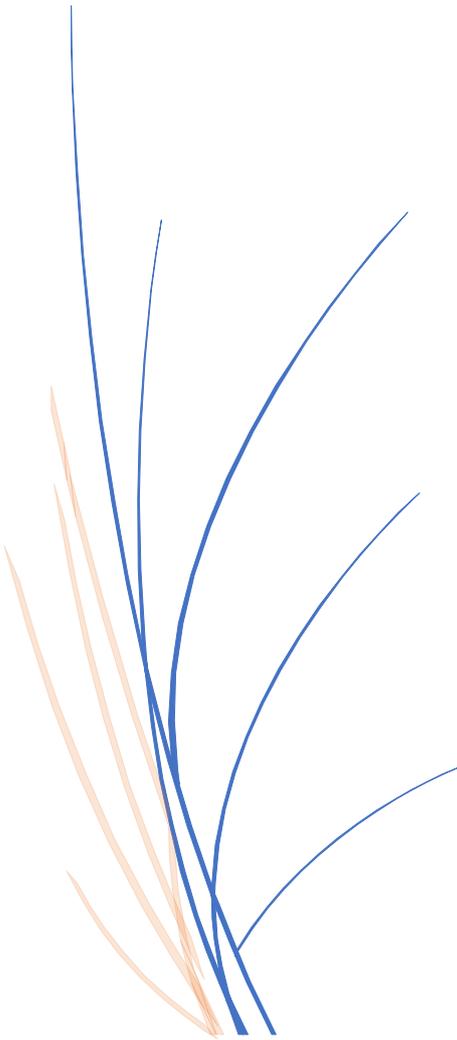


Annual Report of the Technical Regulator 2020-2021

Technical Regulator
South Australia



Annual Report of the Technical Regulator 2020-21

This document describes the operations of the Technical Regulator in the electrical, gas, plumbing and water industries.

The Technical Regulator is a statutory office established by:

- Section 7 of the *Electricity Act 1996*;
- Section 7 of the *Gas Act 1997*; and
- Section 8 of the *Water Industry Act 2012*.

Robert Faunt has held this office since he was appointed as the Technical Regulator under the *Electricity Act 1996* and the *Gas Act 1997* on 28 February 2003, and since he was appointed as the Technical Regulator under the *Water Industry Act 2012* in 2012.

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The Office of the Technical Regulator

Section 1: Overall Background

The Office of the Technical Regulator (OTR) assists the Technical Regulator in the performance of his functions and the exercise of his powers under the *Electricity Act 1996*, the *Gas Act 1997* and the *Water Industry Act 2012* (the Acts).

The Technical Regulator is responsible to the South Australian Government for the safety and technical performance of the electrical, gas, and water industries. The Technical Regulator also works towards ensuring community safety by promoting and enforcing safety measures and Standards across electrical, gas and plumbing appliances, installations, and infrastructure. To fulfil this responsibility, the Technical Regulator carries out an extensive range of activities, including but not limited to providing technical and safety education and advice, incident inspection and investigation activities and audit activities.

The Technical Regulator plays an important role in the development and monitoring of applicable State and National safety and technical Standards and Codes. The Technical Regulator provides technical support and advice on issues to the relevant Ministers and facilitates discussions with industry stakeholders to achieve the best possible outcome for South Australia.

Appendix 1 of the document presents specific results achieved during the last financial year. While the flow chart in Appendix 2 summarises the activities through which the Technical Regulator fulfils his obligations under the various Acts and Regulations.

Section 2: Technical and Safety Regulation

The technical and safety regulation regime is in accordance with the Acts and includes the following components.

2.1. Technical Review of Infrastructure Licence Applications

The Essential Services Commission of South Australia (the Commission) licenses entities under the Acts, and provide the following licences:

- A licence authorising the generation of electricity or the operation of a transmission or distribution network.
- A licence authorising the operation of a gas distribution system.
- A licence authorising the provision of water and/or sewerage retail services.

Entities that have applied for and received a licence exemption may not be exempted from their responsibilities to the Technical Regulator under the Acts.

All licensing requirements can be found on the Commission's website, <http://www.escosa.sa.gov.au/>. Licence applications to the Commission must include organisational, commercial and technical information. Technical information is referred to the Technical Regulator for review and a response is provided to the Commission for consideration during their licence application assessment.

2.2. Safety, Reliability, Maintenance and Technical Management Plan

The Technical Regulator may or will, depending upon the Act, require the entities licensed by the Commission to prepare and periodically revise a safety, reliability, maintenance and technical management plan (SRMTMP).

A SRMTMP is a high-level document relating to the operational Standards, which define key performance indicators to measure the actual performance of an entity. It provides an auditable quality approach to industry safety and technical performance, encouraging the continuous improvement of safety systems and technical compliance.

The SRMTMP addresses issues relating to the technical Standards, operating and maintenance procedures and management practices, including safety requirements, applicable to an entity. The SRMTMP demonstrates the means by which the entity will comply with the direct requirements of the legislation as well as the Standards and Codes called up by the legislation.

The overall information that a SRMTMP must address is defined in the Electricity (General) Regulations 2012, the Gas Regulations 2012 and the Water Industry Regulations 2012 (the Regulations). Guidance documents and general information for preparing SRMTMPs are also available on the OTR website to assist entities.

The Technical Regulator reviews an entity's SRMTMP and, where appropriate, provides direction and makes recommendations or comments to assist in refining it before its final approval. The Technical Regulator is directly responsible for the approval of the SRMTMP for the three industries.

2.3. Audits of Compliance

2.3.1. Infrastructure internal audits

Following the submission and subsequent approval of a SRMTMP, an entity must complete annual internal audits which confirm compliance with its SRMTMP. Those internal audits can be completed by the entity itself or by a third party. Any findings from the internal audits are reported to the Technical Regulator for review and comments. Once the Technical Regulator is satisfied that the entity has addressed all identified issues and complied with its SRMTMP, the entity then updates the plan to include required changes identified in the audit and any recommendations from the Technical Regulator.

2.3.2. Infrastructure audits by the Technical Regulator

In addition to the annual internal audits, the Technical Regulator completes independent safety and technical audits to verify the accuracy of information provided and compliance with an entity's SRMTMP. These audits ensure that safety and technical Standards are maintained in the electrical, gas and water industries by confirming that:

- Appropriate systems and processes have been developed.
- Compliance with these systems and processes is maintained.
- The systems and processes comply with the water industry entity's current approved SRMTMP.

The Technical Regulator conducts both field and desktop audits to confirm that the entity is operating in accordance with its policies and procedures to which ensure the safe and reliable operation of the infrastructure. Upon completion of an audit, the Technical Regulator provides the entity with a report of observations and provides comments and/or recommendations.

Audits completed by the Technical Regulator also allow for the monitoring of technical safety and reliability trends within the electrical, gas and water industries and comparison to other National and Global industries.

2.3.3. Installations compliance audit

The Technical Regulator has a process in place whereby electrical, gas and plumbing domestic, commercial and industrial installations are monitored for compliance with the Acts, Regulations and relevant Standards.

Periodic (seasonal, recurring and ongoing) events are monitored to ensure the safety of the public and workers at the event in relation to the temporary and permanent electrical, gas and plumbing equipment and installations. This is often done in conjunction with other relevant Authorities such as SafeWork SA or Consumer and Business Services.

2.4. Incidents Investigations

2.4.1. Infrastructure incidents

Infrastructure incidents that involve death, or injury to a person requiring medical assistance, property damage or any critical infrastructure failure, must be reported to the Technical Regulator under the *Electricity Act 1996* and the *Gas Act 1997*. Water infrastructure incidents shall also be reported to the Technical Regulator under a specific incident protocol. Incident reports are recorded by the Technical Regulator and, where appropriate, the incidents are investigated.

During major consumer outages and incidents, the Technical Regulator monitors the outage and assesses the adequacy of the response. This provides a level of confidence that the operational and maintenance strategy employed by the service providers is effective.

2.4.2. Installation incidents

Installation incidents are where an appliance or its installations is directly attributed to the cause of human death, injury or property damage. The Regulations require these events to be reported within specific time frames depending on severity.

These events are investigated by the Technical Regulator to determine the cause, often in conjunction with other relevant authorities or organisations, such as Metropolitan Fire Services (MFS), Country Fire Services (CFS), SA Police (SAPOL), SafeWork SA, and insurance companies. Incidents reported to the Technical Regulator are investigated and recorded. The OTR personnel may be called as witnesses in any subsequent legal action.

2.4.3. Electronic Certificate of Compliance

Certificates of Compliance are provided to property owners by an appropriately licensed person to demonstrate that they have met their duty to ensure that the electrical, gas fitting or plumbing works completed at their property is compliant. See Appendix 3 for an example of electrical, gas and plumbing eCoC.

