



# Technical Regulator Emergency Standards – Voltage Management and Under Frequency Load Shedding

Minimum technical & operational standards  
under regulation 55H of the *Electricity  
(General) Regulations 2012*



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**Acknowledgement of Country**

The Department for Energy and Mining acknowledges Aboriginal people as the First Nations Peoples of South Australia. We recognise and respect the cultural connections as the traditional owners and occupants of the land and waters of South Australia, and that they continue to make a unique and irreplaceable contribution to the state.

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# 1 Document approval and control

Table 1: Document control

Version	1.2
Date	6 October 2023
Status	Approved
Confidentiality	Public

Table 2: Document approval


Title	Name	Date signed	Signature
Technical Regulator	Rob Faunt	6/10/2023	

Table 3: Revision history

Revision version	Revision date	Summary of change	Author
1.0	Original	N/A	Reinhard Struve
1.1	7 March 2023	Qualco and Cadell substations removed and substituted with North Unley substation	Mark Burns
1.2	6 October 2023	Remove: Ardrossan West Distribution, Cleve, Penola West Distribution, Snuggery and add Angaston, Blanche, Croydon, and Findon.  Clarify requirements on some 33kV lines.  Add clause to facilitate granularity improvements.	Mark Burns

## 2 Regulatory context

Under regulation 55H of the *Electricity (General) Regulations 2012* the Technical Regulator may prepare and publish technical and operational standards that must be applied so that electricity infrastructure and electrical installations are installed, maintained, and operated in a manner that facilitates the taking of effective emergency action.

This document constitutes emergency standards under the regulations, as applicable to the relevant entity listed in Appendix 1 of this document.

## 3 Background

South Australia continues to experience significant increases in the amount and extent of distributed energy resources being connected to the electricity system.

Unless addressed, these significant increases in distributed energy resources will result in two distinct security of supply issues (which will adversely affect the standard of delivery of services by the distribution network in South Australia).

One issue arises because of high electricity exports at low net system load times. When this occurs, distributed energy resources may need to be disconnected within a very short timeframe to maintain a minimum operational demand on the system, in order to maintain a secure system.

The second issue occurs when under frequency load shedding is required to operate in an emergency. To ensure the effective operation of under frequency load shedding, those circuits where there is a net export of power must not be disconnected in an underfrequency event.

These emergency standards impose obligations on the relevant entity to address these two issues.

## 4 Technical standard – Voltage management

The Technical Regulator requires the relevant entity to implement and maintain a scheme of last resort which enables the effective curtailment of distributed energy resources via management of distribution network voltage levels. This scheme of last resort must be available to automatically control network voltages within the electricity infrastructure and/or electrical installations listed in Appendix 2 of this document.

## 5 Technical standard – Under frequency load shedding (dynamic arming)

The Technical Regulator requires the relevant entity to amend or install relays within the electricity infrastructure and/or electrical installations listed in Appendix 3 of this document to have the following characteristics:

- The relays must be able to measure the network system frequency; and
- The relays must have the ability to measure the direction of power flow with a minimum sampling rate of not less than one measurement every 5 minutes; and
- The relays must be programmable such that they will only automatically disconnect a circuit in an under frequency event, if the circuit is a net load to the system.

The dynamic arming level specified in Appendix 3 shall be regarded as the minimum requirement – dynamic arming levels, from most to least granular, are feeder, move to downstream substations, bus and line level. The relevant entity may improve the dynamic arming level, for example, from line level to downstream substations or from bus to feeder level.

## 6 Technical standard – Under frequency load shedding (inaugural installation)

The Technical Regulator requires the relevant entity to amend or install relays within the electricity infrastructure and/or electrical installations listed in Appendix 4 of this document to have the following characteristics:

- The relays must be able to measure the network system frequency; and
- The relays must disconnect feeders at such frequency as determined in consultation between the relevant entity, the Technical Regulator and the Australian Energy Market Operator.

## 7 Activities commenced or completed prior to commencement of these emergency standards

For the purposes of regulation 55H(2)(c) of the *Electricity (General) Regulations 2012*, the Technical Regulator has determined that all activities already commenced or completed by the relevant entity prior to the commencement of these emergency standards that are consistent with the requirements of Section 4 of this document and Appendix 2, or Section 5 of this document and Appendix 3, or Section 6 of this document and Appendix 4:

- Comply with these emergency standards; and
- Were undertaken solely for the purpose of compliance with these emergency standards; and

- Will be taken to have been, and will be treated as having been, undertaken after the commencement of these emergency standards.

## 8 Appendix 1 – Relevant entities

For the purpose of these emergency standards, SA Power Networks (ABN 13 332 330 749) is the relevant entity.

