



ELECTRICITY TRANSMISSION CODE

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ELECTRICITY

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1. PRELIMINARY

1.1 Definitions

- 1.1.1. Words and phrases appearing in bold like this are defined in Chapter 10.
- 1.1.2. References to **Australian Standards** are references to standards existing from time to time, or where they are superseded, their replacements.

1.2 Authority

- 1.2.1. This industry code is made by the **Commission** pursuant to section 28 of the **ESC Act**.

1.3 Application

- 1.3.1. This industry code sets obligations that a **transmission entity** must comply with in relation to the provision of **transmission services** to:
 - (a) a **transmission customer**;
 - (b) a **distributor**;
 - (c) a **generator**,in South Australia.
- 1.3.2. This industry code also imposes obligations on the **system controller**, **distributors** and **generators**.

1.4 Obtaining a copy of this Industry Code

- 1.4.1. A **transmission entity** must, on request by a **transmission customer**, **distributor**, **generator** or a **system controller**, send to them a copy of this industry code free of charge.

1.5 Other Acts, Industry Codes and Regulations

- 1.5.1. Not all aspects of a **transmission entity's** obligations are regulated by this industry code. The **transmission entity's** obligations and some aspects of the relationship between a **generator**, a **transmission customer**, a **distributor** and a **transmission entity** are also affected by:
 - (a) Acts of Parliament and regulations made under those Acts of Parliament (in particular the *Electricity Act 1996* (and associated regulations) and the **ESC Act**;
 - (b) licence conditions;



- (c) the **National Electricity Rules**;
- (d) any guidelines or rules made by the **Commission** from time to time; and
- (e) the terms of any **connection agreements**.

1.6 Scope

- 1.6.1. Any obligations imposed under this industry code are in addition to those imposed under the **National Electricity Rules** and the **Act** (and regulations).
- 1.6.2. If anything in this industry code is inconsistent with the **National Electricity Rules** or the **Act** (and regulations), the provisions of the **National Electricity Rules** or the **Act** (and regulations) will have priority to the extent of the inconsistency except where this industry code imposes an obligation on a person that is higher or more onerous than any corresponding obligation contained in the **National Electricity Rules** or the **Act** (and regulations).

2. SERVICE STANDARDS

2.1 Quality of supply and system reliability

- 2.1.1. A **transmission entity** must use its **best endeavours** to plan, develop and operate the **transmission network** to meet the standards imposed by the **National Electricity Rules** in relation to the quality of **transmission services** such that there will be no requirements to shed load to achieve these standards under normal and reasonably foreseeable operating conditions.
- 2.1.2. A **transmission entity** must use its **best endeavours** to plan, develop and operate the **transmission system** so as to meet the standards imposed by the **National Electricity Rules** in relation to **transmission network** reliability such that there will be minimal requirements to shed load under normal and reasonably foreseeable operating conditions.

2.2 Transmission network standards

- 2.2.1. At the written request of the **Commission**, the **transmission entity** must participate to the extent specified by the **Commission** in the development, issue and review of any standards and procedures specified by the **Commission**.
- 2.2.2. The **transmission entity** must in accordance with any guideline published for this purpose, or as directed by the **Commission**, report to the **Commission** on its performance against applicable standards and procedures.

- 2.2.3. The **Commission** may issue standards and procedures applicable to the **transmission entity** and with which the **transmission entity** must comply if the **Commission** considers that:
- the **transmission entity** has failed to comply with clause **Error! Reference source not found.**; or
 - standards and procedures applicable to the **transmission entity** have been shown to be insufficient to prevent transgressions by the **transmission entity**.
- 2.2.4. The **transmission entity** must act in accordance with any guideline published by the **Commission**, relevant to the **transmission entity**.

2.3 Specific reliability standards

- 2.3.1. A **transmission entity** must plan and develop its **transmission system** such that each **connection point** or group of **connection points** allocated to a category in accordance with clause 2.4 meets the relevant standards for that category as set out in clauses 2.5 to 2.10.

2.4 Allocation of connection points to categories

- 2.4.1. The allocation of exit **connection points** to categories is set out in the table below (**connection points** in square brackets refer to a group of **connection points**):

CATEGORY NAME	CONNECTION POINT
Category 1	<ul style="list-style-type: none"> • Baroota • Dalrymple • Florieton SWER • Kanmantoo Mine • Leigh Creek Coal * • Leigh Creek South • Mannum/Adelaide 1 * • Mannum/Adelaide 2 * • Mannum/Adelaide 3 * • Middleback* • Millbrook * • Morgan/Whyalla 1 * • Morgan/Whyalla 2 * • Morgan/Whyalla 3 * • Morgan/Whyalla 4 * • Mt Gunson • Murray/Hahndorf 1 * • Murray/Hahndorf 2 * • Murray/Hahndorf 3 * • Neuroodla • Roseworthy* • Stony Point (Whyalla Refiners) - distribution • Stony Point* • Waterloo- until 31 December 2009 • Whyalla LMF • Davenport * • Pimba * • Woomera* • Wudinna (until 30 June 2009) <p style="text-align: right; margin-right: 20px;"><small>* denotes a customer but does not include a distributor</small></p>

