interruptions.
 - “Work Instruction - Critical Load Processes V1.0” for identification of critical loads that need continuous supply.
 - “Work Instruction - Life Support Processes V1.0”, identification of sensitive customers that need life support.
 - “Customer Experience Planned Power Outage Work Instructions (DM22469588)” identifies Sensitive Load customers as both Critical load and Life Support customers. It provides for electronic outage notifications to all customers in the outage zone, including Sensitive Load customers, by SMS or email. Contact for acknowledgement from any impacted SHN Customers is also suggested to check if the outage will adversely affect them. Records of both successful and unsuccessful contact are stored in the Velocity system.

4.2.2 Provision of Alternative Supply for Proposed Interruptions, Special Health Needs Customers and Commercially Sensitive Loads (SSec 10(2))

Requirement: The licensee must establish systems for monitoring its compliance with:

- without limiting the requirement of section 10(2) (to reduce the effect of any interruptions, so far as is reasonably practicable) the licensee must consider providing alternative supply for proposed interruptions if the interruption is:
 - greater than 4 or 6 hours;
 - the effect on a business is likely to be substantial; or
 - there are special health needs customers that require electricity for the operation of needed health equipment.

Summary

The audit found that:

- Systems are in place to monitor compliance with the requirements to keep the duration of planned interruptions below 4 to 6 hours as applicable.
- Systems are in place to manage notification of proposed interruptions and provide them at least 72 hours before proposed interruptions.

Whilst it was noted that Horizon Power gives informal consideration and options for interruptions over 4 or 6 hours:

- ▶ There was no clear evidence that systems monitor the process of considering alternative supply if the proposed interruptions is expected to be greater than 4 or 6 hours and the effect on a business is likely to be substantial or special health needs (SHN) customers are affected.

Table 5: 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 (Mandatory Consideration)	Critical Businesses & Special Health Needs Customers
All	Yes	▶ No evidence found	Identified

Findings

The audit recorded a finding of non-compliance:

1. The audit did not find distinct evidence of a system to monitor the process of considering alternative supply if the planned interruptions is expected to exceed 4 or 6 hours, as applicable, and the effect on a business is likely to be substantial or special health needs (SHN) customers are affected.

Recommendation:

- 1/2023. In order to comply with the Code, evidence must be available to show that the system must consider if it should supply electricity by alternative means under the conditions prescribed in section 10(2) of the Code.

Documentation

- C9.7.9 - Regional Planned Outage Notification Process
- Customer Experience Planned Power Outage Work Instructions (DM22469588)
- Asset Management Reports (AMR)
- AMR Detailed Report (PO worksheets only)
- AP24 - Customer Card Drop Replacement - RCM Update, 2016

- Planned Power Outage Notification Form (Fillable Version)
- Planned outage - Customer Notification Reference Guide POF Version, 2016
- Planned outage - Customer Notification Reference Guide EO Web Version, 2016
- Critical Load Process Flow
- Field Verification of Meter Numbers for Life Support Customers (DM#25256666)
- Life Support Dashboard Weekly Check (26 June 2023)
- Life Support DUG Validation Process (DM#24656990) [DUG stands for Data Update Group]
- Life Support Process Flows[
- Major Event Day (MED) Criteria (DM#16176539)
- Operations Master Priority Restoration Feeders (HP_3680948) (DM1809334)
- Work Instruction - Critical Load Processes V1.0
- Work Instruction - Life Support Processes V1.0
- System Reliability Template (for regions comments) (DM#22999354)-June 2023.

Observations

Through interviews and discussions with the Planning Manager, the Data Management Officer and review of documentation and evidence, the audit found that:

- Horizon Power has procedures in place to reduce the effect of interruptions on customers.
- A notification process is in place to advise customers of planned or emergency interruptions.
- “Work Instruction - Critical Load Processes V1.0” documents the process for verification and approval of critical loads that need continuous supply.
- “Work Instruction - Life Support Processes V1.0”, provides for the identification of sensitive customers that need life support.

Monitoring of extended planned interruptions against the Code requirements is provided by AMRs, reporting includes:

- Monitoring of planned interruption over “Charter” duration.
- Monitoring of customer complaints.

