SYSTEM COORDINATION BULLETIN

QUARTERLY UPDATES: 1 APRIL 2024 - 30 JUNE 2024

In accordance with Rule 288 of the Pilbara Network Rules (the Rules), the ISO must periodically, at least once every quarter, publish a bulletin giving brief information on matters discussed in system coordination reports which may impact the operational and commercial decisions of Pilbara electricity market participants.

The report is to include details of:

- The incidence and extent of constraint directions issued;
- The incidence and extent of system operations directions and precontingent directions issued;
- The incidence and extent of non-compliances with directions; and
- The incidence and extent of noteworthy incidents in the power system (including contingencies, pre-contingent actions, shortfalls in essential systems services and occasions on which the power system was not in a secure state or was outside the technical envelope) together with, for each incident:

1. Information about the circumstances that caused the incident; and
2. Information about the actions the ISO and registered NSPs took in response to the incident; and
3. The results of any post-incident discussion or investigation.

The ISO must not include any confidential information in the System Coordination Bulletin. The ISO has consulted with the information owners as required under the Rules prior to publishing this bulletin (see Subchapter 11.2 of the Rules).

This System Coordination Bulletin should be read in conjunction with Chapter 7 of the Rules and the Interim Protocol Framework Procedure.

Table 1: List of Fortnightly Coordination Meetings

MEETING	DATE	ATTENDEES
62	05/04/2024	Pilbara ISOCo, Rio Tinto, APA, Horizon Power, ISO Control Desk
63	19/04/2024	Pilbara ISOCo, Rio Tinto, APA, Horizon Power, ISO Control Desk
64	03/05/2024	Pilbara ISOCo, Rio Tinto, APA, Horizon Power, ISO Control Desk
65	16/05/2024	Pilbara ISOCo, Rio Tinto, APA, Horizon Power, ISO Control Desk
66	31/05/2024	Pilbara ISOCo, Rio Tinto, APA, Horizon Power, ISO Control Desk
67	14/06/2024	Pilbara ISOCo, Rio Tinto, APA, Horizon Power, ISO Control Desk
68	28/06/2024	Pilbara ISOCo, Rio Tinto, APA, Horizon Power, ISO Control Desk

INCIDENCE AND EXTENT OF DIRECTIONS ISSUED

Table 2 provides details of the incidence and extent of the directions issued under the Rules, including:

- Pre-contingent [Rule 79];
- Systems operations [Rule 188];
- Emergency [Rule 189]; and
- Constraint [Rule 258].

Table 2: Directions issued

DATE	27/04/2024- 02/05/2024	REASON
TYPE OF DIRECTION	Enable Frequency Control and Flow Limit Directions	The ISO Control Desk activated the Pre-Contingent Protocol and Islanding Protocol, due to a scheduled line outage for planned maintenance on the Horizon Power network that resulted in the formation of the West Pilbara and East Pilbara credible islands. Under these Protocols, a direction was issued to APA DEWAP to limit the active power flows to 45 MW on one of its transmission lines, to reduce the size of credible contingencies involving the loss of generation in the East Pilbara networks. This direction was identified and agreed in the system coordination meeting to avoid large credible contingencies on the East Pilbara networks when islanded. A similar direction to limit the maximum contingency size was agreed to be necessary for South Hedland Power Station, however, the direction was not issued. Under the activated Protocols, Port Hedland Power Station was also directed to enable secondary frequency control. The Protocols were active for 6 days, then formally deactivated.
DIRECTION GIVEN BY	ISO Control Desk	
FACILITY DIRECTED	Port Hedland Power Station South Hedland Power Station	
COMPLIANCE WITH DIRECTION (Y/N)	Y	

Table 2: Directions issued

DATE	27/05/2024	REASON
TYPE OF DIRECTION	Enable Frequency Control	Due to a scheduled line outage for planned maintenance on the Horizon Power network, the ISO Control Desk issued a pre-contingent direction to the Port Hedland Power Station to enable secondary frequency control within the East Pilbara credible island.
DIRECTION GIVEN BY	ISO Control Desk	
FACILITY DIRECTED	Port Hedland Power Station	
COMPLIANCE WITH DIRECTION (Y/N)	Y	

NOTEWORTHY INCIDENTS IN THE POWER SYSTEM

Table 3 provides an overview of noteworthy incidents that occurred in the power system during the reporting period.