CATEGORY NAME	CONNECTION POINT		
Category 2	<ul style="list-style-type: none"> • Ardrossan West • Kadina East • Wudinna (on and from 1 July 2009) • Yadnarie 		
Category 3	<ul style="list-style-type: none"> • Port Lincoln • Snuggery Rural • Whyalla Terminal – Main Bus (until 30 June 2010) 		
Category 4	<table border="0"> <tr> <td> <ul style="list-style-type: none"> • Angas Creek • Berri/Monash • Blanche • Brinkworth • [Bungama and Pt Pirie] • Clare North • Coonalpyn West • Dorrien • Templers • Hummocks • Keith • Kincraig • Mannum • Mobilong </td> <td> <ul style="list-style-type: none"> • Mt Barker • Mt Gambier • North West Bend • Playford • Snuggery Industrial • Taillem Bend • Waterloo – from 1 January 2010 • Whyalla Terminal – Main Bus (on and from 1 July 2010) • Penola West • [Dry Creek West, Kilburn, Lefevre, New Osborne and Torrens Island 66kV] • [Happy Valley , Magill and Morphett Vale East] • [Para and Parafield Gardens West] </td> </tr> </table>	<ul style="list-style-type: none"> • Angas Creek • Berri/Monash • Blanche • Brinkworth • [Bungama and Pt Pirie] • Clare North • Coonalpyn West • Dorrien • Templers • Hummocks • Keith • Kincraig • Mannum • Mobilong 	<ul style="list-style-type: none"> • Mt Barker • Mt Gambier • North West Bend • Playford • Snuggery Industrial • Taillem Bend • Waterloo – from 1 January 2010 • Whyalla Terminal – Main Bus (on and from 1 July 2010) • Penola West • [Dry Creek West, Kilburn, Lefevre, New Osborne and Torrens Island 66kV] • [Happy Valley , Magill and Morphett Vale East] • [Para and Parafield Gardens West]
<ul style="list-style-type: none"> • Angas Creek • Berri/Monash • Blanche • Brinkworth • [Bungama and Pt Pirie] • Clare North • Coonalpyn West • Dorrien • Templers • Hummocks • Keith • Kincraig • Mannum • Mobilong 	<ul style="list-style-type: none"> • Mt Barker • Mt Gambier • North West Bend • Playford • Snuggery Industrial • Taillem Bend • Waterloo – from 1 January 2010 • Whyalla Terminal – Main Bus (on and from 1 July 2010) • Penola West • [Dry Creek West, Kilburn, Lefevre, New Osborne and Torrens Island 66kV] • [Happy Valley , Magill and Morphett Vale East] • [Para and Parafield Gardens West] 		
Category 5	<ul style="list-style-type: none"> • [Dry Creek East, Magill and Northfield] 		
Category 6	<ul style="list-style-type: none"> • Adelaide Central [East Tce, new CityWest substation] 		

2.5 Category 1 loads

2.5.1. For **transmission line** capacity, a **transmission entity** must:

- (a) not contract for an amount of **agreed maximum demand** greater than:
 - (i) 100% of installed **transmission line** capacity; or
 - (ii) where the **transmission entity** has appropriate **network support arrangements** in place, 120% of installed **transmission line** capacity;
- (b) provide **equivalent line capacity** for at least 100% of contracted **agreed maximum demand**;
- (c) in the event of an interruption:
 - (i) use its **best endeavours** to restore the **line capacity** required by this clause so as to minimise the duration of the interruption; and
 - (ii) in any event, restore the **equivalent line capacity** required by this clause within 2 days of the interruption.

2.5.2. For **transformer** capacity, a **transmission entity** must:

- (a) not contract for an amount of **agreed maximum demand** greater than:
 - (i) 100% of installed **transformer** capacity; or
 - (ii) where the **transmission entity** has appropriate **network support arrangements** in place, 120% of installed **transformer** capacity;
- (b) provide **equivalent transformer capacity** for at least 100% of contracted **agreed maximum demand**;
- (c) in the event of a **transformer** failure:
 - (i) use its **best endeavours** to so as to minimise the duration of the interruption; and
 - (ii) in any event, restore the **equivalent transformer capacity** required by this clause within 8 days.

2.6 Category 2 loads

2.6.1. For **transmission line** capacity, a **transmission entity** must:

- (a) not contract for an amount of **agreed maximum demand** greater than:
 - (i) 100% of installed **transmission line** capacity; or
 - (ii) where the **transmission entity** has appropriate **network support arrangements** in place, 120% of installed **transmission line** capacity;
- (b) provide **equivalent line capacity** for at least 100% of contracted **agreed maximum demand**;
- (c) in the event of an interruption:
 - (i) use its **best endeavours** to restore the **equivalent line capacity** required by this clause so as to minimise the duration of the interruption; and
 - (ii) in any event, restore the **equivalent line capacity** required by this clause within 2 days of the interruption.

2.6.2. For **transformer** capacity, a **transmission entity** must:

- (a) not contract for an amount of **agreed maximum demand** greater than:
 - (i) 100% of installed **transformer** capacity; or
 - (ii) where the **transmission entity** has appropriate **network support arrangements** in place, 120% of installed **transformer** capacity;
- (b) provide **N-1 equivalent transformer capacity** for at least 100% of **agreed maximum demand**;

- (c) in the event of a **transformer** failure, use its **best endeavours** to repair the installed **transformer** or install a replacement **transformer** as soon as possible so as to minimise the likelihood of an interruption as a result of the failure of any other **transformer** installed at the relevant **connection point**.

2.6.3. In the event that **agreed maximum demand** at a **connection point** or group of **connection points** exceeds the **equivalent transformer capacity** standard required by this clause 2.6, a **transmission entity** must:

- (a) use its **best endeavours** to ensure that the **equivalent transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 12 months; and
- (b) ensure that the the **equivalent transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 3 years.

2.7 Category 3 loads

2.7.1. For **transmission line** capacity, a **transmission entity** must:

- (a) not contract for an amount of **agreed maximum demand** greater than:
 - (i) 100% of installed **transmission line** capacity; or
 - (ii) where the **transmission entity** has appropriate **network support arrangements** in place, 120% of installed **transmission line** capacity;
- (b) provide **equivalent line capacity** such that at least 100% of **agreed maximum demand** can be met following the failure of any relevant **transmission line** or **network support arrangement**;
- (c) in the event of an interruption, use its **best endeavours** to:
 - (i) within one hour of the interruption, restore **equivalent line capacity** to meet 100% of **agreed maximum demand**; and
 - (ii) restore the **equivalent line capacity** required by clause 2.7.1(b) within 2 days of the interruption.