The purpose of the certificate is to:

- Enable self-certification of work.
- Describe the works that have been completed.
- Assure the customer that the work is installed and tested to the appropriate Standard.
- Protect the licensed person by confining the responsibilities to the work that they have carried out.
- Allow the Technical Regulator to audit installations for adherence to safety and technical Standards.

The OTR has transitioned from the previous paper-based process for electrical, gas and plumbing certificates of compliance to an automated electronic system called electronic certificates of compliance (eCoC). In preparation for the use of eCoCs, changes were required to the Electricity (General) Regulations 2012 and the Gas Regulations 2012. Changes were also required to the Plumbing Certificate of Compliance Scheme established by the Technical Regulator under section 69(2) of the *Water Industry Act 2012*. These changes were completed in late 2016 and mainly consisted of removal of references to paper forms, to allow eCoCs to be valid.

The eCoC system is free for electrical, gas and plumbing contractors and workers, and enables them to complete, submit, store and refer to certificates of compliance online. Contractors and workers can access the eCoC system via the internet from desktop and mobile devices. A one-time registration needs to be completed to use the eCoC system. Contractors and workers need to provide professional registration/licence number and expiry date, email address, a password and contractor/worker details.

Overall, the system is considered more flexible, being on a digital form, and more professional and continuous improvements are brought to the platform based on the feedback received from users. Any feedback on the system can be sent to otr.ecoc@sa.gov.au.

More information and updates on the eCoC project can be found on the OTR eCoC website at www.sa.gov.au/otr/ecoc.

2.5. Technical Advisory Committees

Under the Acts, the Technical Regulator must establish an advisory committee (technical advisory committee) for each industry, including representatives of industry entities, contractor and employee associations involved in the industry, and local government.

The objective of those committees is to provide advice to the Technical Regulator, either on its own initiative or at the request of the Technical Regulator, on any matter relating to the functions of the Technical Regulator.

Section 3: Participation in Standards

The Technical Regulator is actively represented on a number of Australian Standards and joint Australian and New Zealand Standards Committees as well as on the Australian Building Codes Committees and International Standards. Committees relate to electrical and gas products, design, installation and commissioning of electrical installations, gas installations and on-site plumbing, and design, operations and maintenance of electrical, gas and water infrastructure. The Technical Regulator plays an important role in developing and maintaining these Standards and Codes.

Section 4: Emergency Management

The Technical Regulator works closely with relevant emergency management stakeholders to assist in ensuring the resilience of the State in case of an energy emergency, including the State Emergency Management Committee, SAPOL, the Australian Energy Market Operator (AEMO) and major SA energy entities. The OTR has several staff members rostered with the State Emergency Centre (SEC) to provide electricity, gas and fuel supply monitoring and engineering service advice during a state emergency.

The Technical Regulator plays a key role in the monitoring of the security of the power system in South Australia. The Technical Regulator works with the Bureau of Meteorology (BOM), and stakeholders within the electricity generation, transmission and distribution industries, to ensure that appropriate precautions are taken during times when there is a risk to the power system (i.e. large storm systems, bushfires, extreme temperatures, etc.).

During times when the load in South Australia may not be balanced by the electricity generation, the Technical Regulator will seek voluntary load reduction from large energy users across several industries. The Technical Regulator also manages the South Australian Electricity Manual Load Shedding List (the list) in cooperation with SA Power Networks, ElectraNet and AEMO. The list sets out the electrical circuits which should be tripped by the power system's automatic protection mechanisms or if AEMO instructs to reduce load to maintain the power system's security and integrity. The preparation of the list is an obligation on the Technical Regulator under the National Electricity Rules in his role as the Jurisdictional System Security Coordinator for South Australia.

The Technical Regulator has also the responsibility to assess and monitor any threatening situations in relation to gas supply and is required to manage an emergency where societal objectives can no longer be met by the market. Should an event occur, normally the Short-Term Trading Market (STTM) for gas would be the first line of defence in managing any shortfall. The STTM is operated by AEMO and sets a daily price at each gas hub. It runs once a day, on the day ahead, for each hub. It utilises bids, offers, and forecasts as submitted by the participants and the pipeline capacities to determine the schedules for the deliveries of gas. The STTM also operates a contingency gas market should gas supplies fall short of the estimated daily demand. The use of the contingency gas market will extend the use of market outcomes. If the shortfall is not resolved, the Technical Regulator would consider recommending that the Minister issue directions for temporary gas rationing.

Section 5: Consumer Safety Awareness

5.1. Assistance with the Development of Technical Training Courses

The Technical Regulator continues to liaise closely with Consumer and Business Services (CBS), TAFE SA / PEER VEET and Training Prospects about tradespeople training curriculums and competencies (CBS regulates the licensing of tradespeople under the *Plumbers, Gasfitters and Electricians Act 1995*).

Tailored safety presentations are given to apprentice groups at registered training organisations across the State. Presentations are also given to other groups such as professional associations and contractor groups on request.

5.2. Industry Roadshows

A key initiative of the OTR is Industry Roadshows where presentations are provided to electrical, gas and plumbing workers and contractors across South Australia. Roadshows are provided at all major population centres annually, and other regional areas less frequently, such as bi-annually, and are typically held in conjunction with industry associations. Roadshows provide an opportunity to share updates in electrical, gas and plumbing Standards and legislation, and obtain feedback from the industry.

5.3. Regulation Roundup

To keep the electrical, gas and plumbing industry informed, the Technical Regulator publishes biannually a joint electrical/gas/plumbing industry newsletter – Regulation Roundup. Prior to 2019, printed copies were sent to approximately 2,800 registered workers and licensed contractors in the State. Copies are also sent to interstate Technical Regulators and other interested parties in a reciprocal arrangement. As of late 2019, the Regulation Roundup is solely dispatched electronically to contractors and workers as part of the Government initiative to embrace online communication.



Figure 1: Example of Regulation Roundup

5.4. Continuous Safety Promotion

5.4.1. Proactive awareness campaign

The 'Be Energy Safe' Campaign is facilitated by the Technical Regulator and reviewed annually. Its objective is to promote safety to the community by raising awareness of electrical and gas safety and influencing the general public to take the appropriate actions. The campaign involves the provision of messages which are promoted via advertising on Google and Facebook and during the radio traffic reports.

Previous key messages included:

- Carbon Monoxide (CO) awareness – do not bring outdoor gas appliances indoors – service your appliance regularly.
- Gas leaks should be reported via the Gas Emergency and Leak Reporting Service on 1800 GAS LEAK (1800 427 532).
- Plumbing, gas and electrical jobs should be done by a licensed person – not DIY businesses.
- Plumbing, gas and electrical works should come with a Certificate of Compliance.
- Barbecues should be serviced regularly to prevent gas leaks.
- Safety switch should be tested twice a year.
- Christmas lights should be checked for faults prior to being used.

The campaigns are published by an advertising company and performance reports are provided regularly to the Technical Regulator to monitor the rate of penetration of the advertisements. Overall, the campaign is considered to achieve fair results. Some examples of the advertisements are shown in Figure 2.



Figure 2: Example of safety awareness campaign advertisements

5.4.2. Reactive awareness campaign

Reactive safety awareness campaigns are undertaken by the Technical Regulator usually takes the form of a single or series of media releases around the topic of interest. Typically, this type of campaign is the result of an incident and ensures that the public receives correct and appropriate safety information.

5.4.3. OTR's Website

The OTR's websites include current content on technical regulation and safety issues at:

- www.sa.gov.au/otr for all technical information.
- www.sa.gov.au/energysafe for consumer safety information for gas and electricity.

5.5. Consumer Safety Survey

Every year, the Technical Regulator conducts a consumer safety survey to ascertain the public's knowledge of gas and electrical safety, and the effectiveness of the OTR's education campaigns and legislative functions. The survey is contracted to an external contractor using computer assisted telephone interview and online surveys. The last two years approximately 400 online surveys were conducted, with two thirds located in the Adelaide metropolitan area and one third in SA regional areas. Questions used for the survey remain consistent to provide comparisons to previous results.

Section 6: Energy and Water Ombudsman South Australia

There is a Memorandum of Understanding (MOU) in place between the Technical Regulator and the Energy and Water Ombudsman South Australia (EWOSA). The MOU defines how the two bodies will interact to deal with customer complaints

The EWOSA seeks the Technical Regulator's advice on some occasions. In all cases, advice is sought on customer complaints received by the EWOSA that had resulted from the customer not being satisfied with the responses from the electricity entities. The technical input provided by the Technical Regulator assists the EWOSA in assessing a range of complex issues.

Volume I – Electricity Industry

Preface

This volume covers the Technical Regulator's operations under the *Electricity Act 1996* and the Technical Regulator's administration of the *Energy Products (Safety and Efficiency) Act 2000*.