For the purposes of this System Coordination Bulletin, a noteworthy incident in the power system includes contingencies, pre-contingent actions, shortfalls in essential system services and occasions on which the power system was not in a secure state or was outside the technical envelope [see Rule 163], which might have been credibly expected to adversely affect [see Rules 166 and 183(5)]:

- Security or reliability, as defined by the System Security Objective; or
- The ability of any part of a covered transmission network to benefit from essential system services; or
- The ability of a covered NSP to provide transmission voltage contracted network services; or
- Anything else ISO determines as a noteworthy incident.

As per Rule 162, the “System Security Objective” is to:

- Maintain the power system inside the Technical Envelope where practicable, and otherwise promptly return it to inside the Technical Envelope; and
- Maintain the power system in a Secure State where practicable, and otherwise return it to a Secure State as soon as practicable; and
- Otherwise — to a GEIP standard maintain, and to a GEIP standard seek to improve, security and reliability.

Table 3: Noteworthy incidents in the power system

DATE	DESCRIPTION OF CIRCUMSTANCES THAT CAUSED THE INCIDENT	ACTIONS TAKEN BY ISO AND NSP IN RESPONSE TO INCIDENT	POST INCIDENT DISCUSSION OR INVESTIGATION (Y/N)
11/04/24	Earth fault protection trip of a transformer caused a frequency excursion of 50.42 Hz. Frequency recovered and stabilised to below 50.25 Hz within 3 minutes.	As the system was in a secure and normal operating state, the frequency excursion was managed by generator droop response, including responses from ESS providers. After frequency stabilised, the loss of generation was picked up by the primary FCESS response.	N
11/04/24	A snake on the cable terminations of a distribution feeder caused a transmission line to trip on undervoltage protection, resulting in a frequency excursion to 50.47 Hz. Frequency recovered and stabilised below 50.25 Hz in less than a minute.	As the system was in a secure and normal operating state, the frequency excursion was managed by generator droop response, including responses from ESS providers.	N
04/05/24	A generating unit tripped resulting in a frequency drop to 49.67 Hz. Frequency recovered and stabilised above 49.75 Hz within 2 seconds.	As the system was in a secure and normal operating state, the frequency excursion was managed by generator droop response, including responses from ESS providers. After frequency stabilised, the loss of generation was picked up by the primary FCESS response.	N
2/1/2024	A pole fire led to a feeder fault, causing a frequency excursion to 49.37 Hz. Frequency recovered and stabilised above 49.75 Hz within less than 1 minute.	As the system was in a secure and normal operating state, the frequency excursion was managed by generator droop response, including responses from ESS providers.	N
26/05/2024	A battery energy storage system (BESS) tripped during commissioning, causing frequency to drop to 49.74 Hz. Frequency recovered and stabilised above 49.75 Hz within 2 seconds.	As the system was in a secure and normal operating state, the frequency excursion was managed by generator droop response, including responses from ESS providers.	N
03/06/2024	A generating unit tripped resulting in a frequency drop to 49.67 Hz. Frequency recovered and stabilised above 49.75 Hz within 3 seconds.	As the system was in a secure and normal operating state, the frequency excursion was managed by generator droop response, including responses from ESS providers. After frequency stabilised, the loss of generation was picked up by the primary FCESS response.	N

Table 3: Noteworthy incidents in the power system

DATE	DESCRIPTION OF CIRCUMSTANCES THAT CAUSED THE INCIDENT	ACTIONS TAKEN BY ISO AND NSP IN RESPONSE TO INCIDENT	POST INCIDENT DISCUSSION OR INVESTIGATION (Y/N)
05/06/2024	A generating unit tripped resulting in a frequency drop to 49.63 Hz. Frequency was stabilised above 49.75 Hz within 3 seconds.	As the system was in a secure and normal operating state, the frequency excursion was managed by generator droop response, including responses from ESS providers. After frequency stabilised, the loss of generation was picked up by the primary FCESS response.	N
06/06/2024	A human error during testing of black start functionality at a generating facility led to the trip of a generating unit resulting in a frequency drop to 49.73 Hz. Frequency recovered and was stabilised above 49.75 Hz within 4 seconds.	As the system was in a secure and normal operating state, the frequency excursion was managed by generator droop response, including responses from ESS providers. After frequency stabilised, the loss of generation was picked up by the primary FCESS response	N
20/06/2024	A BESS tripped output during commissioning, resulting in a frequency drop to 49.55 Hz. Frequency recovered and was stabilised above 49.75 Hz within 3 seconds	As the system was in a secure and normal operating state, the frequency excursion was managed by generator droop response, including responses from ESS providers.	N

RESULTS OF POST-INCIDENT DISCUSSIONS OR INVESTIGATION

Table 4 provides an overview of results of post-incident discussions or investigations during the reporting period.