## 9 Appendix 2 – Network locations – Voltage management

Table 4: Substations with enhanced voltage management capabilities

SUBSTATION		
Aldgate	Holden Hill	Paralowie
Aldinga	Hope Valley	Paringa 11kV
Allendale East	Ingle Farm	Penfield
Angaston	Kadina	Plympton
Angle Vale	Keith 11kV	Port Adelaide
Ascot Park	Kent Town	Port Adelaide North
Athol Park	Keswick	Port Augusta
Berri	Kilburn	Port Augusta West
Blackpool	Kilburn South	Port Lincoln City
Blackwood	Kilkenny	Port Lincoln Marina
Bordertown	Kingscote	Port Noarlunga
Burnside	Kingswood	Port Pirie South
Campbelltown	Langhorne Creek	Port Stanvac
Cavan	Largs North	Prospect
Ceduna	Linden Park	Pyap
Cheltenham	Lobethal	Queenstown
Clare	Loveday	Renmark
Clarence Gardens	Lower Mitcham	Roonka
Clarendon	Loxton	Salisbury
Clearview	Lyrup	Seacombe
Cleve 11kV	Maitland	Seaford
Coonawarra	McLaren Flat	Sheidow Park
Croydon	Meadows	Smithfield West
Croydon Park	Milang	Square Water Hole
Cudmore Park	Millicent	Stirling East

SUBSTATION		
Direk	Monarto South	Stockwell
Dorrien Distribution	Moonta	Strathalbyn
Edinburgh	Morphett Vale East	Streaky Bay
Elizabeth Downs	Morphettville	Tea Tree Gully
Elizabeth Heights	Mount Barker Distribution	Thebarton
Elizabeth South	Mount Gambier 11kV	Tonsley Park
Evanston	Mount Gambier North	Two Wells
Findon	Mount Gambier West	Uraidla
Flinders Park	Murray Bridge North	Victor Harbor
Fulham Gardens	Murray Bridge South	Virginia
Gawler Belt	Myponga	Waikerie
Glanville	Naracoorte	Wallaroo
Glenelg North	New Richmond	Whyalla City
Glossop	Noarlunga Centre	Whyalla Stuart
Golden Grove	North Adelaide	Willunga
Goolwa	North Unley	Woodforde
Hackham	Northfield	Woodside
Hahndorf	Norwood	Woodville 11kV
Happy Valley Distribution	Nuriootpa	Yankalilla
Harrow	Oaklands	
Henley South	Panorama	
Hillcrest	Parafield Gardens	

## 10 Appendix 3 – Network locations for dynamic under frequency load shedding

The relevant entity must amend or install relays in accordance with Section 5 of this document at the following locations:

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Aldinga	Aldinga Beach	Feeder Level
Aldinga	Maslin Beach	Feeder Level
Aldinga	Sellicks Beach	Feeder Level
Aldinga	Willunga West	Feeder Level
Angas Creek	Gumeracha	Move to Lobethal, Houghton Substations
Angas Creek	Tungkillo	Move to Birdwood, Mount Pleasant Substations



SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Angaston	Dorrien	Feeder level
Angaston	Tanunda	Feeder level
Angle Vale	Angle Vale	Feeder Level
Angle Vale	Curtis Road	Feeder Level
Angle Vale	Taylors Road	Feeder Level
Angle Vale	Virginia	Feeder Level
Angle Vale	Virginia Blocks	Feeder Level
Ascot Park	Edgeworth Street	Bus Level
Ascot Park	Harcourt Gardens	Bus Level
Ascot Park	Nilpena Avenue	Bus Level
Ascot Park	Parkholme	Bus Level
Ascot Park	Sixth Avenue	Bus Level
Ascot Park	Vermont	Feeder Level
Athol Park	Athol Park	Feeder Level
Athol Park	Mansfield Park	Feeder Level
Athol Park	Pennington	Bus Level
Athol Park	Wingfield	Bus Level
Blanche	Allendale East	Line level
Blanche	Lakeside	Line level
Blanche	Mt Gambier West	Line level
Baroota	Murraytown	Line Level
Barossa South	Barossa South	Feeder Level
Barossa South	Rowland Flat	Feeder Level
Berri	Berri	Bus Level
Berri	Berri Cannery	Bus Level
Berri	Berri East	Bus Level
Berri	Berri West	Bus Level
Berri	Glossop	Move to Glossop, Loveday, Woolpunda Substations
Berri	Loxton	Move to Loxton, Pyap Substations
Berri	Renmark	Line Level
Birdwood	Birdwood	Feeder Level
Birdwood	Birdwood	Feeder Level
Blackpool	North Haven	Feeder Level
Blackpool	Osborne	Feeder Level
Blackpool	Pelican Point	Feeder Level
Blackpool	Taperoo	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Blackwood	Brighton Parade	Feeder Level
Blackwood	Coromandel	Feeder Level
Blackwood	Eden	Feeder Level
Blackwood	Glenalta	Feeder Level
Blackwood	Sun Valley	Feeder Level
Brinkworth	Blyth	Bus Level
Brinkworth	Collinsfield	Bus Level
Brinkworth	Gladstone	Bus Level
Bungama	Gladstone	Line Level
Bungama	Murraytown	Line Level
Bungama	Port Broughton - Crystal Brook	Move to Crystal Brook, Port Broughton Substations
Burnside	Burnside	Feeder Level
Burnside	Erindale	Feeder Level
Burnside	Hazelwood Park	Feeder Level
Burnside	Stonyfell	Feeder Level
Campbelltown	Athelstone	Feeder Level
Campbelltown	Clairville	Feeder Level
Campbelltown	Darley Road	Feeder Level
Campbelltown	Felixstow	Feeder Level
Campbelltown	Fourth Creek	Feeder Level
Campbelltown	Montacute	Feeder Level
Campbelltown	Newton	Feeder Level
Campbelltown	Paradise	Feeder Level
Cape Jervis	Penneshaw	Line Level
Cavan	Cavan	Feeder Level
Cavan	Churchill	Feeder Level
Cavan	Goldsborough	Feeder Level
Cavan	Market	Feeder Level
Cavan	Mawson Lakes	Feeder Level
Cavan	Mawson Lakes West	Feeder Level
Cavan	Parkway	Feeder Level
Cavan	Pooraka South	Feeder Level
Cavan	Technology Park	Feeder Level
Ceduna	Ceduna	Feeder Level
Ceduna	Kongwirra	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Ceduna	Thevenard	Feeder Level
Cheltenham	Addison Rd	Feeder Level
Cheltenham	St Clair	Feeder Level
Cheltenham	Torrens Road	Feeder Level
Clare	Burra	Line Level
Clare	Clare	Bus Level
Clare	Farrell Flat	Bus Level
Clare	North Clare	Bus Level
Clare	Penwortham	Bus Level
Clarence Gardens	Blackforest	Feeder Level
Clarence Gardens	Cabra	Feeder Level
Clarence Gardens	Edwardstown	Feeder Level
Clarence Gardens	Hammersmith	Feeder Level
Clarence Gardens	Hills Industries	Feeder Level
Clarendon	Clarendon North	Bus Level
Clarendon	Kangarilla	Bus Level
Clearview	Blair Athol	Feeder Level
Clearview	Clearview	Feeder Level
Clearview	Enfield	Feeder Level
Clearview	Greenacres	Feeder Level
Croydon	Bowden	Feeder level
Croydon	West Croydon	Feeder level
Croydon Park	Challa Gardens	Bus Level
Croydon Park	Days Road	Feeder Level
Croydon Park	Devon Park	Feeder Level
Croydon Park	Ferryden Park	Feeder Level
Croydon Park	Gelland	Bus Level
Crystal Brook	Crystal Brook	Feeder Level
Cudmore Park	Ackland Gardens	Bus Level
Cudmore Park	Bridgestone	Bus Level
Cudmore Park	Daw Park	Bus Level
Cudmore Park	St Marys	Feeder Level
Cudmore Park	Woodlands Park	Feeder Level
Dalrymple	Marion Bay	Line Level
Dalrymple	Stansbury	Line Level
Davenport West	Quorn	Line Level
Direk	Coles Myer	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Direk	Diment	Feeder Level
Direk	Inghams No 1	Feeder Level
Direk	Inghams No 2	Feeder Level
Direk	Sturton North	Feeder Level
Direk	Sturton South	Feeder Level
Direk	Vicinity	Feeder Level
Direk	Wyatt	Feeder Level
Dorrien Distribution	Barossa South	Move to Barossa South, Lyndoch, Williamstown South Substations
Dorrien Distribution	Langmeil	Feeder Level
Dorrien Distribution	Nuriootpa	Move to Stockwell, Nuriootpa Substations
Dorrien Distribution	Seppeltsfield	Feeder Level
Dorrien Distribution	Stonewell	Feeder Level
Edinburgh	DSTO	Bus Level
Edinburgh	Edinburgh Parks North	Bus Level
Edinburgh	GMH H14	Bus Level
Edinburgh	Nurlutta	Bus Level
Edinburgh	Sturton South	Bus Level
Elizabeth Downs	Anderson Walk	Feeder Level
Elizabeth Downs	Blakes Crossing	Feeder Level
Elizabeth Downs	Blakeview	Feeder Level
Elizabeth Downs	JK Cable	Feeder Level
Elizabeth Downs	L Cable	Feeder Level
Elizabeth Downs	M Cable	Feeder Level
Elizabeth Downs	N Cable	Feeder Level
Elizabeth Downs	Smithfield	Feeder Level
Elizabeth Downs	Uley Road	Feeder Level
Elizabeth Heights	Adams Road	Feeder Level
Elizabeth Heights	Elizabeth East	Feeder Level
Elizabeth Heights	P Cable	Feeder Level
Elizabeth Heights	Q Cable	Feeder Level
Elizabeth Heights	R Cable	Feeder Level
Elizabeth South	A Cable	Feeder Level
Elizabeth South	B Cable	Feeder Level
Elizabeth South	C Cable	Feeder Level
Elizabeth South	E Cable	Feeder Level
Elizabeth South	F Cable	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Elizabeth South	G Cable	Feeder Level
Evanston	Dalkeith	Feeder Level
Evanston	Evanston	Feeder Level
Evanston	Evanston South	Feeder Level
Evanston	Gawler East	Feeder Level
Evanston	Gawler North	Feeder Level
Evanston	Gawler West	Feeder Level
Evanston	Willaston	Feeder Level
Findon	Beverley	Feeder Level
Findon	Findon	Feeder Level
Findon	Seaton	Feeder Level
Findon	Woodville West	Feeder Level
Flinders Park	Anglely Avenue	Feeder Level
Flinders Park	Flinders Park	Feeder Level
Flinders Park	Kidman Park	Feeder Level
Flinders Park	Lockleys	Feeder Level
Fulham Gardens	Frederick	Feeder Level
Fulham Gardens	Fulham	Feeder Level
Fulham Gardens	Grange	Feeder Level
Fulham Gardens	Henley	Feeder Level
Fulham Gardens	Marlborough	Feeder Level
Fulham Gardens	West Lakes	Feeder Level
Glanville	Ethelton	Bus Level
Glanville	Glanville	Bus Level
Glanville	Mellor Park	Bus Level
Glanville	Semaphore	Bus Level
Glanville	Swan Tce	Bus Level
Glenelg North	Graymore	Feeder Level
Glenelg North	Lightburn	Feeder Level
Glenelg North	Mattner Avenue	Feeder Level
Glenelg North	Novar Gardens	Feeder Level
Glenelg North	St Leonards	Feeder Level
Glenelg North	Wigley	Feeder Level
Glossop	Berri Estates	Bus Level
Glossop	Berri Fruit Juices	Bus Level
Glossop	Glossop	Bus Level
Glossop	Monash	Bus Level