Electricity Act 1996

Section 3 of the *Electricity Act 1996* states that:

“The objects of this Act are—

- (a) to promote efficiency and competition in the electricity supply industry; and
- (b) to promote the establishment and maintenance of a safe and efficient system of electricity generation, transmission, distribution and supply; and
- (c) to establish and enforce proper standards of safety, reliability and quality in the electricity supply industry; and
- (d) to establish and enforce proper safety and technical standards for electrical installations; and
- (e) to protect the interests of consumers of electricity.”

Section 8 of the *Electricity Act 1996* states that:

“The Technical Regulator has the following functions:

- (a) the monitoring and regulation of safety and technical standards in the electricity supply industry; and
- (b) the monitoring and regulation of safety and technical standards with respect to electrical installations; and
- (c) the administration of the provisions of this Act relating to the clearance of vegetation from powerlines; and
 - (a) the monitoring and investigation of major interruptions to the electricity supply in the State and the provision of reports relating to such interruptions in accordance with any requirements prescribed by the regulations; and
- (d) any other functions prescribed by regulation or assigned to the Technical Regulator by or under this or any other Act.”

Energy Products (Safety and Efficiency) Act 2000

The *Energy Products (Safety and Efficiency) Act 2000* makes provisions relating to the safety, performance, energy efficiency and labelling of products powered by electricity, gas or some other energy source.

Section 7: Electrical Infrastructure

7.1. Electricity Supply

7.1.1. Ensuring safety within the Electricity Supply Industry

Public Safety

Public safety is achieved under the *Electricity Act 1996* through:

- The prescription of safe distances between powerlines and structures or vegetation.
- The prescription of safe working distances in proximity to powerlines, which vary depending on the voltage of the powerlines, the type of activity being performed, and the risk assessment being considered by the worker.
- The prescription of technical safety.

Safe Work Practices

The safety of electrical workers is regulated by the *Work Health and Safety Act 2012*. Accidents are required to be reported in accordance with Regulation 70 of the Electricity (General) Regulations 2012.

The *Electricity Act 1996* and the Electricity (General) Regulations 2012 set out requirements related to the safety of electricity infrastructure, including monitoring through SRMTMPs and also of electrical installations. Safety performance is measured against nationally accepted benchmarks and expressed as:

- Lost Time Injuries – the number of injuries resulting in more than one working day lost.
- Medical Treatment Injuries – the number of injuries requiring medical treatment.

Electricity entities provide these indicators as part of their annual reporting to the Technical Regulator.

Live Powerline Work Safety

The Electricity (General) Regulations 2012 prescribe safety procedures and processes to be employed while working on or near live powerlines. A person who wants to perform high voltage live line work must complete an appropriate training course. The content of that course and the training provider must be approved by the Technical Regulator.

Currently, seven training providers have obtained Technical Regulator approval:

- SA Power Networks Skill Enhancement Centre
- Omaka Training (New Zealand)
- Transgrid
- Serec—A Subsidiary Of Electricité De France (Edf)
- Aeropower Pty Ltd
- Powerline Training Pty Ltd
- Enersafe

Substation Work Safety

Substations are considered high risk areas. Prior to working in a substation, a worker must have the appropriate level of accreditation for access to the required areas and functions in the substations, complete an induction and follow safe access processes including compliance with work permit systems.

7.1.2. Major Generators

In South Australia, the major entities responsible for scheduled generation supply a total installed capacity of 3295MW. Natural gas is the source of fuel for the majority of the generators.

Table E 1: Scheduled Generators with nameplate capacity exceeding 50MW operation in 2020-21

Power Station	Fuel	Owner	Capacity (MW)
Angaston	Diesel	Lumo Generation SA Pty Ltd	50
Barker Inlet	Natural Gas Pipeline	AGL Barker Inlet Pty Ltd	210
Dry Creek GT	Natural Gas Pipeline	Synergen Power Pty Ltd	156
Hallett GT	Natural Gas Pipeline	EnergyAustralia	234.3
Ladbroke Grove	Natural Gas Pipeline	Origin Energy Power Limited	80
Hornsedale Battery	n/a (battery)	Neoen	150
SAGT North	Diesel/Natural Gas Pipeline	SA power network/Nexif Energy	154
SAGT South	Diesel/Natural Gas Pipeline	Iberdrola Australia SAGT Pty Ltd	123
Mintaro GT	Natural Gas Pipeline	Synergen Power Pty Ltd	90
Osborne	Natural Gas Pipeline	Osborne Cogeneration Pty Ltd	180
Pelican Point	Natural Gas Pipeline	Pelican Point Power Limited	529
Port Lincoln GT	Diesel	Synergen Power Pty Ltd	50
Port Stanvac 1	Diesel	Lumo Generation SA Pty Ltd	57.6
Quarantine	Natural Gas Pipeline	Origin Energy Power Limited	128
Snuggery	Diesel	Synergen Power Pty Ltd	63
Torrens Island A	Natural Gas Pipeline	AGL Energy	240
Torrens Island B	Natural Gas Pipeline	AGL Energy	800
Total			3295

Reference: AEMO: SA existing generation Information

7.1.3. Renewable Generation

South Australia's generation mix includes a high proportion of renewable energy technology. Currently, there are 17 wind generation licenses with a total output capacity of 2033MW.

The information for the wind farm capacities below are sourced from the AEMO SA existing generation information and the Commission Generation Licenses website.

Table E 2: Semi- Scheduled and Non-Scheduled renewable Generation with capacity exceeding 20MW

Power Station	Fuel	Capacity (MW)
Bungala One	Solar	135
Canunda Wind Farm	Wind	46
Cathedral Rocks	Wind	66
Clements Gap	Wind	56.7
Hallett 4 North Brown Hill	Wind	132.3
Hallett 5 The Bluff WF	Wind	52.5
Hallett Stage 1 Brown Hill	Wind	94.5

Hallett Stage 2 Hallett Hill	Wind	71.4
Hornsedale Wind Farm Stage 1	Wind	102.4
Hornsedale Windfarm Stage 2	Wind	102.4
Hornsedale Windfarm Stage 3	Wind	112
Lake Bonney 1 Wind Farm	Wind	80.5
Lake Bonney 2 Wind Farm	Wind	159
Lake Bonney 3 Wind Farm	Wind	39
Lincoln Gap Wind Farm	Wind	126
Mt Millar	Wind	70
Snowtown	Wind	98.7
Snowtown S2	Wind	270
Starfish Hill	Wind	33
Tailem Bend	Solar	108
Waterloo	Wind	111
Wattle Point	Wind	90.75
Willogoleche Wind Farm	Wind	119
Total		2276.15

Reference: AEMO: SA existing generation Information

7.1.4. Transmission

The electricity transmission system transports power from the power stations directly to a series of substations and switchyards, which in turn supply the distribution system and directly connected transmission customers. The major transmission entity in South Australia, ElectraNet, owns and operates a network of approximately 5,684 circuit kilometres of transmission lines. The network operates at nominal voltages of primarily 275 kV and 132 kV with a smaller number of 66 kV lines as shown in Table E3.

Table E 3: ElectraNet transmission network length

Voltage (kV)	Overhead (km)	Underground (km)
275kV	2,621	26
132kV	3,042	0
66kV	21	3

The South Australian electricity transmission network is connected to Victoria through the Heywood and Murraylink interconnectors.

ElectraNet operates 97 substations. Substations included in the transmission network are primarily of outdoor construction and air insulated. The network includes some gas insulated metal clad switchgear. ElectraNet does not own all the assets or land at a number of substations; these sites are shared with other electricity entities, primarily SA Power Networks, the operator of the distribution network.

A system monitoring and switching centre for the transmission network is located in Adelaide and includes Supervisory Control and Data Acquisition (SCADA) facilities to monitor system conditions at substations and to control equipment in the network.

The transmission system is the backbone of electricity supply in South Australia and is being maintained at a high level of reliability and availability. A number of thermal generators and wind farms are connected to this transmission network at various locations throughout the State.

Murraylink Transmission Company

The Murraylink Transmission Company Pty Ltd runs an inter-regional transmission service comprising two high voltage direct current cables 176 kilometres in length between Berri in South Australia and Red Cliffs in Victoria. At both ends of the cable is a DC-AC converter station to connect Murraylink to the existing transmission systems in South Australia (at 132 kV) and Victoria (at 220 kV).

Murraylink is a bi-directional facility with a steady state transfer capability of 220 MW at the receiving end. It provides South Australian consumers with access to generation from Victoria and New South Wales at times of local peak loads or generation shortfall. During off-peak periods, Murraylink is able to export excess South Australian generation to Victoria and New South Wales consumers.

7.1.5. Distribution

In South Australia, the entity primarily responsible for electricity distribution is SA Power Networks which serves approximately 897,602 customers. There are a number of smaller distribution entities covering remote areas. Some of these areas were managed by SA Power Networks under contract for the reporting period. The electricity distribution network in South Australia covers more than 178,000km². The network extends across difficult and remote terrain and operates in demanding conditions and stretches for over 82,000km, and includes over 400 zone substations, 77,800 street transformers, more than 640,000 Stobie poles and 200,000km of overhead conductors and underground cables. Some distribution substations are within sites shared with ElectraNet.