In accordance with Subchapter 7.6 of the Rules, the ISO may conduct informal discussions [Rule 196] or investigations [Rule 197] on the following:

- a Contingency or other event which in the ISO's opinion jeopardised, or had the potential to jeopardise, the System Security Objective to a significant extent; or
- an unplanned outage of a facility or network element for which a planned outage would be a notifiable event; or
- a Protocol being activated or the ISO referring any other matter relating to the Protocol Framework.

The primary objective of ISO's post-incident discussions and investigations is, with a view to maintaining and improving security and reliability, to enable and promote:

- continuous improvement of the Rules, the Procedures, and the operation of the power system; and
- appropriate accountability for Rules Participants.

Table 4: Post-incident discussions or investigations

DATE	OVERVIEW OF INCIDENT AND DISCUSSION OR INVESTIGATION	RESULTS AND RECOMMENDATIONS
17/07/2023	**Event Description** While the system was in normal operating conditions and in a secure state, a generating unit tripped at 24 MW output. Frequency dropped to a low of 49.66 Hz over 2 seconds, recovering back to 49.75 Hz within 4 seconds and stabilising at 49.87 Hz within 7.7 seconds of the trip. **Purpose of Informal Discussion** The ISO elected to conduct an informal discussion of the event with the purpose to assess the technical performance of the contracted ESS generators against the minimum droop response requirements of the HTR 3.3.4.4(e)(1)(A) and HTR 3.3.4.4(f)(1)**.**	Ongoing The ISO concluded that all except one of the generating units online at the time of the trip exhibited the minimum droop response required by HTR 3.3.4.4(e)(1)(A) and HTR 3.3.4.4(f)(1). The ISO requested the Registered Controller of the exceptional generating unit to undertake further investigations into the droop response of that unit, and to report back to the ISO on the outcomes of its investigations. The Registered Controller has implemented high-speed recorders at all generating units and are testing the data extraction process. Through this and other compliance monitoring activities, the ISO has identified compliance with HTR 3.3.4.4.f.1 as a targeted monitoring priority for 2024-25.

Table 4: Post-incident discussions or investigations

DATE	OVERVIEW OF INCIDENT AND DISCUSSION OR INVESTIGATION	RESULTS AND RECOMMENDATIONS
22/10/2023	**Event Description** While the system was in normal operating conditions and in a secure state, a generating unit tripped at 25.4 MW output. Frequency dropped to a low of 49.4 Hz. Frequency recovered and stabilised above 49.75 Hz within 1 minute of the initial trip. **Purpose of Informal Discussion** The ISO elected to conduct an informal discussion of the event with the purpose of investigating the cause of the event and issues related to generators switching between droop and isochronous control during the event.	Ongoing The informal discussion found that a generating unit had a historic 49.5 Hz setting for automatic isochronous control. This setting could impact droop response and cause two different generators to be in isochronous control. As a short-term solution the generating unit setting was lowered to 49.25 Hz. The ISO is performing power system modelling to determine if droop can be relied on for an unexpected islanding event without the automatic frequency control in place. Following the modelling, a permanent solution will be put in place.
8/11/2023	**Event Description** An undetected bushfire led to a 220 kV transmission line trip. This resulted in load rejection and the system frequency to rise to 50.72 Hz. The non-covered islanded network frequency dropped to 47.71 Hz, triggering UFLS scheme within the non-covered islanded network. The islands were synchronised and the system returned to normal within 36 minutes and 8 seconds. Purpose of the Review The ISO elected to conduct an informal discussion of the event with the purpose of understanding and improving the reporting and coordination of systems operations functions. **Purpose of the Review** The ISO elected to conduct an informal discussion of the event with the purpose of understanding and improving the reporting and coordination of systems operations functions.	Ongoing Informal discussion on hold. The ISO currently has limited capacity of engineering resources. It is prioritising the most urgent work.
2/03/2024	**Event Description** An Emergency Shutdown (ESD) valve operated at the gas delivery station, shutting gas supply to the power station and resulting in 100 MW loss of generation. This caused the system frequency to drop to 49.20 Hz and triggered UFLS and UFIS schemes in the non-covered islanded network. Frequency was stabilised within 1 minute of the initial trip. The interconnectors were restored, and system returned to normal operating conditions 3 hours and 24 minutes after the event. **Purpose of Informal Discussion** The NSP is preparing a report of the incident and will provide it to ISO. The ISO will share relevant findings with NSP controllers, with the purpose of understanding and improving the reporting and coordination of systems operations functions.	Ongoing The ISO will complete the Informal Discussion when all information from NSPs has been received. The ISO currently has limited capacity of engineering resources. It is prioritising the most urgent work.