In addition:

- Further monitoring of customers status and agreement to outages is provided through notifications and customer response.
- The process in “Customer Experience Planned Power Outage Work Instructions” allows for cancellation of power outage by the “Customer and Community” group if sensitive customers

advise that the outage will compromise their safety.

- Verification of data consistency is provided by Horizon Power's 'Life Support Summary / Data Anomalies Summary' reports which allow the monitoring of data consistency of "Life Support" customers and "Critical Loads" (as per "Life Support Dashboard PowerBI App-Screenshot").
- The "Customer Service Policy" states that SHN customers with life support equipment and registered business premises are given priority restoration services during unexpected interruptions.

The audit found that:

- ▶ Monitoring of consideration of the use of alternative power where the proposed interruption is expected to exceed 4 to 6 hours, or the effect on business is substantial or there are SHN customers was not noted.

The audit noted that the "Customer Experience Planned Power Outage Work Instructions" provided for:

- Cross checking of information between Velocity system and OCS/POA (where OCS is Outage Capture System) and
- Cancellation of the outage if no acknowledgement of the notification from any impacted SHN customer was obtained, but also
- Possibility to carry out with the outage even if the customer is not contactable through the General Manager (GM) escalation.

The audit made a further observation on the annual NQRS Code Report. The reports include Appendix A which, in the section "Normalised Data Set - Unplanned" state:

- "Horizon Power uses Normalised data set to measure the management of incidents that are within the business' control."
- "Horizon Power's Normalised Data excludes interruptions where the interruption is not reasonably practicable to control such as:
 - Customer installations/ appliances
 - Planned outages/ disconnections
 - Vehicle, machine or tool damage
 - Wilful damage
 - Damage due to events that Horizon Power cannot, so far as is reasonably practicable, control such as cyclones, fires and floods."

The report may need to clarify the interpretation of 'Planned outages / disconnections' as interruptions

that are not practicable to control, rather as needing to be assessed in a different report.

4.3 PLANNED INTERRUPTIONS: ACCEPTABLE IF LESS THAN 4 OR 6 HOURS AND IF NOTIFIED (SEC. 11)

Requirement: The transmitter or distributor must establish systems to monitor compliance with the requirement to:

- maintain, so far as is reasonably practicable, planned outages not exceeding 4 or 6 hours; and
- provide notifications at least 72 hours before each planned outage; or
- if it is not reasonably practicable, at the earliest practicable time before the start of the interruption.

Summary

The audit found that:

- Systems are in place to monitor compliance with the requirements to keep the duration of planned interruptions below 4 to 6 hours, as applicable.
- Systems are in place to manage notification of proposed interruptions and provide them at least 72 hours or, if not practicable, at the earliest practicable time before the start of the proposed interruption.
- The systems rely on customer complaints for registering potential non-compliance with the notification requirement. Once the complaints are registered the system reports on the non-compliance however, due to the likely low numbers, these reports are not included in the widely distributed Asset Management Reports (AMRs) which detracts from the intent of the monitoring.

In view of the number of outages performed by Horizon Power it can be concluded that Horizon Power's system, as far as reasonably practicable, complied with the Code requirements.

Table 6: 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	Duration ≤ 4h or 6h (as practicable)	Notification ≥ 72 hours prior, or at earliest practicable time
All	Monitored 116 planned outages with duration over Code limits (> 4 or 6 hours) in FY ending 2021, 166 in FY 2022 to 100 in FY 2023	Monitoring of the notification system relies on customer complaints to show if the process is working. Failures are not reported to management due to the expected low number of customer complaints per year.

Findings

The audit did not record any findings.

Documentation

- “Customer Service Policy”
- Customer Experience Planned Power Outage Work Instructions (DM22469588)
- C9.7.9 - Regional Planned Outage Notification Process
- AP24 - Customer Card Drop Replacement - RCM Update
- Planned outage - Customer Notification Reference Guide EO Web Version
- Planned outage - Customer Notification Reference Guide POF Version.