Table E 4: Distribution network length at August 2021

Operating Voltage	Overhead (km)	Underground (km)
Low Voltage (<1000 Volts)	18,574	13,998
11 kV (includes 7.6 kV)	17,878	4,225
19 kV (SWER)	29,116	62
33 kV	3,989	134
66 kV	1,441	54
132 kV ¹	11	0
Total	71,009	18,473

¹ Licence modified to allow for 132 kV distribution assets

SA Power Networks Key Performance Indicators (KPIs)

SA Power Networks KPIs cover service and technical Standards and include supply interruptions, power surges and low and high voltage complaints. SA Power Networks reports its performance against these KPIs, with reliability and outage indicators on a quarterly basis and all other indicators on an annual basis. The Technical Regulator receives and reviews these reports and follows up on any technical issues, where deemed appropriate, to ensure that corrective action has been taken or is planned. This reporting process ensures that the Technical Regulator is kept informed of major outages and provides assurance that the reliability of electricity supply is being maintained or improved. These KPIs are included in Table K2 in Volume IV of Appendix 1.

7.2. Safety Clearances to Powerlines

The Technical Regulator is responsible for the administration of the provisions of the *Electricity Act 1996* relating to the safe clearance of buildings and structures, workers and equipment, and vegetation from powerlines.

Where there is a dispute relating to either vegetation or building clearances, the Technical Regulator strives to facilitate a sensible, safe and agreeable resolution that complies with the requirements of the legislation.

7.2.1. Vegetation Clearance

The Technical Regulator administers the Electricity (Principles of Vegetation Clearance) Regulations 2010 which include:

- The required clearance distances and the normal clearance cycle of vegetation.
- The list of species of vegetation which may be planted or nurtured near powerlines.
- Providing the occupiers of land an opportunity to lodge an objection in relation to vegetation clearance issues.

Risks associated with Vegetation near Powerlines

The risks directly associated with vegetation contacting powerlines include electric shocks, fire, damage to infrastructure and interruptions of supply. To protect people and property from these risks, clearance zones and buffer zones (which limit the amount of pruning of vegetation) and planting restrictions have been established under the Electricity (Principles of Vegetation Clearance) Regulations 2010.

In South Australia, a special case for concern is the risk of bushfires being started by overhead powerlines. This risk is principally managed through vegetation clearance, keeping flammable material well away from powerlines.

Vegetation Clearance Objections

Electrical entities conduct a periodic vegetation inspection at intervals of no longer than three years. In bushfire risk areas, annual inspections are conducted prior to the bushfire season. When an electricity entity identifies vegetation on private property as requiring trimming or removal, the entity is required to provide the owner or occupier with a 30-day notice of intention to enter the property to cut vegetation. The owner or occupier then has 21 days after receiving the notice to lodge a written notice of objection with the Technical Regulator. The Technical Regulator holds regular meetings with SA Power Networks and Active Tree Services' management throughout the year, to discuss any disputes or other matters regarding vegetation near powerlines, which had come to the attention of the Technical Regulator.

Vegetation Clearance Agreements

The *Electricity Act 1996* makes provision for electricity transmission and distribution entities and Councils to enter into agreed vegetation clearance schemes under which vegetation clearance responsibilities may be conferred on a Council. A Council also may agree to pay for the cost of more frequent clearance in order to reduce the scale of a three-yearly pruning by the entity. There are currently no such agreements in place between any Council and SA Power Networks.

7.2.2. Building and Working Clearances

The Electricity (General) Regulations 2012, under the *Electricity Act 1996* define the minimum clearances between buildings or structures and powerlines. Section 86 of the *Electricity Act 1996* also gives the Technical Regulator power to grant an approval (subject to limitations as specified in the Electricity (General) Regulations 2012) for a building or structure to be erected within the prescribed clearance distances.

Risks associated with Buildings near Powerlines

Minimum building clearances are defined in the legislation to prevent electric shocks, damage to infrastructure or property, and to ensure the reliability of supply.

The Technical Regulator actively promotes awareness of these legislated distances within the construction industry by providing verbal and written advice and presentations, undertaking site assessments, and distributing information via brochures and the internet.

The *Electricity Act 1996* makes provisions for an electricity entity to rectify identified breaches of minimum safety clearances and recover the costs by means of a court order.

Section 8: Electrical Installation

8.1. Regulatory Framework

The safety of electrical installations is mandated by the *Electricity Act 1996* and the *Electricity (General) Regulations 2012*. This legislation defines the powers, rights and responsibilities of the various parties in relation to the safety of electrical installations. The *Electricity (General) Regulations 2012* mandate compliance with *AS/NZS 3000 – Wiring Rules* as well as the technical installation rules of the network operator.

Key issues covered by the *Electricity Act 1996* and the *Electricity (General) Regulations 2012* include placing the responsibility for the safety of an electrical installation with the owner or operator of that installation, and the reliance of a certificate of compliance as a means of demonstrating that this responsibility has been met. Likewise, the person connecting the installation to the network (typically the network operator) can rely on the certificate of compliance to demonstrate they have met their obligation regarding the safety and compliance of the installation.

Occasionally installations and appliances are deliberately misused by unlicensed persons involved in illegal activities, for example in the manufacture of illegal drugs.

8.2. Compliance Audits

Audits may be random or targeted. Targets for random audits are obtained from data such as lists of new connections and alterations such as solar installations supplied by network operators. Targeted audits are performed following complaints, concerns from past performance or intelligence gathered from the industry.

The Technical Regulator inspects electrical installations against requirements specified in *AS/NZS 3002* for outdoor events due to their temporary nature, and the high levels of potential risk involved.



Figure E 1: Non-compliant electrical installation at a major event. The circled cable is too low, has no secondary support and is not flagged

Other specialist areas that are audited include recreational vehicles, caravan parks, boats and marinas, hazardous areas and patient areas.

8.3. Electrical Helpline

Electrical workers and contractors are encouraged to call the Technical Regulator for assistance with technical compliance matters. This proactive strategy helps the industry achieve compliance in a timely manner. The helpline is available 8am-4.30pm Monday to Friday.

8.4. Enforcement

The Technical Regulator has a range of enforcement options to deal with non-compliant electrical installation work and other breaches of the *Electricity Act 1996*.

8.4.1. Directives to make installation safe

An authorised officer can give a direction to make an electrical installation safe. This direction can be given to the owner or operator of the installation or to the person who performed the work. In some cases this may also include disconnection of the installation until it is repaired and made safe to the satisfaction of the authorised officer.

8.4.2. Formal warnings

A formal warning can be given to the person responsible for breaching the *Electricity Act 1996*. If this is done verbally it is also confirmed in writing. Formal warnings provide a basis for additional enforcement activity should there be an escalation of the offence, in addition to establishing patterns of repeated non-compliance.

8.4.3. Expiations

Expiation notices are issued for more serious breaches of the *Electricity Act 1996*. They are an administrative penalty that is intended to minimise the impacts on the courts and legal system caused by relatively minor offences. The issue of an expiation does not register a conviction against the alleged offender, and paying the expiation is not considered to be an admission of guilt. Expiations can be challenged in court by the alleged offender, who then faces the potential of a significantly higher penalty if found guilty.

8.4.4. Prosecution

The Technical Regulator may prosecute a person where the non-compliance is so serious as to constitute gross negligence or where the offender has a history of significant non-compliances.

The court will then decide the actual penalty up to the maximum stated in the *Electricity Act 1996* should the person be found guilty.

8.4.5. Suspension/cancellation of licenses

In cases of serious or consistent non-compliance, the Technical Regulator may refer a case to the Commissioner for Consumer Affairs who is responsible for occupational licensing under the *Plumbers, Gasfitters and Electricians Act 1995* for action. This may result in the suspension or cancellation of a contractor's licence or worker's registration, or the imposition of conditions to that licence/registration.

Instances of electrical work performed by non-licensed/registered persons are also forwarded to the Commissioner.

8.5. Reporting of Electric Shocks

All incidents that result in electric shocks or burns must be reported to the Technical Regulator. In the case of death, this must be done immediately. If a person requires medical treatment it must be reported within one working day. All other instances must be reported within 10 working days.

This allows an appropriate time for the incident to be investigated. The Technical Regulator investigates electrical fatalities, usually in conjunction with SAPOL. Other investigations are normally performed by registered electrical workers. Incident reports help prevent recurrences of the event and may result in enforcement action being taken. Statistical data from shock and incident reports also assist with resource allocation and scope for potential changes to electrical Standards.

Section 9: Electrical Products

The Energy Products (Safety & Efficiency) Act 2000 is administered by the Technical Regulator and requires that proclaimed classes of electrical products must comply with specified safety and performance Standards and be labelled to show compliance before sale (see Appendix 4).