SYSTEM METRICS - EVENTS

Table 5: Unplanned events

EVENT	SUM OF EVENTS THIS REPORTING PERIOD	SUM OF EVENTS YEAR-TO-DATE	SUM OF TRADING INTERVALS THIS REPORTING PERIOD	SUM OF TRADING INTERVALS YEAR-TO-DATE
Abnormal frequency events	8	29	8 (0.18% of trading intervals for the quarter)	29 (0.17% of trading intervals for the year)
UFLS	0	3	0	3
UFIS	0	1	0	4
Unplanned islanding events	0	2	0	8
Secondary FCESS enablement (unplanned)	0	2	The ISO monitors this metric, but does not publish this information as it is commercially sensitive	The ISO monitors this metric, but does not publish this information as it is commercially sensitive
Protocol activations	2	3		
System operations directions, pre-contingent directions, emergency directions	2	3		
Constraint directions	0	0	0	0

Figure 1: Quarterly moving averages of system events

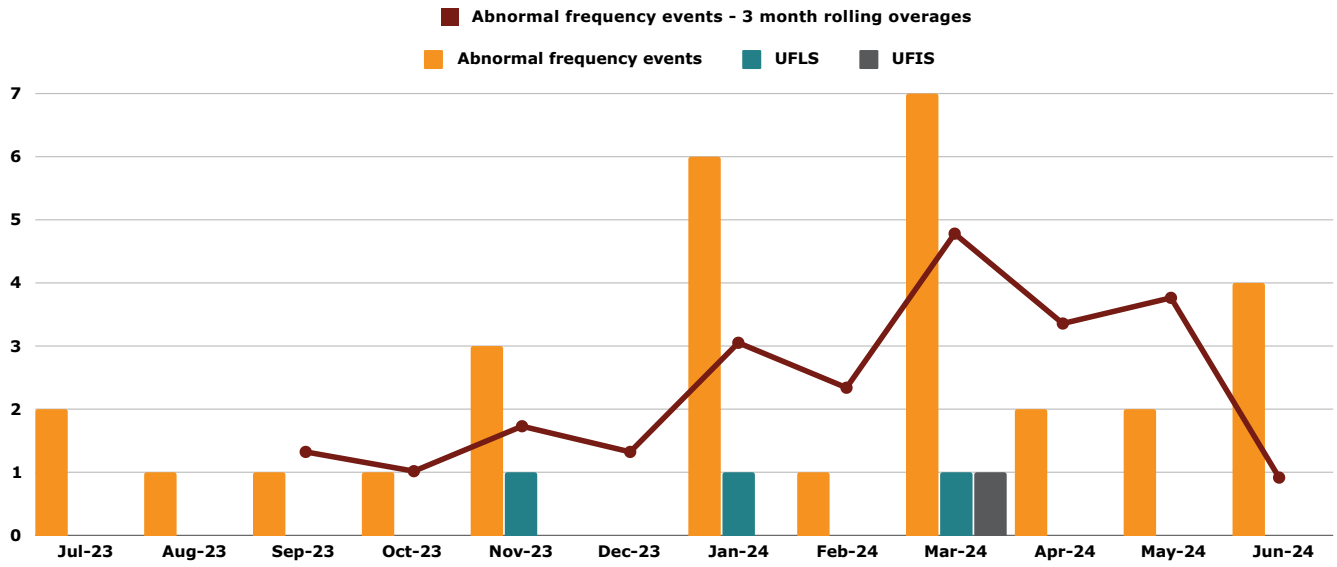


Table 6: Planned events

EVENT	SUM OF EVENTS THIS REPORTING PERIOD	SUM OF EVENTS YEAR-TO-DATE	SUM OF TRADING INTERVALS THIS REPORTING PERIOD	SUM OF TRADING INTERVALS YEAR-TO-DATE
Planned Islanding / Planned Secondary FCESS Events	2	4	The ISO monitors this metric, but does not publish this information as it is commercially sensitive	The ISO monitors this metric, but does not publish this information as it is commercially sensitive