2.7.2. For **transformer** capacity, a **transmission entity** must:

- (a) not contract for an amount of **agreed maximum demand** greater than:
 - (i) 100% of installed **transformer** capacity; or
 - (ii) where the **transmission entity** has appropriate **network support arrangements** in place, 120% of installed **transformer** capacity;

- (b) provide **equivalent transformer capacity** such that at least 100% of **agreed maximum demand** can be met following the failure of any installed **transformer** or **network support arrangement**;
 - (c) in the event of an interruption use its **best endeavours** to restore the **equivalent transformer capacity** required by clause 2.7.2(b) within one hour of the interruption;
 - (d) in the event of a **transformer** failure, use its **best endeavours** to repair the installed **transformer** or install a replacement **transformer** as soon as possible so as to minimise the likelihood of an interruption as a result of the failure of any other **transformer** installed at the relevant **connection point**.
- 2.7.3. In the event that **agreed maximum demand** at a **connection point** or group of **connection points** exceeds the **equivalent line capacity** or **equivalent transformer capacity** standard required by this clause 2.7, a **transmission entity** must:
- (a) use its **best endeavours** to ensure that the **equivalent line capacity** or **equivalent transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 12 months; and
 - (b) ensure that the **equivalent line capacity** or **equivalent transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 3 years.

2.8 Category 4 loads

- 2.8.1. For **transmission line** capacity, a **transmission entity** must:
- (a) not contract for an amount of **agreed maximum demand** greater than 100% of installed **transmission line** capacity;
 - (b) provide **N-1 equivalent line capacity** for at least 100% of **agreed maximum demand**; and
 - (c) use its **best endeavours** to restore **equivalent line capacity** capacity within 12 hours of an interruption.
- 2.8.2. For **transformer** capacity, a **transmission entity** must:
- (a) not contract for an amount of **agreed maximum demand** greater than 100% of installed **transformer** capacity;
 - (b) provide **N-1 equivalent transformer capacity** for at least 100% of **agreed maximum demand**; and

- (c) in the event of a **transformer** failure, use its **best endeavours** to repair the installed **transformer** or install a replacement **transformer** as soon as possible so as to minimise the likelihood of an interruption as a result of the failure of any other **transformer** installed at the relevant **connection point**.

2.8.3. In the event that **agreed maximum demand** at a **connection point** or group of **connection points** exceeds the **equivalent line capacity** or **equivalent transformer capacity** standards required by this clause 2.8, a **transmission entity** must:

- (a) use its **best endeavours** to ensure that the **equivalent line capacity** or **equivalent transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 12 months; and
- (b) ensure that the **equivalent line capacity** or **equivalent transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 3 years.

2.9 Category 5 loads

2.9.1. For **transmission line** capacity, a **transmission entity** must:

- (a) not contract for an amount of **agreed maximum demand** greater than 100% of installed **transmission line** capacity;
- (b) provide **N-1 equivalent line capacity** for at least 100% of **agreed maximum demand**;
- (c) provide **N-2 equivalent line capacity** for at least X% of Z, where:¹
- (i) Z = the sum of the **agreed maximum demand** for all **connection points** within Category 5 and Category 6;
- (ii) $X\% = Y\% + \left(\frac{100\% - Y\%}{2} \right)$;

¹ A worked example of the requirements of clause 2.9.1(c) in relation to **equivalent line capacity** is set out below. This example is provided for information only and does not affect the operation of this industry code – see clause 10.2.1(a).

If the **agreed maximum demand** for Adelaide Central (Category 6) is 250MW and the **agreed maximum demand** for Dry Creek East, Magill and Northfield (Category 5) and Category 6 (excluding the Adelaide Central area) is 500MW, then:

$$Z = 250\text{MW} + 500\text{MW} = 750\text{MW}$$

$$Y\% = \left(\frac{250}{750} \right) \times 100 = 33.3\%$$

$$X\% = 33.3\% + \left(\frac{100\% - 33.3\%}{2} \right) = 66.6\%$$

Therefore, the **N-2 equivalent line capacity** required in this case would be 66.6% of 750MW = 500MW.

$$(iii) \quad Y\% = \left(\frac{AMD_{CBD}}{Z} \right) \times 100; \text{ and}$$

(iv) AMD_{CBD} = the **agreed maximum demand** for **Adelaide Central**;

(d) use its **best endeavours** to restore **equivalent line capacity** within 4 hours of an interruption.

2.9.2. For **transformer** capacity, a **transmission entity** must:

(a) not contract for an amount of **agreed maximum demand** greater than 100% of installed **transformer** capacity;

(b) provide **N-1 equivalent transformer capacity** for at least 100% of **agreed maximum demand**;

(c) provide **N-2 equivalent transformer capacity** for at least X% of Z, where the terms X% and Z have the meanings given in clause 2.9.1(c);

(d) in the event of a **transformer** failure, use its **best endeavours** to repair the installed **transformer** or install a replacement **transformer** as soon as possible so as to minimise the likelihood of an interruption as a result of the failure of any other **transformer** installed at the relevant **connection point**.

2.9.3. In the event that **agreed maximum demand** at a **connection point** or group of **connection points** exceeds the **equivalent line capacity** or **equivalent transformer capacity** standards required by this clause 2.9, a **transmission entity** must:

(a) use its **best endeavours** to ensure that the **equivalent line capacity** or **equivalent transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 12 months; and

(b) ensure that the **equivalent line capacity** or **equivalent transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 3 years.

2.10 Category 6 loads

2.10.1. For **transmission line** capacity, a **transmission entity** must:

(a) not contract for an amount of **agreed maximum demand** greater than 100% of installed **transmission line** capacity;

(b) until 31 December 2011, provide **transmission line capacity** for at least 100% of **agreed maximum demand**;

(c) after 31 December 2011:

- (i) provide ***N-1 transmission line capacity*** into ***Adelaide Central*** for at least 100% of ***agreed maximum demand***; and
- (ii) provide the ***transmission line*** capacity referred to in clause 2.10.1(c) (i) on a continuous basis by means of independent and diverse ***transmission*** substations (which must be commissioned and commercially available), one of which must be located west of King William Street;
- (d) use its ***best endeavours*** to restore contracted ***transmission line*** capacity within 4 hours of an interruption.