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SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Glossop	Winkie	Bus Level
Golden Grove	Fairview Park	Feeder Level
Golden Grove	Golden Grove North	Feeder Level
Golden Grove	Golden Grove West	Feeder Level
Golden Grove	Greenwith	Feeder Level
Golden Grove	Rifle Range	Feeder Level
Golden Grove	Wynn Vale South	Feeder Level
Golden Grove	Wynn Vale West	Feeder Level
Golden Grove	Yatala Vale	Feeder Level
Goolwa	Currency Creek	Bus Level
Goolwa	Goolwa	Bus Level
Goolwa	Hindmarsh Island	Bus Level
Goolwa	Middleton	Bus Level
Hackham	Hackham East	Feeder Level
Hackham	Hackham West	Feeder Level
Hackham	Huntfield Heights	Feeder Level
Hahndorf	Biggs Flat	Feeder Level
Hahndorf	Hahndorf	Feeder Level
Happy Valley Distribution	Aberfoyle	Feeder Level
Happy Valley Distribution	Chandlers Hill	Feeder Level
Happy Valley Distribution	Craigburn	Feeder Level
Happy Valley Distribution	Flagstaff Road	Feeder Level
Happy Valley Distribution	Oakridge	Feeder Level
Happy Valley Distribution	Tapleys Hill	Feeder Level
Harrow	Walkerville	Feeder Level
Henley South	Cudmore Terrace	Feeder Level
Henley South	Everest Street	Feeder Level
Henley South	Fawnbrake Crescent	Feeder Level
Henley South	Harbourtown	Feeder Level
Henley South	Kooyonga	Feeder Level
Henley South	Reedbeds	Feeder Level
Henley South	Seaview Road	Feeder Level
Henley South	West Beach	Feeder Level
Hillcrest	Fosters	Feeder Level
Hillcrest	Hillcrest	Feeder Level
Hillcrest	Klemzig	Feeder Level
Hillcrest	Ross Smith	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Hillcrest	Strathmont	Feeder Level
Hillcrest	Windsor Gardens	Feeder Level
Holden Hill	Clovercrest	Feeder Level
Holden Hill	Highbury	Feeder Level
Holden Hill	Holden Hill	Feeder Level
Holden Hill	Modbury	Feeder Level
Holden Hill	Para Vista	Feeder Level
Hope Valley	Barracks	Feeder Level
Hope Valley	St Agnes	Feeder Level
Hope Valley	Valley	Feeder Level
Houghton	Houghton	Feeder Level
Houghton	Inglewood	Feeder Level
Hummocks Distribution	Ardrossan	Line Level
Hummocks Distribution	Balaklava	Line Level
Hummocks Distribution	Ninnes	Line Level
Hummocks Distribution	Port Wakefield	Line Level
Ingle Farm	Ingle Farm	Feeder Level
Ingle Farm	Montague Farm	Feeder Level
Ingle Farm	Nelson Road	Feeder Level
Ingle Farm	Para Hills	Feeder Level
Ingle Farm	Pooraka	Feeder Level
Ingle Farm	Rialto	Feeder Level
Ingle Farm	The Levels	Feeder Level
Jervois	Jervois	Feeder Level
Jervois	Wellington	Feeder Level
Jervois Flat 1	Jervois Flat 1	Feeder Level
Jervois Flat 2	Jervois Flat 2	Feeder Level
Kadina	Alford	Bus Level
Kadina	Kadina	Bus Level
Kadina	Wallaroo Mines	Bus Level
Kadina East Distribution	Kadina	Move to Kadina Substation
Kadina East Distribution	Moonta	Move to Moonta Substation
Kadina East Distribution	Paskeville	Line Level
Kadina East Distribution	Wallaroo	Move to Wallaroo Substation
Kilburn South	Denver Terrace	Feeder Level
Kilburn South	Kilburn South	Feeder Level
Kilburn South	Kilburn West	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Kilburn South	TMA No 2	Feeder Level
Kilkenny	ACI No 3	Bus Level
Kilkenny	ACI No 4	Bus Level
Kilkenny	Allenby Gardens	Bus Level
Kilkenny	Aroona Road	Bus Level
Kilkenny	David Terrace	Bus Level
Kilkenny	Kilkenny	Bus Level
Kincraig	Lucindale	Line Level
Kincraig	Naracoorte	Move to Naracoorte, Naracoorte East Substations
Kingswood	Fullarton	Feeder Level
Kingswood	Highgate	Feeder Level
Kingswood	Malvern	Feeder Level
Kingswood	Mitcham	Feeder Level
Kingswood	Myrtle Bank	Feeder Level
Kingswood	Springfield 1	Feeder Level
Kingswood	Springfield 2	Feeder Level
Kingswood	Unley Park	Feeder Level
Langhorne Creek	Angas Plains	Bus Level
Langhorne Creek	Hartley	Bus Level
Langhorne Creek	Langhorne Creek	Bus Level
Langhorne Creek	Mulgundawa	Bus Level
Largs North	Birkenhead	Feeder Level
Largs North	Largs North	Feeder Level
Largs North	Mildred	Feeder Level
Largs North	Military Road	Feeder Level
Largs North	Peterhead	Feeder Level
Linden Park	Beaumont	Feeder Level
Linden Park	Glen Osmond	Feeder Level
Linden Park	Glenside	Feeder Level
Linden Park	Glenunga	Feeder Level
Linden Park	St Georges	Feeder Level
Linden Park	Sydney	Feeder Level
Linden Park	Tusmore	Feeder Level
Lobethal	Cudlee Creek	Feeder Level
Lobethal	Kenton Valley	Feeder Level
Lobethal	Lobethal	Feeder Level



SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Loveday	Barmera	Bus Level
Loveday	Cobdogla	Bus Level
Loveday	Loveday	Bus Level
Loveday	Loveday Pump	Bus Level
Loveday	Moorook	Bus Level
Lower Mitcham	Cumberland Park	Feeder Level
Lower Mitcham	Hawthorn	Feeder Level
Lower Mitcham	Wattlebury Road	Feeder Level
Lower Mitcham	Westbourne Park	Feeder Level
Loxton	Loxton	Bus Level
Loxton	Loxton East	Bus Level
Loxton	Loxton North	Bus Level
Loxton	Loxton Pumping Station	Bus Level
Lyndoch	Dorrien	Bus Level
Lyndoch	Lyndoch	Bus Level
Lyndoch	Transformer No3 33/11kV	Bus Level
Lyrup	Gurra	Feeder Level
Lyrup	Lyrup South	Feeder Level
Lyrup	Pike River	Feeder Level
Magill	Woodforde 2	Line Level
Magill	Woodforde 3	Line Level
Mannum	Mannum Town	Line Level
Mannum	Palmer	Line Level
Mannum	Walker Flat	Line Level
McLaren Flat	Blewitt Springs	Feeder Level
McLaren Flat	McLaren Flat	Feeder Level
McLaren Flat	McLaren Vale	Feeder Level
McLaren Flat	Chalk Hill Road	Feeder Level
Meadows	Bull Creek	Feeder Level
Meadows	Echunga	Feeder Level
Meadows	Macclesfield	Feeder Level
Meadows	Meadows	Feeder Level
Milang	Bagley Bridge	Bus Level
Milang	Milang	Bus Level
Milang	Point Sturt	Bus Level
Mobilong Distribution	Murray Bridge North and Monarto	Move to Monarto South, Monarto Central, Murray Bridge North Substations