SYSTEM METRICS - ENERGY

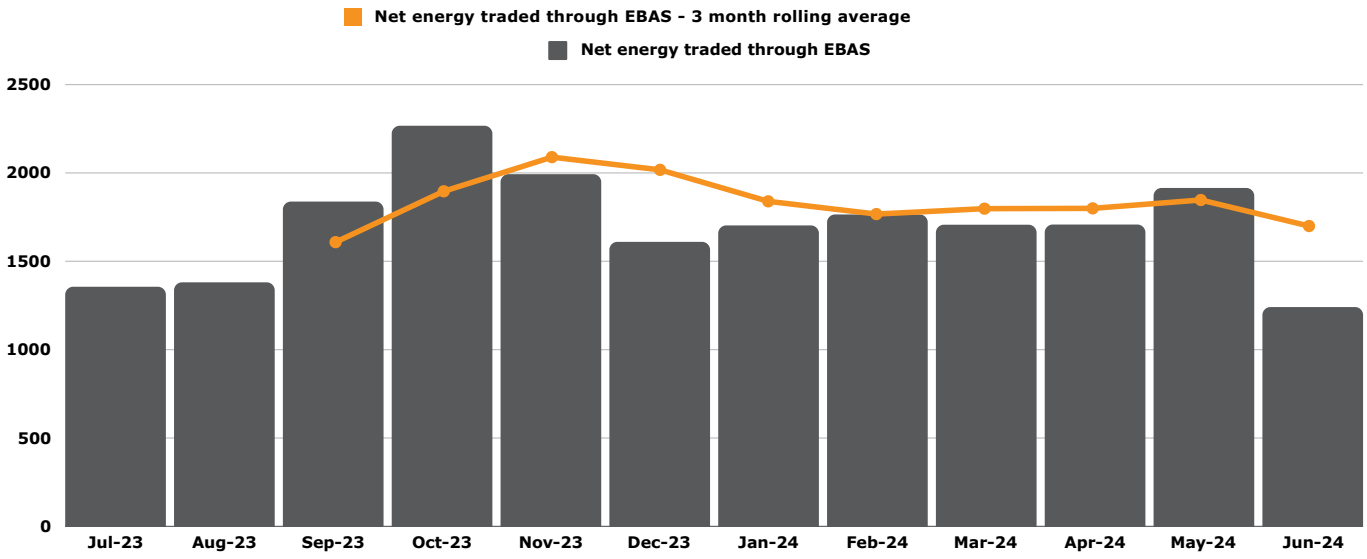
Table 7: 2022-23 Total electricity production and emissions (Clean Energy Regulator Data)

METRIC	2022/2023 TOTAL
Electricity Production	2,957 GWh
Total emissions (scope 1 and scope 2)	1,711,614 t CO2-e

Table 8: Net energy traded through EBAS

METRIC	SUM THIS REPORTING PERIOD (MWH)	SUM YEAR-TO-DATE (MWH)
Net energy traded through EBAS	4,864	22,192

Figure 2: Quarterly moving averages of energy traded through EBAS (MWh)



SYSTEM METRICS - GENERATING FACILITIES

Table 9: Installed generating facilities Covered Networks

METRIC	NUMBER	CAPACITY
Thermal generating facilities*	4	442 MW
Renewable facilities	0	0
BESS	0	0

*Note - Includes generation connected to networks that are Covered under Part 8 of the Electricity Industry Act 2004. Covered networks in the NWIS include APA DEWAP and Horizon Power, this does not include any generation owned by Rio Tinto

Table 10: New connections

METRIC	NUMBER OF NEW GENERATORS	NUMBER OF NEW GENERATORS YEAR-TO-DATE	NEW INSTALLED CAPACITY IN REPORTING PERIOD	NEW INSTALLED CAPACITY YEAR-TO-DATE
New thermal generation	0	0	0	0
New renewable generation	0	0	0	0
New BESS	0	0	0	0
New load facilities or excluded networks	0	0	0	0
Total new facilities >10 MW	0	0	0	0