Other Australasian jurisdictions have similar legislation. The Technical Regulator works with other Australasian Regulators and Standards Committees to ensure a nationally consistent electrical product safety regulatory regime.

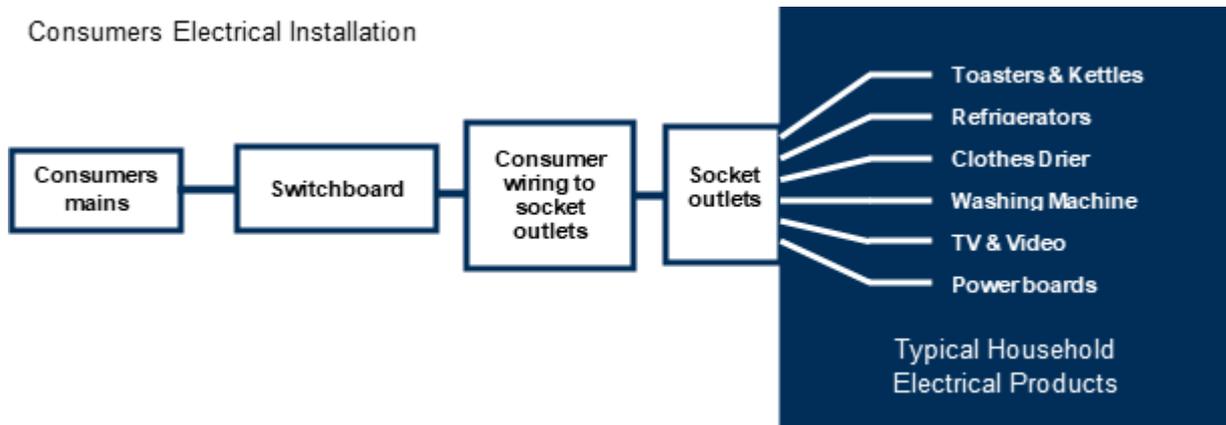


Figure E 2: Boundary of installations from products

An electrical product is any device that needs to be connected to the household electricity supply. This includes such items as white goods, power tools, portable household products, power boards, air conditioners and hot water services. It is estimated that the typical household has up to 50 electrical products.

The Technical Regulator investigates reports of breaches of the *Energy Products (Safety & Efficiency) Act 2000*. This can result in the issue of stop sale notices, public warning statements, product recalls, expiation notices or prosecution.

9.1. Role of the Technical Regulator

The Technical Regulator, in accordance with the *Energy Products (Safety & Efficiency) Act 2000* grants electrical products safety labelling certificates and electrical product suitability certificates to applicants. The certificates are required to label electrical products to indicate their compliance with applicable Standards or certify their suitability to connect to an electricity transmission or distribution network before sale. The Technical Regulator also follows up these products after sale, through field audits and product investigations, based on reported failures.

The Technical Regulator is represented on national regulatory and Standards committees, the aim of which is to ensure that regulators act in a coordinated manner throughout Australia and that the safety Standards impose a common, acceptable level of safety. These committees are listed in Section 10.2.

The Technical Regulator also provides technical advice to manufacturers and importers, the electrical industry, government agencies and emergency services.

The Technical Regulator has power under the *Energy Products (Safety and Efficiency) Act 2000* to prohibit the sale or use of unsafe energy products (including recall or repair) and issue public warning statements about unsafe energy products.

9.2. Product Safety

9.2.1. Product Approval

There are 64 classes of products proclaimed under the *Energy Products (Safety & Efficiency) Act 2000*, which must comply with specified safety and performance Standards. This list has evolved over time, and typically includes the household products that, in the past, have been involved in numerous fires and/or

electric shock incidents and therefore represent a ‘high risk’ category. These products, which are covered by similar legislation in all Australian States, require pre-market approval and must carry an approval label to indicate their compliance with safety and performance Standards before they can be sold. Appendix 4 lists these proclaimed products.

9.2.2. Product Approval Safety Process

In South Australia, the current approvals process requires manufacturers or importers to submit samples of proclaimed products for testing at accredited laboratories to ensure their compliance with the applicable Australian/New Zealand safety and technical Standards. These Standards set down the basic requirements that the products must meet to be considered electrically safe. Typically, these requirements include levels of protection to guard against such things as unsafe construction, access to live parts, overheating from normal or abnormal operation and fire propagation.

Testing must be carried out in accordance with the relevant Standards by appropriate test laboratory facilities in Australia or overseas. In Australia, this means a testing facility that has National Association of Testing Authorities (NATA) accreditation. Evidence of compliance can then be submitted to the Technical Regulator or a private certifier, who will verify compliance and then issue a certificate. This certificate is generally valid for five years. When offered for sale, the product must carry the allocated approval marking. If issued by a state regulator or private certifier, the marking contains a letter identifying the State or certifier who approved it, followed by its allocated number (e.g. Victoria – ESVxxxxx, South Australia – S/xxx or OTRxxxxxx), private certifier marking (alpha numeral), or if AS/NZS 4417 (marking of electrical products to indicate compliance with regulations) is complied with, the Regulatory Compliance Mark (RCM) symbol as defined in that Standard as shown in Figure E3.



Figure E 3: Regulatory Compliance Mark



Figure E 4: Example of approval labelling for an OTR (S marking) approved product – wall switch

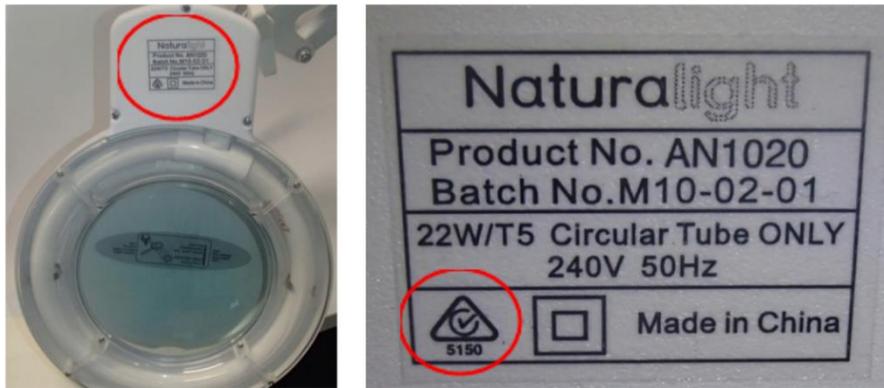


Figure E 5: Example of the RCM approval labelling symbol for an approved product – desk lamp



Figure E 6: Example of approval labelling for regulatory authority NSW Fair Trading – laptop charger

Each state in Australia recognises approvals issued by the other state authorities and product certifiers. There are also alternative private certifying bodies which have been recognised interstate, resulting in approval labelling other than that issued by a State Regulator, with a consequent reduction in the number of products being approved by state authorities. The nature of the retail products industry is such that competitors quickly identify any unapproved items on sale and report them to the Technical Regulator, who is able to take immediate action for breaches of the *Energy Products (Safety & Efficiency) Act 2000*.

9.2.3. Risks due to faulty or misused Products

The risks associated with electrical products that have failed because of their design, or manufacture, or misuse by the consumer include:

- Personal injury (shocks)
- Electrocutation (fatalities)
- Property damage (fires)

Manufacturers, importers and retailers also assume liability through the sale of electrical products for:

- Costs of recalls, replacement or repair of products
- Costs of compensation claims
- Loss of, or damage to, the organisation's reputation

Hazardous Products

Typical hazards found in faulty electrical products include:

- A breakdown of insulation due to overheating or mechanical damage, which may expose the consumer to the risk of electrical shock.
- Overheating of the product, which may result in fire or ignition of its surroundings, exposing consumers to the risk of injury or property damage.
- Mechanical failure, which may cause personal injury to the user.



Figure E 7: Example of an electrical product failure. This photo illustrates the consequences of a faulty electrical connection in a washing machine that overheated and caught fire



Figure E 8: Example of an electrical product failure. This photo illustrates the consequences of a bathroom heater glass diffuser shattering whilst in use, resulting in the user receiving burns and cuts

Products may also fail because of misuse by the consumer. Typical examples of this are:

- Incorrect securing of electric blankets resulting in folds that lead to overheating and fire.
- Unsafe placement of radiators and fan heaters adjacent to furniture and materials, resulting in fires.
- Continued use of electrical products with damaged bodies and cords, resulting in electrical shocks.
- Not having products checked after being subjected to an impact or falling from a height.

Figure E9 shows an example of brand new decorative LED rope lights that started to emit smoke and deform within minutes of use, as a result of the user not observing the warning instructions to remove the packaging.



Figure E 9: Incident due to user not observing the warning instructions

In many cases, products are either incorrectly installed or operated by consumers who do not follow the manufacturer's recommendations and instructions. The Technical Regulator alerts consumers and electricians to such risks through public warnings, the continuous development of information brochures, Regulation Roundup and education programs.