2.10.2. For ***transformer*** capacity, a ***transmission entity*** must:

- (a) not contract for an amount of ***agreed maximum demand*** greater than 100% of ***equivalent transformer capacity***;
- (b) until 31 December 2011, provide ***equivalent transformer capacity*** for at least 100% of ***agreed maximum demand***;
- (c) after 31 December 2011:
 - (i) provide ***N-1 transformer capacity*** into ***Adelaide Central*** for at least 100% of ***agreed maximum demand***;
 - (ii) provide the ***transformer*** capacity referred to in clause 2.10.2(c) (i) on a continuous basis by means of independent and diverse transmission substations (which must be commissioned and commercially available), one of which must be located west of King William Street
- (d) in the event of a ***transformer*** failure, use its ***best endeavours*** to repair the installed ***transformer*** or install a replacement ***transformer*** as soon as possible so as to minimise the likelihood of an interruption as a result of the failure of any other ***transformer*** installed or ***equivalent transformer capacity*** utilised at the relevant ***connection point***.

2.10.3. After 1 January 2012, in the event that ***agreed maximum demand*** at a ***connection point*** or group of ***connection points*** exceeds the ***line capacity*** or ***transformer capacity*** standards required by this clause 2.10, a ***transmission entity*** must:

- (a) use its ***best endeavours*** to ensure that the ***line capacity*** or ***transformer capacity*** at the ***connection point*** or group of ***connection points*** meets the required standard within 12 months; and

- (b) ensure that the **line capacity** or **transformer capacity** at the **connection point** or group of **connection points** meets the required standard within 3 years.

2.11 Network support arrangement standards

- 2.11.1. A **transmission entity** which provides **transmission line** capacity or **transformer capacity** for the purposes of this Chapter 2 by means of a **network support arrangement** must ensure that the **network support arrangement** delivers the required **equivalent line capacity** or **equivalent transformer capacity** within the prescribed time frame on at least 95% of the occasions on which it is sought to be utilised within any 12 month period ending on 30 June.

2.12 New connection points

- 2.12.1. Where a new **connection point** is provided by a **transmission entity**, the **transmission entity** must submit the applicable standards for that **connection point** to the **Commission** for approval. The standards submitted must be developed having regard to:
 - (a) any recommendations of the **Planning Council**;
 - (b) the size of the load;
 - (c) the value of lost load and types of **customers**;
 - (d) the number of **customers**;
 - (e) the distance from **Adelaide Central**; and
 - (f) the cost of installation of transmission assets relevant to the **connection point**.

2.13 Rating of transmission lines and transformers

- 2.13.1. A **transmission entity** must, as required by the **Commission**, provide the **Commission** with the details of how the **transmission entity** determines the rated capacity of its **transmission lines** and **transformers**, including whenever the **transmission entity** changes its rating policy.

2.14 Spare transformers

- 2.14.1. A **transmission entity** must have available sufficient spares of each type of **transformer** such that the reliability standards specified in this Chapter 2 can be met in the event of a **transformer** failure.



2.15 Emergency Transformer Replacement Plan

2.15.1. A **transmission entity** must prepare, implement and comply with an Emergency Transformer Replacement Plan setting out the **transmission entity's** strategy for ensuring that spare **transformers** are available to ensure that it meets the reliability standards specified in this Chapter 2.

2.16 Reports to the Commission

2.16.1. A **transmission entity** must report to the **Commission** by 31 August each year, concerning matters relating to the service standards during the 12 month period ending on 30 June of that year. In particular, the **transmission entity** must:

- (a) report on the actual performance with the service standards set out in this Chapter 2;
- (b) provide an explanation of the reason for any non-compliance;
- (c) report on how the **transmission entity** will continue to meet, or improve its performance so as to meet, the service standards set out in this Chapter 2;
- (d) report on the **transmission entity's** compliance with the Emergency Transformer Replacement Plan prepared in accordance with clause 2.15 and, in the event of any non-compliance, provide an explanation of the reasons for that non-compliance;
- (e) report on the compliance of any **network support arrangements** with the requirements of clause 2.11.1 and, in the event of any non-compliance, provide an explanation of the reasons for that non-compliance

2.16.2. A **transmission entity** must report to the **Commission** on the circumstances of each occasion where it has been required, as a result of a **transformer** failure, to repair a **transformer**, install a new **transformer**, or provide **equivalent transformer capacity**, in order to meet the reliability standards specified in this Chapter 2 within 2 months of that event.

2.17 Country lines

2.17.1. A **transmission entity** must not discontinue or cease to operate, maintain or service those parts of its **transmission system** in country areas without the approval of the Australian Energy Regulator.

3. INTERRUPTIONS

3.1 *Interruptions or restrictions to transmission services*

3.1.1. A **transmission entity** may, subject to anything contrary in a **connection agreement** with a **transmission customer, distributor** or **generator**, interrupt or restrict **transmission services**:

(a) for the purposes of:

- (i) carrying out testing, commissioning, maintenance or repair on a **connection point** or any part of the **transmission network** which can not reasonably be undertaken utilising live line techniques;
- (ii) carrying out augmentation or extensions to the **transmission system** or to connect a new **transmission customer, distributor** or **generator**;
- (iii) complying with the directions or requirements of **NEMMCO**, the **system controller** or any other government authority; and
- (iv) maintaining **power system security** or responding to an **emergency** or for health or safety reasons (in accordance with clause 9.3); or

(b) as otherwise agreed in writing with the **transmission customer, distributor** or **generator**.

3.1.2. Nothing in this clause 3.1 will prevent the interruption or restriction of **transmission services** caused by the normal operation of protection systems forming part of the **transmission network** or any **connection point**.

3.2 *Outage planning*

3.2.1. A **transmission entity** must use its **best endeavours** to coordinate any **planned outages** with all affected **generators, transmission customers, and distributors**.

3.2.2. Where possible, **planned outages** should be coordinated to coincide with works planned by affected **generators, distributors** and **transmission customers**.

3.3 *Minimisation of interruptions*

3.3.1. The **transmission entity** must use its **best endeavours** to minimise the number and duration of any interruption or restriction to **transmission services**, as compared with the level agreed in **connection agreements**.

3.4 Obligation to provide information

- 3.4.1. The **transmission entity** must, on request by a **generator, distributor** or **transmission customer**, provide a written response within 10 **business days** explaining (to the extent that the available information at that time allows) any interruption or restriction to the provision of **transmission services** to the **generator, distributor** or **transmission customer**.