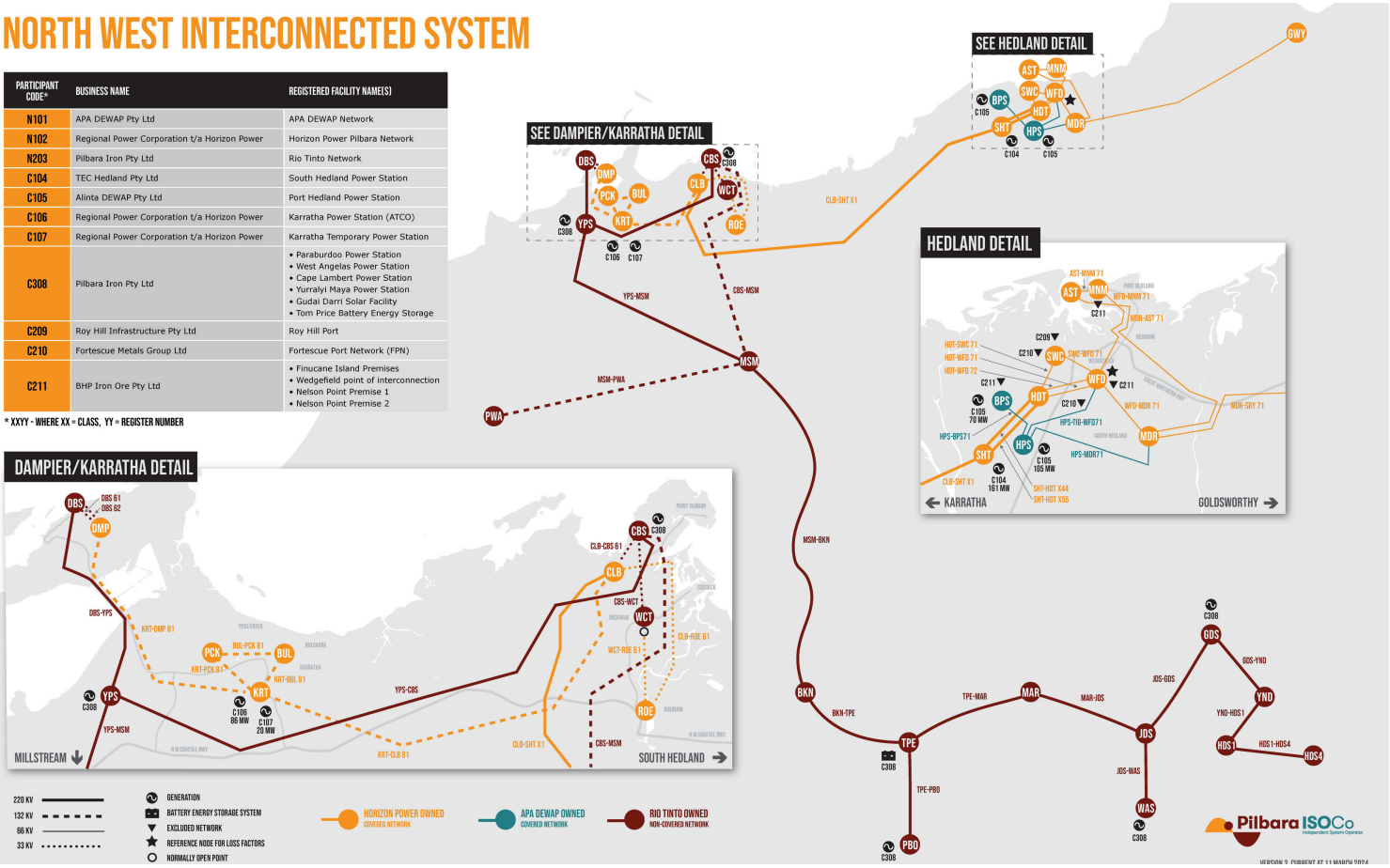
Karijini National Park

NWIS SYSTEM MAP

NORTH WEST INTERCONNECTED SYSTEM

PARTICIPANT CODE*	BUSINESS NAME	REGISTERED FACILITY NAME(S)
N101	APA DEWAP Pty Ltd	APA DEWAP Network
N102	Regional Power Corporation t/a Horizon Power	Horizon Power Pilbara Network
N203	Pilbara Iron Pty Ltd	Rio Tinto Network
C104	TEC Hedland Pty Ltd	South Hedland Power Station
C105	Alinta DEWAP Pty Ltd	Port Hedland Power Station
C106	Regional Power Corporation t/a Horizon Power	Karratha Power Station (ATCO)
C107	Regional Power Corporation t/a Horizon Power	Karratha Temporary Power Station
C308	Pilbara Iron Pty Ltd	• Paraburdoo Power Station • West Angelas Power Station • Cape Lambert Power Station • Yurralyi Maya Power Station • Gudai Darri Solar Facility • Tom Price Battery Energy Storage
C209	Roy Hill Infrastructure Pty Ltd	Roy Hill Port
C210	Fortescue Metals Group Ltd	Fortescue Port Network (FPN)
C211	BHP Iron Ore Pty Ltd	• Finucane Island Premises • Wedgefield point of interconnection • Nelson Point Premise 1 • Nelson Point Premise 2

* XXYY - WHERE XX = CLASS, YY = REGISTER NUMBER



WEBSITE LINK: HTTPS://PILBARAISOCO.COM.AU/NWIS/SYSTEM-MAP/

NETWORK ELEMENTS

Item	Covered Network	Element Type	Element ID, code or name	Rated (nominal) voltage, in kV
1	Alinta DEWAP	Transmission Line	HPS - WFD - TIG	66
2	Alinta DEWAP	Transmission Line	HPS - MDR 66kV	66
3	Alinta DEWAP	Transmission Line	HPS-BPS 66kV	66
4	Horizon Power	Distribution Line	CLB-CBS 61	33
5	Horizon Power	Distribution Line	CLB-ROE 61	33
6	Horizon Power	Feeder	SHT X09	220
7	Horizon Power	Feeder	SHT X07	220
8	Horizon Power	Feeder	SHT X06	220
9	Horizon Power	Feeder	SHT X05	220
10	Horizon Power	Feeder	SWC 705	66