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Mobilong Distribution	Murray Bridge South	Move to Murray Bridge South Substations
Mobilong Distribution	Mypolonga	Move to Mypolonga Substation
Monarto Central	Ferries McDonald Rd	Feeder Level
Monarto South	Monarto South	Feeder Level
Monarto South	White Hill	Feeder Level
Moonta	Moonta	Feeder Level
Moonta	Moonta Bay	Feeder Level
Moorkitatie	Poochera	Feeder Level
Moorkitatie	Venus Bay	Feeder Level
Morphett Vale East	Bains Road	Feeder Level
Morphett Vale East	Clarendon	Feeder Level
Morphett Vale East	Emmerson Drive	Feeder Level
Morphett Vale East	Hackham	Feeder Level
Morphett Vale East	Reynella	Feeder Level
Morphett Vale East	Woodcroft	Feeder Level
Morphettville	Glenelg	Feeder Level
Morphettville	Glenelg East	Feeder Level
Morphettville	Glenelg South	Feeder Level
Morphettville	Somerton Park	Feeder Level
Mount Barker Distribution	Balhannah	Line Level
Mount Barker Distribution	Bugle Ranges	Feeder Level
Mount Barker Distribution	Flaxley	Feeder Level
Mount Barker Distribution	Hahndorf	Move to Hahndorf Substation
Mount Barker Distribution	Mount Barker	Feeder Level
Mount Barker Distribution	Mount Barker CBD	Feeder Level
Mount Barker Distribution	Mount Barker Central	Feeder Level
Mount Barker Distribution	Windmill	Feeder Level
Mount Barker South Distribution	Meadows	Move to Meadows Substation
Mount Barker South Distribution	Strathalbyn	Move to Strathalbyn, Milang, Langhorne Creek Substations
Mount Pleasant	Mount Pleasant	Feeder Level
Murray Bridge North	Meatworks	Bus Level
Murray Bridge North	Northern Heights	Bus Level
Murray Bridge North	Thomas Street	Bus Level
Murray Bridge North	Waratah Avenue	Bus Level
Murray Bridge South	Hill Street	Bus Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Murray Bridge South	Marketplace	Bus Level
Murray Bridge South	Murray Gardens	Bus Level
Murray Bridge South	Riverview	Bus Level
Murray Bridge South	Swanport	Bus Level
Mypolonga	Mypolonga	Feeder Level
Mypolonga	Sunnyside	Feeder Level
Myponga	Blockers Road	Feeder Level
Myponga	Hindmarsh Tiers	Feeder Level
Myponga	Myponga	Feeder Level
Myponga	Sellicks Hill	Feeder Level
Naracoorte	Hynam	Feeder Level
Naracoorte	McIntosh	Feeder Level
Naracoorte	Naracoorte	Feeder Level
Naracoorte	Wrattonbully	Feeder Level
Naracoorte East	Cadgee	Bus Level
Naracoorte East	Carters Road	Bus Level
Naracoorte East	Kybybolite	Bus Level
Noarlunga Centre	Beach Road	Feeder Level
Noarlunga Centre	Burgess Drive	Feeder Level
Noarlunga Centre	Christies Beach South	Bus Level
Noarlunga Centre	Colonnades	Bus Level
Noarlunga Centre	Noarlunga Downs	Feeder Level
North West Bend	Swan Reach	Line Level
North West Bend	Waikerie	Move to Ramco, Waikerie Substations
Northfield	Northfield	Feeder Level
Northfield	Northgate	Feeder Level
Northfield	Valley View	Feeder Level
Norwood	Beulah Park	Feeder Level
Norwood	Evandale	Feeder Level
Norwood	Firle	Feeder Level
Norwood	Kensington	Feeder Level
Norwood	Leabrook	Feeder Level
Norwood	Maylands	Feeder Level
Norwood	Norwood	Feeder Level
Norwood	Payneham	Feeder Level
Norwood	St Peters	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Norwood	Stepney	Feeder Level
Nuriootpa	Nuriootpa East	Feeder Level
Nuriootpa	Nuriootpa West	Feeder Level
Oaklands	Barry Road	Feeder Level
Oaklands	Diagonal Road	Feeder Level
Oaklands	Dwyer Road	Feeder Level
Oaklands	Lascelles Avenue	Feeder Level
Oaklands	Osborne Street	Feeder Level
Oaklands	Warradale	Feeder Level
Oaklands	Westminster	Feeder Level
Panorama	Brownhill	Feeder Level
Panorama	Clapham	Feeder Level
Panorama	Gloucester	Feeder Level
Panorama	Shepherds Hill	Feeder Level
Panorama	Winston Avenue	Feeder Level
Parafield Gardens	Downs	Feeder Level
Parafield Gardens	Gardens	Feeder Level
Parafield Gardens	Greenfields	Feeder Level
Parafield Gardens	Pines	Feeder Level
Parafield Gardens	Salt Pans	Feeder Level
Paralowie	Bolivar	Feeder Level
Paralowie	Burton	Feeder Level
Paralowie	Inghams No 3	Feeder Level
Paralowie	Paralowie	Feeder Level
Plympton	Birkalla	Feeder Level
Plympton	Camden Park	Feeder Level
Plympton	Glenelg WWTP	Feeder Level
Plympton	Kurralt Park	Feeder Level
Plympton	Netley	Feeder Level
Plympton	North Plympton	Feeder Level
Polda	Elliston	Feeder Level
Port Adelaide	Alberton	Feeder Level
Port Adelaide	Kingston	Feeder Level
Port Adelaide	Nile Street	Feeder Level
Port Adelaide	Portland	Feeder Level
Port Adelaide	Rosewater	Feeder Level
Port Adelaide	St Vincent Street	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Port Adelaide North	Adelaide Wallaroo	Feeder Level
Port Adelaide North	Bedford	Feeder Level
Port Adelaide North	Docks	Feeder Level
Port Adelaide North	Gillman	Feeder Level
Port Adelaide North	Sims Metal	Feeder Level
Port Adelaide North	Torrens Island	Feeder Level
Port Broughton	Mundoora	Bus Level
Port Broughton	Port Broughton	Bus Level
Port Lincoln City	Central	Feeder Level
Port Lincoln City	Industrial	Feeder Level
Port Lincoln City	North	Feeder Level
Port Lincoln Docks	Commercial	Feeder Level
Port Lincoln Docks	Kirton	Feeder Level
Port Lincoln Docks	Wharf	Feeder Level
Port Lincoln Marina	Porter	Feeder Level
Port Lincoln Marina	Ravendale	Feeder Level
Port Lincoln Terminal	Pt Lincoln City	Move to Port Lincoln City Substation
Port Lincoln Terminal	Pt Lincoln Docks	Move to Port Lincoln Marina, Port Lincoln Docks Substations
Port Lincoln Terminal	Tod River	Feeder Level
Port Lincoln Terminal	Uley	Line Level
Port Noarlunga	Dyson Road	Feeder Level
Port Noarlunga	Moana	Feeder Level
Port Noarlunga	Onkaparinga	Feeder Level
Port Noarlunga	Seaford Meadows	Feeder Level
Port Noarlunga	Southport	Feeder Level
Port Pirie South	Pirie North	Feeder Level
Port Pirie South	Pirie South	Feeder Level
Port Pirie South	Pirie Town	Feeder Level
Port Pirie South	Pirie West	Feeder Level
Port Pirie South	Risdon Park	Feeder Level
Port Stanvac	Aldenhoven	Bus Level
Port Stanvac	Christies Beach	Feeder Level
Port Stanvac	Christies Beach WWTP	Feeder Level
Port Stanvac	Mitsubishi No 1	Bus Level
Port Stanvac	Mitsubishi No 2	Bus Level
Port Stanvac	Old Reynella	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Port Stanvac	Pimpala	Bus Level
Port Stanvac	Port Noarlunga	Feeder Level
Port Stanvac	Refinery Road	Feeder Level
Port Stanvac	Sherriffs Road	Feeder Level
Prospect	Dudley Park	Feeder Level
Prospect	Fitzroy	Feeder Level
Prospect	Government Laundry	Feeder Level
Prospect	Islington Workshops No 2	Feeder Level
Prospect	Nailsworth	Feeder Level
Prospect	Oxenham Street	Feeder Level
Prospect	Prospect	Feeder Level
Pyap	Loxton West	Bus Level
Pyap	Mindarie	Line Level
Pyap	New Residence	Bus Level
Pyap	Pata	Bus Level
Queenstown	Carnegie Park	Feeder Level
Queenstown	Hendon	Feeder Level
Queenstown	Queenstown	Feeder Level
Queenstown	Royal Park	Feeder Level
Ramco	Golden Heights	Feeder Level
Ramco	Taylorville	Feeder Level
Ramco	Toolunka	Feeder Level
Salisbury	Brahma Lodge	Feeder Level
Salisbury	Bridgestone 1	Feeder Level
Salisbury	Bridgestone 2	Feeder Level
Salisbury	Chidda	Feeder Level
Salisbury	Highway	Feeder Level
Salisbury	River	Feeder Level
Salisbury	Salisbury East	Feeder Level
Salisbury	Salisbury North	Feeder Level
Salisbury	Salisbury Plains	Feeder Level
Salisbury	Salisbury South	Feeder Level
Seacombe	Dover Gardens	Feeder Level
Seacombe	Marino	Feeder Level
Seacombe	O'Halloran Hill	Feeder Level
Seacombe	Seacliff	Feeder Level
Seacombe	Seacombe Gardens	Feeder Level