Observations

Through interviews and discussions with the Planning Manager, the Data Management Officer and examination of documents and records the audit found:

- Processes are in place to address and register both planned and unplanned interruptions.
- Planned interruptions are logged in the work management systems and data is recorded as information and actions details are reported.
- Planned interruption data is registered in asset management report spreadsheets and checked against targets which are consistent with the Code requirements; AMRs collect data from the spreadsheet and report non compliance to the Code requirements to management.

In regard to notifications the audit found:

- Horizon Power relies on customer claims to monitor the performance of the notification process.
- Non-compliance of notification delivery is recorded but, due to the likely low numbers, these reports are not included in the widely distributed AMRs which detracts from the intent of the monitoring.
- The “Customer Service Policy” sets requirements for providing required notification of planned interruptions.
- Work Instructions “Planned outage - Customer Notification Reference Guide EO Web Version” and “Planned outage - Customer Notification Reference Guide POF Version” provide detailed step by step instructions to provide notifications to customers by SMS, e-mail and post, as well as through Horizon Power’s corporate office to publish the outage information on Horizon Power’s web site.
- The above processes are aimed to replace the customer card drop notification process.
- Detailed procedure are in place to ensure notification of planned interruptions and verification of notification.

The audit found sufficient evidence of a process to notify customers.

4.4 INTERRUPTIONS TO RESTORE SUPPLY FROM NETWORK (SEC. 11A)

Requirement: Where the customer is supplied from alternative power because it is unable to receive supply from the network and the transmitter or distributor interrupts the supply of electricity for the purpose of restoring the supply of electricity to the customer from the network, the transmitter or distributor must establish systems to monitor compliance with the requirement to:

- so far as is reasonably practicable, ensure that the interruption does not exceed 4 or 6 hours and
- the transmitter or distributor has used its best endeavours to give notice to the customer.

Summary

The audit found that Horizon Power has systems in place to monitor compliance with the requirements to ensure that interruptions do not exceed 4 or 6 hours and the customer is provided notifications of the outage.

Arrangements are put in place with local power producers where there is interconnection between Horizon Power and others as the need arises, however these arrangements are in principle and not formalized.

Findings

The audit did not record any findings.

Documentation

- “Customer Service Policy”
- Customer Experience Planned Power Outage Work Instructions (DM22469588)
- C9.7.9 - Regional Planned Outage Notification Process
- AP24 - Customer Card Drop Replacement - RCM Update
- Planned outage - Customer Notification Reference Guide EO Web Version
- Planned outage - Customer Notification Reference Guide POF Version
- Horizon Power - Crisis & Emergency Management Plan 2022.

Observations

The audit found that:

- Horizon Power has systems in place to monitor compliance with the requirements to ensure that interruptions do not exceed 4 or 6 hours and the customer is provided notifications of the outage.
- Arrangements are put in place with local power producers where there is interconnection between Horizon Power and others as the need arises, however these arrangements are not official or formalized.
- Contingency plans and the Crisis & Emergency Management Plan refer to such arrangements, to ensure that as soon as there is a network failure, there is an alternative source of supply that is ‘normally open’ but can be closed to back-feed if a fault develops on the regular supply (as per Kimberley Distribution Network Contingency Plan 2022).

Horizon Power stated that: “There is currently no formal process for these scenarios as they are ad hoc requests and highly subject to power system conditions at the time. It is however an example where Horizon is able to be flexible and provide support to minimise interruptions to customer supply”.

4.5 SIGNIFICANT INTERRUPTIONS (OVER 12 HOURS DURATION OR MORE THAN 16 IN A YEAR) TO SMALL USE CUSTOMERS (SEC.12)

Requirement: The distributor 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) occur to a small use customer and

where the distributor considers that the prescribed standard (no significant interruptions in 9 years out of 10) is unlikely to be met.

Summary

The audit found that Horizon Power has systems in place to monitor compliance with the requirements 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) occur to a small use customer.

However, at present remediation and alternative arrangements are provided for groups of customers and while the system has the capability to report on the individual customers thus affected, the system does not follow up traceability of individual customers to show that remedy or alternative arrangements are made with individual customers that are affected by these significant interruptions.