9.2.4. Product Failures and Corrective Actions

The Technical Regulator monitors the failures of electrical products. If necessary, action can be taken under the Energy Products (Safety & Efficiency) Act 2000 to remove any hazardous products from the marketplace. Depending on the severity of the failure, there are a number of options available to the Technical Regulator when assessing what action should be taken for specific situations including:

- Issuing an Incident Report – when the failure of a product has not directly resulted in a safety hazard. The report is circulated to all regulatory authorities throughout Australia and New Zealand for information and monitoring.
- Issuing a Hazard Alert – when the failure of a product has resulted in an immediate safety problem such as a reported electric shock. The notice is immediately circulated to all regulatory authorities including both state and federal consumer affairs authorities for information and followed up by action with the trader as considered necessary.
- Issuing a Stop Sale – generally issued in conjunction with a Hazard Alert. The notice is circulated to all regulatory authorities including both state and federal consumer affairs authorities for information and is followed up by action with the trader.
- Issuing a Recall – when a product already on the market has been identified as a safety hazard. This may warrant the issuance of a recall notice and result in a national public product recall conducted in accordance with ACCC guidelines.

9.2.5. Stop Sales

The Technical Regulator can issue stop sale notices to traders in South Australia as the situation warrants. An example of a situation requiring the seller to “Stop Sale” is when the product is proclaimed under the Energy Products (Safety & Efficiency) Act 2000, but is not marked with any approval labelling indicating that it is formally approved for electrical safety.

9.2.6. Mutual Recognition

Under a Mutual Recognition Agreement (MRA) between two or more jurisdictions, one jurisdiction is able to recognise a product approval by another.

Apart from the 'corresponding laws' recognised under the Energy Products (Safety & Efficiency) Act 2000, several mutual recognition schemes affect the Technical Regulator's operations and those of other State Regulators.

Australian Mutual Recognition

The *Mutual Recognition (South Australia) Act 1993* and the *Mutual Recognition Act 1992 (Commonwealth)* provide that, in principle, a product made in or imported into a state that can be lawfully sold in that state, may be lawfully sold in any other state. A label is required showing the place of manufacture or importation to enable a defence of mutual recognition to be established.

Trans-Tasman Mutual Recognition Arrangement (TTMRA)

The *Trans-Tasman Mutual Recognition (South Australia) Act 1999* and the *Trans-Tasman Mutual Recognition Act 1997 (Commonwealth)* provide that, in principle, products made in or imported into New Zealand that may be lawfully sold in New Zealand, may also be lawfully sold in Australia. A label on the product is required showing the place of manufacture or importation to enable a defence of mutual recognition to be established.

The TTMRA has resulted in some products either manufactured in or imported into New Zealand being offered for sale in Australia without any identifiable approval marking as New Zealand law does not require such labelling.

9.3. Product Energy Efficiency

Energy Labelling and Minimum Energy Performance Standards (MEPS) registrations are now regulated by the Australian Government's *Greenhouse and Energy Minimum Standards Act 2012* (GEMS legislation). The energy efficiency requirements of the *Energy Products (Safety & Efficiency) Act 2000* are still applicable but in general terms have become redundant.

9.4. Industry Communication

There are only a few businesses in South Australian businesses (including manufacturers, importers and retailers) that submit electrical products to the Technical Regulator for approval. The Technical Regulator distributes newsletters and circulars to these businesses to keep them informed of changes to the *Energy Products (Safety & Efficiency) Act 2000* and Australian Standards as necessary.

Section 10: Electricity Regulatory Coordination

10.1. Electrical Regulatory Authorities Council (ERAC)

National uniformity and consistency are extremely important to electricity utility operators, manufacturers, electrical workers, contractors and consumers. ERAC has representatives from all Australian States and Territories and New Zealand. It formally meets twice per year to address regulatory matters related to key technical and worker licensing issues facing the electrical industry and to develop national strategies to address these issues consistently.

Meetings are divided into five sessions, each with their own chairperson, covering general matters, electrical installations and inspection, electrical equipment safety, electrical licensing and electricity supply (network infrastructure).

ERAC works closely with Standards Australia to maintain and develop national Standards which in turn become state-based requirements when they are called up by legislation. The Technical Regulator, as a member of ERAC, actively participates in Standards development issues arising from ERAC meetings. The Technical Regulator also participates in a number of ERAC working groups to ensure that national developments take account of South Australian issues.

Uniform Standards are beneficial in that they provide for the movement of workers between regions and enable the development of Standards based on the experience of a wider group. The national Standards development process also supports the ongoing review and improvement of safety Standards in a transparent manner. ERAC has been active in setting the agenda for the progressive review and implementation of network safety Standards. This has included a Standard dedicated to safety issues associated with “smart” meters.

ERAC has been particularly keen to support the timely development of Standards which deal with matters that have a direct impact on the interface between the network industry and the general public, such as powerline clearances.

Following its review of the regime for regulating electrical equipment safety in Australia, ERAC has recommended an updated system aimed at eliminating shock, injury and property damage resulting from the sale, supply and use of unsafe electrical equipment. ERAC has proposed that the new system should be underpinned by nationally consistent performance-based legislation in each jurisdiction and comprehensive scheme rules. It contains a mixture of pre-market registration based on third party safety assessment and post-market enforcement.

The system will be designed to take into account the changing character of the electrical appliance supply industry in Australia. The recommendations formed the basis of the Regulatory Impact Statement (RIS), released for public comment by ERAC. Following consideration of public submissions on the RIS and further industry consultation, a final RIS was endorsed by ERAC members. In order that a national scheme is agreed and implemented, ERAC is in the process of developing an intergovernmental agreement (IGA) between all states and territories to gain Ministerial agreement to progress the scheme.

The Ministerial Council on Energy (MCE) has established the Energy Technical and Safety Leaders Group (Leaders Group). The Leaders Group was tasked with the development of a plan to achieve further harmonisation of state and territory safety regulation for the electricity and gas supply industry.

The plan presented by the Leaders Group contains recommendations for achieving a harmonised national framework within which state and territory energy supply industry safety and technical regulations could operate. The plan proposes an IGA as the central mechanism by which jurisdictions would commit to a series of overarching principles and objectives supporting harmonisation. The MCE has given in principle agreement to the recommendations contained in the plan as they apply to MCE Ministers’ portfolio responsibilities. MCE Ministers also agreed to work with related portfolio Ministers within their jurisdiction to progress the proposed IGA. The objective of the IGA is to create a nationally harmonised energy supply industry safety framework, to ensure enhanced public and industry safety, enhance worker mobility and contribute to the efficient delivery of energy network services. In particular, the IGA will formalise governments’ commitment to make necessary legislative or other changes to support the nationally

harmonised safety framework for the energy supply industry. The IGA does not commit to the development of a model or applied legislation.

As part of the harmonised safety framework, the IGA commits participating jurisdictions to an ongoing work program in Standards development (such as the Australian Standard for Energy Network Safety Systems), operating safety rules and skills and training. This work would be supported by the Energy Supply Industry Safety Committee (ESISC), a non-statutory advisory body that provides advice, knowledge and expertise to the MCE and its Senior Committee of Officials (SCO) on the development and implementation of the nationally harmonised safety framework. In 2012, the Commonwealth, states and territories endorsed the IGA on Energy Supply Industry Safety by the signature of First Ministers. Under the IGA, Commonwealth, state and territory governments agree to put in place a nationally harmonised safety framework for the energy supply industry. The Terms of Reference (TOR) for the ESISC came into effect with the signing of the IGA. The TOR tasked ESISC to develop and implement a nationally harmonised safety framework for the energy supply industry.

The TOR requires that ESISC submit to the MCE's Senior Committee of Officials (SCO) for approval of the ESISC implementation plan for five years. This plan requires a progress update every 12 months on:

- Energy Network Safety Systems
- Consistency With National Occupational Health And Safety
- Consistency With National Occupational Licensing System Initiatives
- Legislative and regulatory issues
- Expanded National Refresher Training Recognition Protocol For The Electricity Supply Industry
- Generation harmonisation
- Harmonised Operating Safety Rules

A key outcome of this work was the development and publication on 18 April 2013 of the Australian Standard AS 5577:2013 Electricity Networks Safety Management Systems. The Standard provides a national framework for the harmonisation of energy network safety systems.