## Technical Regulator Emergency Standards – Voltage Management and Under Frequency Load Shedding

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Seacombe	Seaview Downs	Feeder Level
Seaford	Ochre	Feeder Level
Seaford	Pedler	Feeder Level
Sheidow Park	Hallett Cove	Feeder Level
Sheidow Park	Karrara	Feeder Level
Sheidow Park	Patpa Drive	Feeder Level
Sheidow Park	Sheidow Park	Feeder Level
Sheidow Park	Trott Park	Feeder Level
Smithfield West	Andrews Farm	Feeder Level
Smithfield West	Munno Para	Feeder Level
Smithfield West	Munno Para West	Feeder Level
Smithfield West	Smithfield Plains	Feeder Level
Square Water Hole	Flagstaff Hill	Feeder Level
Square Water Hole	Mount Compass	Feeder Level
Square Water Hole	Pambula	Feeder Level
Square Water Hole	Tooperang	Feeder Level
Stockwell	Truro	Feeder Level
Stockwell	Willows	Feeder Level
Strathalbyn	Belvidere	Bus Level
Strathalbyn	Strathalbyn East	Bus Level
Strathalbyn	Strathalbyn West	Bus Level
Streaky Bay	Flinders	Feeder Level
Streaky Bay	Streaky Bay	Feeder Level
Tailem Bend	Coonalpyn	Feeder Level
Tailem Bend	Sherlock	Feeder Level
Tailem Bend	Woods Point	Move to Tailem Bend Town, Jervois, Jervois Flat 1, Jervois Flat 2, Woods Point, White Sands Substations
Tailem Bend Town	Tailem Bend East	Bus Level
Tailem Bend Town	Tailem Bend West	Bus Level
Tarlton	Wirrulla	Feeder Level
Tarpeena South	Tarpeena	Feeder Level
Tarpeena South	Timberlink 1	Feeder Level
Tarpeena South	Timberlink 2	Feeder Level
Tea Tree Gully	Banksia Park	Feeder Level
Tea Tree Gully	Redwood Park	Feeder Level
Tea Tree Gully	Ridgehaven	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Tea Tree Gully	Surrey Downs	Feeder Level
Tea Tree Gully	Tea Tree Gully	Feeder Level
Tea Tree Gully	Vista	Feeder Level
Tonsley Park	Burbank	Bus Level
Tonsley Park	Marion	Bus Level
Tonsley Park	Mitchell Park	Bus Level
Two Wells	Korunye Glasshouse	Feeder Level
Two Wells	Two Wells Township	Feeder Level
North Unley	Wayville	Feeder Level
North Unley	Parkside	Feeder Level
North Unley	Unley	Feeder Level
North Unley	Hyde Park	Feeder Level
Victor Harbor	Encounter Bay	Feeder Level
Victor Harbor	Inman Valley	Feeder Level
Victor Harbor	Town Centre	Feeder Level
Victor Harbor	Urimbirra	Feeder Level
Victor Harbor	Victor Harbor East	Feeder Level
Victor Harbor	Victor Harbor West	Feeder Level
Virginia	Old Port Wakefield Road	Feeder Level
Virginia	Port Gawler	Feeder Level
Virginia	Supple Road	Feeder Level
Waikerie	Lowbank	Bus Level
Waikerie	Waikerie South	Bus Level
Waikerie	Waikerie West	Bus Level
Wallaroo	Wallaroo East	Bus Level
Wallaroo	Wallaroo West	Bus Level
Waterloo Distribution	Auburn	Line Level
Waterloo Distribution	Clare	Line Level
Waterloo Distribution	Marrabel	Line Level
Waterloo Distribution	Robertstown	Line Level
White Sands	Flagstaff	Feeder Level
Whyalla Central Distribution	Whyalla City 1	Move to Whyalla City Substation
Whyalla Central Distribution	Whyalla City 2	Move to Whyalla City Substation
Whyalla Central Distribution	Whyalla North	Move to Whyalla North Substation
Whyalla Central Distribution	Whyalla Stuart	Move to Whyalla Stuart Substation
Whyalla City	Broadbent Terrace	Feeder Level