The audit noted that:

- ▶ The audit did not find clear evidence that for each of the customers with multiple interruptions over the prescribed limit, or with durations over the prescribed limit, there is a process where the causes of the interruptions were remedied or alternative arrangements put in place.

Table 7: Systems for monitoring compliance with interruption duration not to exceed 12 hours

Site	Criteria		Causes of Interruption Remedied / Alternative Arrangements
	Duration ≤ 12 hours FY2021 - FY2023	9 Years out of 10 2015 and 2023 (≤ 12 hours)	
MONITORING			
All	Monitoring in place	▶ There is availability of data. Criteria not achieved.	▶ Traceability of remediation for interruptions > 12h is now available but not employed.
PERFORMANCE			
All	Interruptions occurring each FY	▶ There is availability of data. Criteria not achieved.	▶ Records available for interruption to individual customers but no traceability of remediation / alternative arrangements.

Table 8: Systems for monitoring compliance with interruption frequency not to exceed 16 per customer per period

Site	Criteria		Causes of Interruption Remedied / Alternative Arrangements
	# interruptions ≤ 16 / year (July-June) FY2021 - FY2023	9 Years out of 10 (# interruptions ≤16)	
MONITORING			
All	Monitoring in place	Monitoring in place	▶ Traceability of remediation for interruptions > 16#/FY is not yet available.
PERFORMANCE			
All	Interruptions occurring each FY	▶ Not achieved	▶ Not available

Findings

The audit made a finding of non-compliance:

2. At present remediation and alternative arrangements are provided for groups of customers and while the system has the capability to report on the individual customers affected by significant interruptions, the system does not follow up traceability of individual customers to show that remedy or alternative arrangements were made.

Recommendation:

- 2/2023.** Identify and provide remediation or make alternative arrangements to the customer satisfaction, with the individual small use customer(s) likely to be subjected to over 16 interruptions per FY, or an interruption of over 12 hour duration per FY more than once in 10 years.

Documentation

- Monthly AMRs
- AMR Excel Detailed Report (DM#5389397)- June 2023

Observations

Significant Interruptions and Remediation

Through interviews and discussions with the Planning Manager, the Data Management Officer and review of documentation and evidence, the audit found that:

- There was sufficient evidence to show that significant interruptions are monitored.
- AMRs report significant interruptions both monthly and YTD.
- Spreadsheets are generated from field data reporting:
 - Customers that are subject to interruptions over 12 hours are identified by customer number; reporting shows the number of interruptions over one or more years for those customers.
 - Customers that are subject to more than 16 interruptions per year, over one or more years, by the number of interruptions and by customer number.

Spreadsheet reports, such as “AMR Excel Detailed Report”, which provide the data for the monthly AMRs report, reported that, over the audit period:

- A total of 319 customers were subject to interruptions over 12 hours in each of two or three years of the audit period.
- 15 customers were subject to interruptions over 12 hours in each of the three years of the audit

period.

- Customers were subject to up to six interruptions over 12 hours in the audit period.
- One customer was subject to a total of six interruptions over 12 hours in the timespan of two consecutive years.
- One customer was subject to four interruptions in one year, several were subject to three interruptions in one year.

The same spreadsheet report “AMR Excel Detailed Report” showed that:

- A total of 48 customers were subject to more than 16 interruptions in each of two years of the audit period.
- Overall individual customers were subject to up to 26 interruptions in the audit period.

The Code requires that where significant interruptions (duration over 12 hours or more than 16 interruptions in the preceding year) occur to a small use customer and where the licensee considers that the prescribed standard (no significant interruptions in 9 years out of 10) is unlikely to be met, the causes of the interruptions must be remedied or alternative arrangements put in place.

- ▶ The audit did not find clear evidence that for each of the customers with multiple interruptions over the prescribed limit, or with durations over the prescribed limit, the causes of the interruptions were remedied or alternative arrangements put in place.

However the audit did note that reports have been produced indicating the causes of interruption for customers that are affected by interruptions with duration over 12 hours or where the frequency of interruptions exceeds 16 per year.