4. DESIGN REQUIREMENTS

4.1 Protection

- 4.1.1. A **transmission entity** may require as a term of a **connection agreement** that a **transmission customer, distributor** or **generator** that wishes to:
- (a) be connected to a **transmission network**; or
 - (b) modify an existing connection with the **transmission network**,
- consult with the **transmission entity** concerning the design and equipment selection for all protection functions which are required to coordinate and grade with the **transmission network** in order to minimise interruption or restrictions to **transmission services** due to the operation of those protection functions.
- 4.1.2. The **transmission entity** may require as a term of a **connection agreement** that a **transmission customer, distributor** or **generator** installs duplicate protection, including batteries, as required by the **National Electricity Rules**.

4.2 Communications

- 4.2.1. A **transmission entity** may require as a term of a **connection agreement** that a **transmission customer, distributor** or **generator** provides both voice and data communications for the operation and supervision of the **connection point**.

4.3 Protection and control

- 4.3.1. A **transmission entity** may require as a term of a **connection agreement** with a **transmission customer, distributor** or **generator** that protection and control associated with their **connection points** must comply with:
- (a) applicable guidelines issued by the **transmission entity**;
 - (b) the proposed design agreed by the **transmission entity**; and
 - (c) **good electricity industry practice**.

4.4 Testing of third party equipment at connections

- 4.4.1. A **transmission entity** may require as a term of a **connection agreement** with a **transmission customer, distributor** or **generator** that all tests carried out on equipment associated with its **connection points** be undertaken jointly with or under the direction of, the **transmission entity** and, where applicable, in accordance with the **National Electricity Rules**.

4.5 Network maintenance

- 4.5.1. A **transmission entity** must ensure that, where maintenance is carried out in substations that form part of the **transmission system**, adequate precautions are taken in accordance with **good electricity industry practice** to:
- (a) ensure that the equipment to be maintained is correctly identified, isolated, earthed (where appropriate) and clearly marked; and
 - (b) reduce the possibility of incorrect operation of other plant and equipment which could result in interruptions to **transmission services**.
- 4.5.2. On the completion of maintenance the **transmission entity** must take the same precautions to ensure that the equipment is adequately tested prior to its return to service.

4.6 Network modification

- 4.6.1. A **transmission entity** may require as a term of a **connection agreement** that:
- (a) a **transmission customer, generator** or **distributor** does not modify any control or protection devices relating to a **connection point** without the prior agreement of the **transmission entity**;
 - (b) where such changes are made, the relevant entity records and documents the design changes and provides a copy to the **transmission entity**.

4.7 Network equipment performance

- 4.7.1. A **transmission entity** must not operate its **transmission system** beyond the design rating for that **transmission system**.

4.8 Network equipment inspections and tests

- 4.8.1. A **transmission entity** must inspect and test its **transmission system**:
- (a) in accordance with the manufacturer's requirements and **good electricity industry practice**; and



- (b) to ensure that its **transmission system** is operating safely and within the requirements of the **National Electricity Rules** or as specified in any **connection agreement**.

5. TECHNICAL REQUIREMENTS

5.1 Good electricity industry practice

- 5.1.1. A **transmission entity** must observe **good electricity industry practice** for the planning, design, construction, maintenance and operation of its **transmission system**.

5.2 General requirements

- 5.2.1. In relation to the rating, design, erection, maintenance and operation of aerial lines, underground lines, substations and earthing systems, in addition to the requirements of the **Act** (and the regulations) and the **National Electricity Rules**, a **transmission entity** must ensure that the **transmission system** and all its components are designed, constructed, operated and maintained in accordance with:
 - (a) standards set out in **connection agreements**, or agreed with or prescribed by the **Commission**; or
 - (b) where no standards have been agreed or prescribed under clause 5.2.1(a), all applicable and relevant Electricity Supply Association of Australia (**ESAA**) guidelines, IEC Standards, **Australian Standards** and and telecommunication requirements.

5.3 System compatibility

- 5.3.1. A **transmission entity** must ensure that its **transmission system**, or any extensions to its **transmission system** are designed to be compatible with the existing South Australian electricity network including but not limited to:
 - (a) voltages and frequency;
 - (b) relevant **Australian Standards**;
 - (c) **transformer** vector group connection;
 - (d) voltage phase displacements to allow parallel operation;
 - (e) protection coordination with the network to which it is connected;
 - (f) **ESAA** guidelines;

- (g) earthing systems;
- (h) fault levels;
- (i) power factors;
- (j) ground clearances; and
- (k) **National Electricity Rules** requirements.

5.4 Design standards

- 5.4.1. A **transmission entity** may refuse to connect, or energise a connection of, a **transmission customer, distributor, or generator** if that connection is not correctly protected or is not within the design rating of the **transmission system**. A **transmission entity** may disconnect a **transmission customer, distributor, or generator** where that person fails to comply with:
- (a) the design standards set out in the **transmission customer's, distributor's or generator's connection agreement**;
 - (b) where a **connection agreement** does not set out any design standards, recognised design standards of high voltage equipment in relation to design, installation clearances and provision of safe operating and maintenance procedures;
 - (c) the requirements of the **National Electricity Rules** in relation to those design standards.

6. GENERAL REQUIREMENTS

6.1 Power system incident reporting

- 6.1.1. A **transmission entity** must collect information and report on **power system incidents** relating to its **transmission system** in accordance with, and within the times required by the **Commission** from time to time.
- 6.1.2. A **transmission entity** must review each **power system incident** relating to its **transmission system** in accordance with guidelines published by the **Commission** with a view to determining the cause of the **power system incidents** and minimising similar future occurrences.

6.2 Switching manual

- 6.2.1. Each **transmission entity, system controller, generator** and **distributor** must, to the extent requested by the **Commission**, coordinate and assist with the

development of, and amendments to, a switching manual for the safe operation of:

- (a) the **transmission system** and **distribution system**, and any connection to or between those systems; and
- (b) where applicable, equipment belonging to a **transmission customer** or **generator**.