11	Horizon Power	Feeder	SWC 709	66
12	Horizon Power	Feeder	WFD 710	66
13	Horizon Power	Feeder	WFD-FIN 71	66
14	Horizon Power	Substation	DMP	132/33
15	Horizon Power	Substation	KRT	132/132
16	Horizon Power	Substation	BUL	132/22
17	Horizon Power	Substation	PCK	132/22
18	Horizon Power	Substation	SHL	132/22
19	Horizon Power	Substation	KTS	132/22
20	Horizon Power	Substation	CLB	220/132/33
21	Horizon Power	Substation	SHT	220/11
22	Horizon Power	Substation	HDT	220/66/22
23	Horizon Power	Substation	SWC	66/22
24	Horizon Power	Substation	171	66/33
25	Horizon Power	Substation	WFD	66/22
26	Horizon Power	Substation	MDR	66/22
27	Horizon Power	Substation	AST	66/22
28	Horizon Power	Substation	MNM	66/11
29	Horizon Power	Transmission Line	KRT-DMP 81	132
30	Horizon Power	Transmission Line	KRT-PCK 81	132
31	Horizon Power	Transmission Line	KRT-BUL 81	132
32	Horizon Power	Transmission Line	KRT-SHL 81	132
33	Horizon Power	Transmission Line	KRT-SHL 82	132
34	Horizon Power	Transmission Line	KRT-KTS 81	132
35	Horizon Power	Transmission Line	KRT-CLB 81	132
36	Horizon Power	Transmission Line	BUL-PCK 81	132
37	Horizon Power	Transmission Line	CLB-SHT X1	220
38	Horizon Power	Transmission Line	SHT-HDT X44	220
39	Horizon Power	Transmission Line	SHT-HDT X55	220
40	Horizon Power	Transmission Line	HDT-WFD 71	66
41	Horizon Power	Transmission Line	HDT-WFD 72	66
42	Horizon Power	Transmission Line	HDT-SWC 71	66
43	Horizon Power	Transmission Line	SWC-WFD 71	66
44	Horizon Power	Transmission Line	WFD-MDR 71	66
45	Horizon Power	Transmission Line	WFD-MNM 71	66
46	Horizon Power	Transmission Line	MDR-HPS 71	66
47	Horizon Power	Transmission Line	MDR-AST 71	66
48	Horizon Power	Transmission Line	AST-MNM 71	66