5 SYSTEMS TO MANAGE COMPLIANCE WITH PART 2, DIVISION 3 AND 3A- STANDARDS FOR THE DURATION OF INTERRUPTION OF SUPPLY IN PARTICULAR AREAS (SEC. 13)

Requirement: The transmitter or distributor must:

Establish systems to monitor compliance with the Code requirement to ensure that, so far as is reasonably practicable, the average total length of interruptions per customer in an area, during each year, for the four years up to the current year, for areas other than the Perth CBD, does not exceed 160 minutes in urban areas or 290 minutes in any other area of the State.

Summary

The audit found that Horizon Power has a system to monitor that the average total length of interruptions per customer for the four years up to the current year do not exceed 290 minutes.

There is evidence to show that processes are in place and are performing in compliance with the Code.

Table 9: Systems to monitor compliance with requirement for interruption not to exceed 290 minutes average per customer over 4 years.

Site	Average of Total Length of Interruptions per Customer per year (minutes)				4 Year Average (Criteria: Avg over 4 years ≤ 290 min)
	2020	2021	2022	2023	
All sites	315	204	234	280	258

Table 10: Systems to monitor compliance with requirement for interruption not to exceed 290 minutes average per customer over 4 years.

Site	4 Year Average Total Length of Interruptions per Customer per Year during Audit Period (Criteria: Avg over 4 years ≤ 290 min)		
	2021	2022	2023
All sites	226	246	258

Findings

The audit did not record any findings.

Documentation

- Monthly AMRs
- Horizon Power intranet dashboard 'Powerlink'
- Code reports - Network Quality and Reliability of Supply
- Non Performing System Action Plan – June 2023.

Observations

Through interviews and discussions with the Planning Manager, the Data Management Officer and review of documentation and evidence, the audit found that:

- the process uses AMRs, which are published monthly, to report on the performance of the entire network down to individual townships. The data reported include:
 - Targets for each town which, if achieved, will result in compliance with the Code requirements.
 - Highlighting of systems including townships that have interruptions exceeding the Code requirements.

In order to verify actions taken for managing compliance the published data was tested by comparing the 2020-21 period to the 2021-22 and 2022-23 periods, to find systems that may have recurring failures over two and three periods. The test found systems that had recurring non-compliance over two and three periods. A sample of these systems were analysed including Carnarvon, Mount Magnet and Norseman. Results showed that in each case corrective actions had been put in place to rectify faults or improve the performance:

- Carnarvon: Horizon Power investigated failures and determined causes, rectification actions were completed; progressive System Average Interruption Duration Index (SAIDI), (i.e. total interruption duration per customer over the year) monthly figures decreased to below Code limits at the end of the 2022-23 period.
- Mount Magnet: failures were identified and analysed, rectification actions were implemented to improve reliability.
- Norseman: five incidents were analysed for improvement, multiple incidents were attended to and monthly SAIDI fell below Code limits at the end of the audit period and trending to be mostly compliant over the next 12 month period.

6 VARIATIONS OF OBLIGATIONS (SEC 14-15)

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

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.

Summary:

Through discussions with the Planning Manager and the Data Management Officer the audit found that no specific customer agreements are in place for deviation from the code.

Documentation

- Operations Master Priority Restoration Feeders (HP_3680948) (DM1809334).

7 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 previous audit (FY ending 2020) resulted in no non-compliances, two "Opportunity for Improvement" and 2 recommendations. This audit (2023) has found that there has been progress in Horizon Power actions in response to the audit observations.

The 2023 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.

Section 1.3, "Summary and Recommendations of the 2023 Audit" includes Table 2, which details the findings, observations and recommendations arising from the audit. The table rates the various element as complying (✓), non-complying (✘), actions in progress, observations, findings, non-compliances (NC), Opportunities for Improvement (OFI) or recommendations. The audit found two non-compliances and no OFIs.

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, in the opinion of the auditor, and except as noted in the audit summary table, the system and processes within Horizon Power are in compliance with the requirements of Part 2 of the Code, "Quality and Reliability Standards".