- 6.2.2. The switching manual must be approved by the **Commission**.
- 6.2.3. The switching manual, and any amendments to the switching manual, come into force when approved by the **Commission**, and must be complied with by each of the entities referred to in clause 6.2.1.
- 6.2.4. Each entity must ensure that any person with whom it establishes a connection agreement, or an agreement to carry out work to which the switching manual relates, will be contractually bound to comply with that entity's internal switching manual.
- 6.2.5. An electricity entity will report to the **Commission**, within 20 **business days**, all breaches of its internal switching manual, including breaches by a contractor or customer of which it has become aware.

6.3 Planning approvals and easement acquisition

- 6.3.1. A **transmission entity** must use its **best endeavours** to obtain all necessary planning approvals and acquire all necessary easements on the basis of forecast demand prior to **agreed maximum demand** breaching the reliability standards specified in this industry code.

7. ACCESS TO SITES

7.1 Rights of site entry for electricity entities

- 7.1.1. Each **site occupier** must enter into an agreement with an **electricity entity** (or include provisions in its **connection agreement** with that **electricity entity**) allowing the **electricity entity** access to the **site occupier's transmission system, distribution system** or generation assets (as the case may be) for purposes of the **electricity entity** to operate and maintain properly its **transmission system, distribution system** or generation assets (as the case may be).
- 7.1.2. The access must be on terms agreed between the parties or, failing agreement on terms determined by the **Commission**, dealing with such things as:

- (a) the times during which entry will be allowed (which must at least include normal working hours, with reasonable prior notice);
- (b) rights of entry to be granted at any time in cases of **emergency**;
- (c) requiring that the **electricity entity** complies with any **applicable laws** or reasonable rules of the **site occupier** relating to occupational health and safety;
- (d) ensuring that the **electricity entity** complies with any reasonable rules or requirements of the **site occupier** relating to operating procedures and security;
- (e) requiring that the **electricity entity** maintain its equipment or assets so that they operate safely;
- (f) the liability of the **electricity entity** to the **site occupier** for any direct physical loss it suffers caused by the **electricity entity** (or its assets or equipment located on the site);
- (g) the liability of the **site occupier** to the **electricity entity** for any direct physical loss it suffers in relation to its equipment or assets situated on the **site occupier's** site, that are caused by the **site occupier**; and
- (h) the preconditions that must be satisfied by the **electricity entity** before it will be allowed access to the relevant site or electricity infrastructure.

7.2 Disputes

- 7.2.1. Any dispute relating to the granting of access contemplated by clause 7.1, or the terms of such access, shall be submitted to the dispute resolution procedures prescribed in codes issued by the **Commission** from time to time.

8. TELECOMMUNICATIONS ACCESS

8.1 Access to the network

- 8.1.1. A **transmission entity** and **distributor** must make an offer to a person requesting rights to use or have access to its **transmission system** or **distribution system** (as the case may be) for telecommunications purposes, having regard to matters including:
 - (a) the technical feasibility of the entity granting such access to its **transmission system** or **distribution system**; and

- (b) the preservation of visual amenity, given the surroundings and environment in which the relevant part of the **transmission system or distribution system** is located;
- (c) whether or not it would be uneconomical for the person requesting access to develop another facility to provide the telecommunications service requested;
- (d) whether or not access can be provided without:
 - (i) undue risk to human health or safety;
 - (ii) undue risk to the safety of property;
 - (iii) adversely affecting the safety or performance of the **transmission system or distribution system**;
 - (iv) adversely affecting any **customers** or entities connected to those systems;
- (e) the matters set out in clause 8.2; and
- (f) the person requesting access agreeing in writing with the **transmission entity or distributor** that any dispute relating to the granting of such access be submitted to arbitration in accordance with clause 8.3 or such other arbitration procedures prescribed in codes issued by the **Commission** from time to time.

8.2 Terms of access

- 8.2.1. The offer by the **transmission entity or distributor** for the purposes of clause 8.1 must be on reasonable commercial terms, having regard to:
- (a) the significance of the request for access to **transmission system or distribution system**, given the nature and scope of the telecommunications purpose for which access is requested;
 - (b) the capital and operational costs of the **transmission system or distribution system**;
 - (c) the rate of return expected to be earned by the **transmission entity or distributor** (as the case may be) in relation to access for telecommunications purposes;
 - (d) the **transmission entity's or distributor's** actual or anticipated use of its own system for telecommunications purposes.

8.3 **Arbitration**

- 8.3.1. If a dispute arises under or in connection with:
- (a) the granting of access contemplated by clause 8.1;
 - (b) the terms on which such access is offered,
- a party to the dispute may, by notice in writing to each of the other parties to the dispute, refer the matter to arbitration
- 8.3.2. The parties must, within 20 **business days** after receipt of a notice under paragraph 8.3.1, agree on the nomination of an arbitrator. If the parties fail to agree on the nomination of an arbitrator within this time, a party to the dispute may, by notice in writing to the **Commission** and each other party to the dispute, request the **Commission** to nominate an arbitrator.
- 8.3.3. The arbitration will be conducted in accordance with the *Commercial Arbitration Act 1996* and the Institute of Arbitrators, Australia Rules for the conduct of Commercial Arbitration.

9. **EMERGENCIES**

9.1 **Emergency disconnection**

- 9.1.1. Notwithstanding any other clause in this industry code, a **transmission entity** may disconnect, interrupt or limit the provision of **transmission services** at one or more **connection points** in the case of an **emergency**.
- 9.1.2. Where a **transmission entity** exercises its rights under clause 9.1.1, the transmission entity must:
- (a) provide, by way of its 24 hour emergency service, information on the nature of the **emergency** and an estimate of the time when **transmission services** will be available; and
 - (b) use its **best endeavours** to restore **transmission services** to a **transmission customer, distributor** or **generator** once the emergency condition has passed.

9.2 **Emergency provisions of other Acts**

- 9.2.1. Nothing in this industry code prevents the **transmission entity** from exercising any power, or obligation to comply with any direction, order or requirement under the *Emergency Powers Act 1941, Essential Services Act 1981, State*



Disaster Act 1980 or the *State Emergency Services Act 1987* or other relevant legislation.