## Technical Regulator Emergency Standards – Voltage Management and Under Frequency Load Shedding

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Whyalla City	George Avenue	Feeder Level
Whyalla City	Hospital	Feeder Level
Whyalla City	Hummock Hill	Feeder Level
Whyalla City	Jacobs Street	Feeder Level
Whyalla City	Russell Street	Feeder Level
Whyalla City	Viscount Slim	Feeder Level
Whyalla North	Betatene	Feeder Level
Whyalla North	West	Feeder Level
Whyalla Stuart	Flinders Avenue	Feeder Level
Whyalla Stuart	Middleback	Feeder Level
Whyalla Stuart	Opie Street	Feeder Level
Whyalla Stuart	Westland	Feeder Level
Whyalla Stuart	Whyalla Jenkins	Feeder Level
Williamstown	Mt Crawford	Feeder Level
Williamstown South	Williamstown	Feeder Level
Willunga	Square Water Hole	Move to Square Water Hole, Goolwa, Victor Harbor Substations
Willunga	Willunga	Feeder Level
Willunga	Willunga North / Dingabledinga	Feeder Level
Woods Point	Brinkley East	Bus Level
Woods Point	Monteith	Bus Level
Woods Point	Woods Point	Bus Level
Woodville	Albert Park	Bus Level
Woodville	Cheltenham	Bus Level
Woodville	Woodville	Feeder Level
Woodville	Woodville South	Bus Level
Woolpunda	Devlins Pound	Bus Level
Woolpunda	Woolpunda	Bus Level
Woolpunda	Woolpunda East	Bus Level
Wudinna Distribution	Moorkitatie	Move to Moorkitatie, Tarlton, Ceduna, Streaky Bay Substations
Wudinna Distribution	Polda	Feeder Level
Wudinna	Minnipa	Bus Level
Wudinna	Warramboo	Bus Level
Yankalilla	Bald Hills	Feeder Level
Yankalilla	Normanville	Feeder Level

SUBSTATION NAME	FEEDER NAME	DYNAMIC ARMING LEVEL
Yankalilla	Wattle Flat	Feeder Level

## 11 Appendix 4 – Network locations for inaugural installation of under frequency load shedding capability (non-dynamic)

The relevant entity must amend or install relays in accordance with Section 6 of this document at the following locations:

SUBSTATION NAME	FEEDER NAME	UNDER FREQUENCY LEVEL
Cleve	Boothby	Bus Level
Cleve	Cleve	Bus Level
Cleve	Ticklebelly Hill	Bus Level
Coromandel Place	AO2 & GC4	Bus Level
Coromandel Place	CH2 & UN2	Bus Level
Coromandel Place	CKT	Bus Level
Coromandel Place	FGP & HS2	Bus Level
Coromandel Place	GC4 & GFP	Bus Level
Coromandel Place	GFP & HS1	Bus Level
Coromandel Place	GHM	Bus Level
Coromandel Place	GPW	Bus Level
Coromandel Place	HS3 & UN3	Bus Level
Coromandel Place	NT4	Bus Level
Coromandel Place	PW3	Bus Level
Coromandel Place	PW4	Bus Level
Coromandel Place	PW5	Bus Level
Coromandel Place	PW6 & GPN	Bus Level
Coromandel Place	RAH1	Bus Level
Coromandel Place	RGP	Bus Level
Coromandel Place	RGP & CH1	Bus Level
Coromandel Place	TORRENS	Bus Level
Coromandel Place	TP1	Bus Level
Coromandel Place	UN4 & GPW	Bus Level
East Terrace	FF3 & GGP	Bus Level
East Terrace	FGP & FF2	Bus Level
East Terrace	GA1	Bus Level

SUBSTATION NAME	FEEDER NAME	UNDER FREQUENCY LEVEL
East Terrace	GC3 & RH1	Bus Level
East Terrace	GC4 & PW2	Bus Level
East Terrace	GG2	Bus Level
East Terrace	GGP	Bus Level
East Terrace	GHP	Bus Level
East Terrace	GHP	Bus Level
East Terrace	GW2 & UH3	Bus Level
East Terrace	H1 & GW1	Bus Level
East Terrace	H2	Bus Level
East Terrace	NT3	Bus Level
East Terrace	TG1 & TF1	Bus Level
East Terrace	UH2	Bus Level
East Terrace	UH4	Bus Level
East Terrace	UH5	Bus Level
East Terrace	UH6 & FGP	Bus Level
East Terrace	UH7	Bus Level
East Terrace	UN1	Bus Level
Elizabeth South	Elizabeth Vale D	Feeder Level
Elizabeth South	GMH H3 & H10	Feeder Level
Elizabeth South	GMH H8 & H9	Feeder Level
Flinders Park	Sungard 1	Feeder Level
Flinders Park	Sungard 2	Feeder Level
Kent Town	Dulwich	Feeder Level
Kent Town	Rose Park	Feeder Level
Keswick	Ashford	Bus Level
Keswick	Glandore	Bus Level
Keswick	Showground	Bus Level
Kincraig	Inverness	Bus Level
Morphett Vale East	Morphett Vale	Feeder Level
Panorama	Reade Park	Feeder Level
Port Stanvac	Mitsubishi No3	Bus Level
Port Stanvac	Mitsubishi No4	Bus Level
Whyalla Terminal	Onesteel LMF	Line Level

## Further information

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