10.2. Committee Representation

The Technical Regulator provides expert technical input for the revision of key Australian Standards through representation on the following Standards committees:

<i>EL-001</i>	<i>Wiring Rules</i>
<i>EL-001-09</i>	<i>Wiring Rules Drafting Subcommittee</i>
<i>EL-001-17</i>	<i>Construction and Demolition Sites Installations</i>
<i>EL-001-21</i>	<i>Testing and Inspection of Electrical Installations</i>
<i>EL-001-24</i>	<i>Generating Sets</i>
<i>EL-002</i>	<i>Safety of Household and Similar Electrical Appliances and Small Power Transformers and Power Supplies</i>
<i>EL-004</i>	<i>Electrical Accessories</i>
<i>EL-011</i>	<i>Electricity Metering Equipment</i>
<i>EL-042</i>	<i>Renewable Energy Power Supply Systems & Equipment</i>
<i>EL-042-03</i>	<i>Grid Connected Systems and Equipment</i>
<i>EL-042-05</i>	<i>Safety of battery systems for use in inverter energy systems</i>
<i>EL-044</i>	<i>Safe Working on Low-Voltage Electrical Installations</i>
<i>EL-052</i>	<i>Electrical Energy Networks, Construction and Operation</i>
<i>ET-007</i>	<i>Coordinating Committee on Power and Telecommunications (CCPT)</i>
<i>QR-012</i>	<i>Conformance Marking to Regulatory Requirements</i>

Volume II – Gas Industry

Preface

This volume covers the Technical Regulator's operations under the *Gas Act 1997*.

Gas Act 1997

Section 3 of the *Gas Act 1997* states that:

“The objects of this Act are—

- (a) to promote efficiency and competition in the gas supply industry; and
- (b) to promote the establishment and maintenance of a safe and efficient system of gas distribution and supply; and
- (c) to establish and enforce proper standards of safety, reliability and quality in the gas supply industry; and
- (d) to establish and enforce proper safety and technical standards for gas installations and appliances; and
- (e) to protect the interests of consumers of gas.”

The Technical Regulator is established by section 7 of the *Gas Act 1997*.

Section 8 of the *Gas Act 1997* states that:

“The Technical Regulator has the following functions:

- (a) the monitoring and regulation of safety and technical standards in the gas supply industry; and
- (b) the monitoring and regulation of safety and technical standards with respect to gas installations; and
- (a) the provision of advice in relation to safety or technical standards in the gas supply industry to the Commission at the Commission's request; and
- (c) any other functions assigned to the Technical Regulator under this Act.”

The Technical Regulator advises the Minister for Energy on gas emergency management and related issues. In addition, the Technical Regulator provides expert input and is involved in a range of activities in liaison with the gas industry and other Government agencies. The Technical Regulator's operations in relation to these functions are dealt with in various sections of this report.

Energy Products (Safety and Efficiency) Act 2000

The *Energy Products (Safety and Efficiency) Act 2000* makes provisions relating to safety, performance, energy efficiency and energy labelling of products powered by electricity, gas or other energy sources.

Section 11: Gas Infrastructure

11.1. Overview of the Natural Gas Industry in SA

Typically, commercial and residential consumers use natural gas for cooking, space and water heating. Industrial use includes processes such as cement and glass manufacturing and steel production.

South Australia receives gas from Moomba (SA) through the Moomba to Adelaide pipeline (MAP), South West Queensland via the QSN Link Pipeline (Ballera) and Victoria via Port Campbell to Adelaide pipeline (PCA pipeline). The South East Pipeline System (SEPS) delivers gas from the PCA pipeline to the Ladbroke Grove/Katnook pressure reduction station for distribution to the Limestone Coast region in SE South Australia. The MAP is operated by Epic Energy South Australia (EESA) and the PCA pipeline is operated by SEA Gas. A joint venture project between EESA and SEA Gas resulted in the interconnection of the two pipelines and was completed in June 2015. This interconnection is located at the Pelican Point Power Station and allows gas to travel mainly from the PCA pipeline to the MAP. This interconnection provides a higher security of supply to the network and power generators in South Australia. There has generally been a concern regarding single source of supply to both to both Port Pirie and Wasleys laterals in the north, however, following this project both of these laterals can now be feed via the MAP pipeline from gas supplied via the PCA pipeline.



Figure G 1: Southern and eastern Australian gas fields and major pipelines

11.2. SA Natural Gas Supply

The role of the Technical Regulator with respect to the gas supply is to monitor the quantity and quality of the gas being supplied into the distribution network and onto the consumers. Should there be a gas supply emergency; the Technical Regulator will act within the provisions of the legislation to ensure that the impacts upon the South Australian community is minimised.

The gas is transported from the source through transmission pipelines and these in turn transfer the gas into the distribution networks at custody transfer metering stations, often referred to as 'City Gate Stations'. Here the gas is metered, the pressure reduced and made ready for transportation through the distribution network to houses and industry.

Australian Gas Networks (AGN) is the owner of and is licensed to operate the natural gas distribution networks in South Australia. AGN has contracted the APA Group to operate these networks on its behalf. Gas from the distribution system is then supplied to consumers in accordance with their contract with their retailer. In addition, AGN also owns several small gas systems, typically referred to as 'farmtaps'. The farmtaps supply gas to typically a single industrial/commercial consumer that is fed directly from the transmission pipeline.

11.3. Safety of Natural Gas Infrastructure

As required by the *Gas Act 1997* and AGN's gas distribution licence, AGN is required to submit for the approval to the Technical Regulator the Safety, Reliability, Maintenance and Technical Management Plan (SRMTMP) which requires to include a detailed Leakage Management Plan (LMP), an Asset Management Plan (AMP) and a Distribution Mains and Services Integrity Plan (DMSIP). The Technical Regulator approves the SRMTMP on an annual basis based on requirements prescribed by legislation, the Commission's Gas Distribution Code and Gas Metering Code and AGN's distribution licence conditions.

11.3.1. Compliance with SRMTMP

The Technical Regulator uses the following techniques to monitor compliance with AGN's SRMTMP:

- Auditing AGN's and the APA Group's compliance with specific sections of the plan directly affecting consumers, the general public, and/or the safety, reliability, and integrity of the distribution network.
- Reviewing the results of any independent technical auditor engaged by AGN.
- Reviewing the results of internal auditing processes used by the APA Group.
- Reviewing the prescribed set of KPI's reported to the Technical Regulator by AGN.
- Regular technical meetings and discussions with AGN and the APA Group.

11.3.2. Gas measurement management plan (GMMP)

A GMMP is required as a condition of a distribution network licence. Detailed requirements are set out in the Gas Metering Code issued by the Commission. It forms an integral part of managing the risks associated with the installation and maintenance of gas meters to an acceptable level.

11.3.3. Gas incidents

Gas incidents that involve death, or injury to a person requiring medical assistance, property damage above \$5,000 or a dangerous situation involving a pipeline operating above 1,050 kPa, must be reported to the Technical Regulator. The APA Group and the Technical Regulator liaise frequently with the MFS and representatives of other emergency services about appropriate actions that should be taken when responding to gas incidents.

11.3.4. Third party damage

Damage to the distribution systems (mains and services) caused by third party activities constitutes one of the greatest gas related risks to the South Australian community because it can result in gas escapes of large volume. AGN reports the number of these incidents annually to the Technical Regulator as one of its KPIs. A major factor contributing to the damage of mains and services is a lack of notification from a third party to the gas distributor prior to any activity in the vicinity of the mains and services. In South Australia, the APA Group utilises the "Dial Before You Dig" (DBYD) service to minimise the likelihood of damage. This service allows the APA Group to advise about the location of gas pipes and to assess the associated risks of the activities proposed by third parties.

The Technical Regulator monitors the effectiveness of this service via frequent discussions with the APA Group, annual audits and the review of the APA Group's annual operational reports. These discussions assist to assess whether the DBYD system provides an adequate, detailed and prompt asset information and field checking service.

The Technical Regulator addresses and resolves, with the APA Group's assistance, numerous technical enquiries and concerns which are directly made to the Technical Regulator by third parties involved in various works in the vicinity of AGN's distribution infrastructure.

The APA Group promotes a 'Gas Main Awareness Program' to reduce the number of gas incidents caused by third parties. It conducts training sessions and carries out other means of communications (e.g. meetings, letters, emails, etc.) to familiarise metropolitan and regional Councils, major civil works contractors, other utilities (e.g. SA Water, SA Power Networks and Telstra) and emergency services with

the existence and identification of AGN's distribution infrastructure. The Technical Regulator strongly supports and monitors these APA Group activities.

11.3.5. Gas leak public reports

The identification, location and repair of leaks are key to the safe operation of the distribution network. The public's safety is a principal priority for the Technical Regulator, distribution system owners and operators. Should a pipeline fail, it could result in a leak that migrates through the ground to a confined space (e.g. a cellar) and thus would pose a major risk of fire or explosion. Any gas escapes that are found in the distribution system would have been detected through either public reporting (reactive) or regular leakage surveys (proactive). The ongoing mains renewal and mains and services repair strategy of AGN is expected to improve the condition and reliability of the gas distribution network. Over time it is expected that this should further reduce the number of gas escapes reported. The Technical Regulator continues to monitor the gas leak data, especially in relation to the mains replacement strategy.

11.3.6. Leakage surveys

Leakage surveys are the key proactive maintenance strategy employed by the distribution system operator to manage leakage and determine the condition and reliability of the gas distribution network. The approach to leakage surveys is currently risk-based and 'high consequence' locations are surveyed more frequently. The APA Group reports the results of the leakage surveys to the Technical Regulator annually as one of its KPIs.