9.3 Health and safety

- 9.3.1. Notwithstanding any other clause of this industry code, a **transmission entity** may disconnect, interrupt or limit the provision of **transmission services** to a connection point for reasons of health or safety, provided it follows the procedures in clause 9.3.2.
- 9.3.2. Except in the case of an **emergency**, or where relevant regulations require it, a **transmission entity** must not disconnect a **connection point** for a health or safety reason unless the **transmission entity** has:
- (a) given the affected **generator, distributor** and **transmission customer** written notice of the reason; and
 - (b) where the threat to health or safety is due to:
 - (i) a **transmission entity's transmission system**, given each affected **distributor, generator** and **transmission customer** 5 business days prior notice;
 - (ii) a **distributor, generator** or **transmission customer**, allowed the relevant person 5 **business days** to remove the threat to health or safety (the 5 **business days** shall be counted from the date of receipt of the notice).

10. DEFINITIONS AND INTERPRETATION

10.1 Definitions

Act	means the Electricity Act 1996 (SA);
Adelaide central	means that area of Adelaide which is located east of West terrace, north of South Terrace, west of East Terrace and south of the River Torrens;
agreed maximum demand	for a connection point or a group of connection points is the demand specified as such in the connection agreement between ElectraNet and the relevant transmission customers or ETSA Utilities ;
applicable laws	means the Act , the National Electricity Rules , any industry code made by the Commission under the ESC Act , the licences issued under the Act and any other legislation, rules, regulations, code or conditions which are binding on the transmission entity ;
Australian Standard or AS	means a standard published by the Standards Association of Australia;
best endeavours	means to act in good faith and use all reasonable efforts, skill and resources;
business day	means a day that banks are open for general banking business in Adelaide, other than a Saturday or a Sunday;
commencement date	means 11 th October 1999;
Commission	means the Essential Services Commission established under the ESC Act ;
connection agreement	means an agreement between a transmission entity and a transmission customer, generator or distributor relating to the connection to the transmission entity's transmission network and the provision of transmission services ;
connection assets	has the meaning given to that term in the National Electricity Rules ;
connection point	means an agreed point of supply between a transmission entity's transmission network and a transmission customer, generator, or distributor ;
customer	has the meaning given to that term in the Act ;
distributor	means a holder of a licence issued under the Act authorising the operation of a distribution system ;
distribution network	means a system of electric lines (generally at nominal voltages of 66kV or below) and other apparatus,



	equipment, plant and buildings used to convey electricity, excluding connection assets;
distribution system	means a distribution network , together with connection assets;
ElectraNet	means ElectraNet Pty Ltd (ACN 094 482 416) and includes any entity which replaces or assumes rights and/or obligations of that company by way of succession, assignment, novation, ministerial direction or otherwise;
ETSA Utilities	means means the partnership comprising CKI Utilities Development Limited (ABN 65 090 718 880), HEI Utilities Development Limited (ABN 82 090 718 951), CKI Utilities Holdings Limited (ABN 54 091 142 380), HEI Utilities Holdings Limited (ABN 50 091 142 362) and CKI/HEI Utilities Distribution Limited (ABN 19 091 143 038);
electricity entity	for the purposes of clause 7 means a generator , distributor and a transmission entity referred to in a site occupier's licence as having the benefit of the access to a site occupier's transmission system, distribution system or generating assets;
element	means a transmission line , circuit breaker, transformer or any such device which is utilised to connect the contracted load ;
emergency	means an emergency due to the actual or imminent occurrence of an event which in any way endangers or threatens to endanger the safety or health of any person, or the maintenance of power system security , in the state of South Australia or which destroys or damages, or threatens to destroy or damage, any property in the state of South Australia.
entry point	means a connection point through which a transmission customer substantially exports electricity to the transmission network ;
entry services	are: <ul style="list-style-type: none">(a) the provision of capability at each entry point (by means of the connection assets for that entry point) to enable the transmission customer to deliver electricity to that entry point<ul style="list-style-type: none">(i) up to the agreed capability for that entry point, and(ii) in accordance with the service standards in relation to connection point and connection services availability, response and restoration and unplanned outages,

as specified in the **connection agreement** for that **entry point** as at the **relevant commencement date**;

- (b) the management, maintenance and operation of those **connection assets** to provide the capability referred to in (a) above, using **good electricity industry practice** and in accordance with the requirements of the **National Electricity Rules**, this industry code and any other **applicable laws** as at the **commencement date** including (without limitation) by:
 - (i) maintaining auto-reclose facilities at each **entry point**;
 - (ii) the provision of supervisory control and data acquisition capabilities at each **entry point**; and
 - (iii) emergency attendance and advice responses;
- (c) the provision of backup protection facilities for each **entry point**,
- (d) the provision of telecommunications facilities at each **entry point**,
- (e) the provision and maintenance of the **metering installations** (other than the **meters**) in place for each **entry point** as at the **relevant Commencement Date**; and
- (f) the provision and maintenance of the **meter** for each **entry point** until the **transmission customer** elects to obtain this service from a **metering provider** other than **ElectraNet**;

equivalent line capacity

means the capacity to transmit energy to meet demand using means including, but not limited to:

- (a) **transmission system** capability;
- (b) **network support arrangements**.

equivalent transformer capacity

means the capacity to transform energy to meet demand using means including, but not limited to:

- (a) **transmission system** capability;
- (b) **network support arrangements**.

ESC Act

means the Essential Services Commission Act 2002 (SA);

exit point

means a **connection point** through which a **transmission customer** imports electricity from the **transmission network**;

exit services

are:

- (a) the provision of capability at each **exit point** (by means of the **connection assets** for that **exit point** as at the relevant **commencement date**) to deliver electricity to the **transmission customer** through that **exit point** up to the **agreed maximum demand** for that **exit point** (or for the group of **exit points** which includes that **exit point**) as specified in the relevant connection agreement for that **exit point**;
- (b) the management, maintenance and operation of those **connection assets** so as to provide the capability referred to in paragraph (a) above, using **good electricity industry practice** and in accordance with the requirements of the **National Electricity Rules**, this industry code and any other **applicable laws** as at the **commencement date** including (without limitation) by:
 - (i) the provision and maintenance of bus ties and transfer bus ties capabilities;
 - (ii) fault clearance services (including the provision and maintenance of protection systems, control systems and auto-reclose systems);
 - (iii) the provision of supervisory control and data acquisition capabilities for each **exit point**; and
 - (iv) emergency attendance and advice responses;
- (c) the provision of backup protection facilities for each **exit point**;
- (d) the provision and maintenance of the **metering installations** (other than the **meters**) in place for each **exit point** as at the **relevant commencement date**, and
- (e) the provision and maintenance of the **meter** for each **exit point** until the **transmission customer** elects to obtain this service from a **metering provider** other than **ElectraNet**;

ESAA

means the Electricity Supply Association of Australia;

generator

means a holder of a licence issued under the the **Act** authorising the person to generate electricity;

good electricity industry practice

has the meaning given to that term in the **National Electricity Rules**;

<i>meter</i>	has the meaning given to that term in the <i>National Electricity Rules</i> ;
<i>metering installation</i>	has the meaning given to that term in the <i>National Electricity Rules</i> ;
<i>metering provider</i>	means a person registered as a Metering Provider in accordance with the <i>National Electricity Rules</i> ;
<i>N-1</i>	means the ability of the <i>transmission system</i> to continue to supply the contracted amount of <i>agreed maximum demand</i> connected to the <i>transmission system</i> without interruption should any one <i>element</i> fail (typically an outage of a <i>transmission line</i> or <i>transformer</i>). <i>N-1</i> capacity may be provided by means including by implementation of <i>transmission network</i> capability and/or <i>network support arrangements</i> ;
<i>N-2</i>	means the ability of the <i>transmission system</i> to continue to supply the amount of <i>agreed maximum demand</i> connected to the <i>transmission system</i> without interruption following the failure of any two single independent and diverse (i.e. located at or servicing different sites) transmission <i>elements</i> (typically an outage of a <i>transmission line</i> in combination with a <i>transformer</i> , an outage of two independent <i>transformers</i> located at different sites). <i>N-2</i> capacity may be provided by means including by the implementation of <i>transmission network</i> capability and/or <i>network support arrangements</i> ;
<i>National Electricity Rules</i>	has the meaning given to that term in the <i>National Electricity Law</i> ;
<i>National Electricity Law</i>	means the National Electricity Law, as defined in the <i>National Electricity (South Australia) Act 1996</i> ;
<i>NEMMCO</i>	means the National Electricity Market Management Company Limited (ACN 072 010 327);
<i>network support arrangements</i>	means: <ul style="list-style-type: none"> (a) <i>distribution system</i> capability; (b) generating unit capability; (c) load interruptibility; or (d) any combination of those means.



Planning Council	means the Electricity Supply Industry Planning Council established under Part 2 of the Act ;
planned outages	means an interruption of, or restriction to, transmission services , other than due to an emergency ;
power system incidents	means an unplanned event which affects the provision of transmission services to a generator , transmission customer or distributor to the level agreed in the relevant connection agreement and occurs when protection equipment is activated;
power system security	has the meaning given to that term in the National Electricity Rules ;
relevant commencement date	means: <ul style="list-style-type: none">(a) in respect of connection points that are in existence as at the commencement date, the relevant commencement date is the commencement date; and(b) in respect of connection points that are not in existence as at the commencement date but are in existence as at 1 July 2000, the relevant commencement date is 1 July 2000;
site occupier	means any transmission entity , distributor , or generator that is required by its licence to provide access to its transmission system , distribution system or generating assets to another electricity entity (referred to in the licence), to the extent that access is necessary for the purposes of the electricity entity to operate and maintain properly its transmission system , distribution system or generation assets (as the case may be);
system controller	means a person holding a licence under Part 3 of the Act to exercise the function of system control over a power system;
transformer	means a plant or device forming part of the transmission network that reduces or increases the voltage of alternating current and includes the associated primary plant and connected secondary systems to the extent that those items must be capable of supplying the appropriate reliability standard in clause 2;
transmission customer	means a customer having a connection point with a transmission network ;

<i>transmission entity</i>	means a holder of a licence issued under the Act authorising the operation of a <i>transmission system</i> ;
<i>transmission line</i>	means an electric line forming part of the <i>transmission network</i> and includes the associated primary plant and connected secondary systems to the extent that those items must be capable of supplying the appropriate reliability standard in clause 2;
<i>transmission network</i>	means a system of electric lines (generally at nominal voltages of 66kV or above) and other apparatus, equipment, plant and buildings used to convey electricity, but excluding connection assets;
<i>transmission services</i>	means: (a) in relation to a <i>transmission customer</i> and a <i>distributor, transmission use of system services</i> and <i>exit services</i> ; and (b) in relation to a <i>generator, entry services</i> (unless otherwise agreed between the <i>generator</i> and the <i>transmission entity</i>);
<i>transmission system</i>	means a <i>transmission network</i> together with <i>connection assets</i> ;
<i>transmission use of system services</i>	has the meaning given in the <i>National Electricity Rules</i> .

10.2 Interpretation

10.2.1. In this industry code, unless the context otherwise requires:

- (a) headings, footnotes and examples are for convenience or information only and do not affect the operation or interpretation of this industry code or of any term or condition set out in this industry code;
- (b) words importing the singular include the plural and vice versa;
- (c) an expression importing a natural person includes any company, partnership, trust, joint venture, association, corporation or other body corporate and any governmental agency and vice versa;
- (d) a reference to a clause or appendix is to a clause or appendix of this industry code;
- (e) a reference to any statute includes all statutes varying, consolidating, re-enacting, extending or replacing them and a reference to a statute includes all regulations, proclamations, ordinances, by-laws and determinations issued under that statute;
- (f) a reference to a document or a provision of a document includes an amendment or supplement to, or replacement of or novation of, that document or that provision of that document;
- (g) a reference to a person includes that person's executors, administrators, successors, substitutes (including, without limitation, persons taking by novation) and permitted assigns;
- (h) other parts of speech and grammatical forms of a word or phrase defined in this industry code have a corresponding meaning.