Figure G 2: The APA Group emergency/gas leak reporting number (1800 GAS LEAK – 1800 427 532)

11.3.7. Unaccounted for gas (UAFG) and Distribution Mains and Services Integrity Plan

UAFG is the difference between the measured quantity of gas entering and leaving the distribution network and is thought to be largely due to leakage. Levels of UAFG above industry norms can sometimes relate to the general condition, of a distribution network, or issue related to measurement factors. In old networks, the majority of UAFG is often associated with leaking of CI and UPS mains. The Technical Regulator monitors AGN's compliance with the UAFG and DMSIP requirements as prescribed in AGN's gas distribution licence and the Gas Distribution Code. APA is undertaking 'old generation' HDPE mains replacement which is expected to reduce the risks of failures at the squeeze off areas and reduce levels of UAFG over time.



Figure G 3: HDPE mains replacement

11.4. Safety of LP gas Distribution Networks

Distributors and retailers of reticulated LP gas in South Australia are required to have licence or the licences relevant to their operations granted by the Commission. These licences are subject to several conditions to ensure that the safety and technical requirements of the *Gas Act 1997* and the *Gas Regulations 2012* apply. Network owners operate their LP gas distribution networks under a SRMTMP approved by the Technical Regulator. The Technical Regulator monitors technical compliance to ensure that the construction, commissioning, operations and maintenance of the LP gas distribution networks are undertaken according to the appropriate Standards and gas industry practices.



Figure G 4: Gas storage tank compound

As is the case with natural gas distribution Network, LP gas incident reports are registered and reviewed by the Technical Regulator. Where found to be appropriate, the reported incidents will be investigated.

Table G 1: LP gas distribution networks in South Australia as of 30 June 2021

Network Location	Owner/Operator	Length of Main (m)	Operating Pressure (kPa)	Number of consumers
Roxby Downs	Origin	31,381	120	1,570
Victor Harbor (Rosetta Retirement Village)	Origin	5,474	80	411
Renmark (Jane Eliza Estate)	Origin	2,736	80	99
Port Lincoln	Origin	4,075	105	165
Walleroo	Origin	6,355	70	198
Cape Jaffa Anchorage	Origin	3,600	70	26
Clare (Hanlins Rise Estate)	Elgas Ltd	1,900	140	65
Mount Barker (several locations)	Environmental Land Services (ELS)	45,669	70 – 120	2,277

11.5. Gas Retailers' Safety Awareness Plans (SAP)

As of 1 February 2013, following the changes that were made to the National Energy Retail Law (South Australia) (NERL), a gas retailer must prepare, maintain, publish on its website and periodically revise a SAP in accordance with the requirements of Regulation 36A of the NERL. The requirements prescribe that the SAP must include details of the retailers' consumer communication plan, including topics ranging from general gas safety information, to the gas appliance safety approvals scheme, and whom to contact in the event of a gas supply outage. The gas retailer must obtain the approval of the Technical Regulator for the SAP and any revision thereof.

Section 12: Gas Installation

12.1. Natural Gas and LP gas Installations

Gas installation commences downstream of the infrastructure (billing gas meter or LP gas first stage regulator) connected to LP gas cylinders owned by the gas entities. The condition and safe use of the installation is the responsibility of the owner/operator of the installation. The gas installation generally includes appliances, pipe work, flueing, ventilation and controls.

12.1.1. Responsibilities

The Technical Regulator is responsible, under the *Gas Act 1997*, for the monitoring and regulation of safety and technical Standards with respect to gas installations in South Australia. This involves ensuring that installation work is performed in a safe manner, using appropriate methods and materials that are compliant with relevant Standards. The monitoring and regulating of gas installation work is carried out by officers authorised under the *Gas Act 1997*.

The Regulations call up the Australian Standard AS/NZ 5601 – Gas Installations including any Standard called up by or under AS/NZ 5601. The Regulations require that a certificate of compliance must be issued by the gas fitting contractor to the client within 30 days of the completion of all installation work. The *Energy Products (Safety and Efficiency) Act 2000* requires that certain proclaimed gas appliances must be labelled as evidence that they are approved to appropriate Standards by a recognised certification body or the Technical Regulator.

12.1.2. Residential and Light Commercial Gas Installations

Generally, gas installation work involves the connection of new gas appliances. Every year, a significant amount of new domestic and light commercial gas appliances are sold and installed in South Australia, including multiple appliances installed in new premises as well as single additional and replacement appliances in existing premises. In addition to the installation of new gas appliances a significant amount of work involves the repair, replacement and extension of existing gas installation pipe work and components such as flues and ventilation equipment.

An important number of new residential, including industrial/commercial natural gas connections are made every year to the AGN distribution system. New LP gas connections (by various LP gas suppliers) are also made to residential and light commercial premises.

In larger new residential developments where natural gas is not available, it is becoming increasingly popular to supply LP gas by means of reticulated LP gas systems supplied from large storage tanks located on the perimeter of the estate. This has some safety advantages as it removes the need for individual LP gas cylinders at each home to be replaced when empty or having individual tanks refilled by tankers.

12.1.3. Industrial and Large Commercial Gas Installations

The Technical Regulator provides oversight on several significant industrial and commercial gas installations and its involvement often extends over months or even years on some larger jobs and often requires multiple site visits.

The Technical Regulator also provides advice on the interpretation of gas Standards to hydraulic consultants, architects and builders as well as to gas contractors. This represents a significant proportion of the work done by the gas installation and appliance section. Most advice of this type involves commercial or industrial premises and site visits are required to verify that the advice given is consistent with the actual site conditions. This service, whilst resource intensive, is very important and effective. It is far better to identify and resolve installation issues proactively in advance than to reactively deal with non-compliances and potentially unsafe situations in areas where they may create a hazard or delay building handover.

The Technical Regulator monitors complex gas installations particularly where type B appliances are involved. Contractors must provide submissions to authorised type B certifiers to initiate the certification process prior to commissioning, inspection/testing and commercial operation. Installers are also required

to provide submission plans to the Technical Regulator for elevated pressure installations in order to get gas on to the property or where existing installation pressures are upgraded.



Figure G 5: New Air Dryer (type B appliance) undergoing commissioning and type B testing



Figure G 6: Preowned resin sand dryer (type B appliance) undergoing modifications and installation

12.1.4. Compliance Audits

Proactive Audits

The current strategy, where possible, is to proactively audit samples of the gas installation work from each contractor in South Australia annually. Gas contractors performing LP gas work in the more remote regional areas may be audited less often because of logistical and resource constraints.

The Technical Regulator uses a standard audit pro-forma to record audit results. Where work is satisfactory a copy of this form is provided to the installation owner and the contractor. Where there are non-compliances an escalation process is used (see “Enforcement activities for non-compliant gas installations” for more detail).

Where new type B (industrial and large commercial) gas appliances are installed, it is mandatory that they are individually inspected and tested for compliance with AS 3814. If deemed compliant the equipment can then be certified and then commercially operated.

Select Solutions P/L - a division of the gas distributor SP Ausnet and Tamar Gas Certification (TGC) were both assessed as technically competent and approved by the Technical Regulator to undertake this task. The Technical Regulator in turn carries out sample audits of type B certification work performed by both certifiers. These arrangements have been operating successfully since their commencement in 2014.

Figure G 7: Example of gas e-audit form

Mobile installations in recreational vehicles

The Technical Regulator pays close attention to the standard of LP gas installations and appliances in caravans, motor homes, houseboats, river craft and small sea going vessels - including prawn boats.

Imported recreational vehicles (motor homes, caravans and camper trailers) as well as imported yachts warrant attention because they may include unique proprietary gas pipe and jointing systems not covered in the Installation Standard and appliances that are not certified to the appropriate Australian Appliance Standards.

Similar concerns apply to some imported boats. Gas safety is an ongoing consideration when a gas system or appliance repairs and maintenance is required due to the lack of spare parts. The Technical Regulator encourages importers to make space provision for appliances during the construction of boats or recreational vehicles and then source appliances certified for use in Australia and fit them on arrival in Australia hence ensuring the provision for spare parts and manufacturer warranty to overcome these issues.

South Australian registered commercial marine and river craft come under the control of the Australian Maritime Safety Authority (AMSA) who have delegated authority to the Department of Planning, Transport and Infrastructure (DPTI), Vessel Unit in South Australia to provide day to day operations.

Commercial houseboats are required to be periodically surveyed by DPTI accredited marine surveyors. Marine surveyors may advise the owner of the vessel to have a gas safety inspection carried out by a licensed contractor in advance of the slips survey so that the owner can provide evidence of fitness for purpose, by way of a copy of a gas Certificate of Compliance.

Because of the Technical Regulator's auditing activity in this area, some insurance companies have become more aware of gas safety requirements and now insist that the gas installation is certified before marine or catering vehicle insurance policies will be issued or renewed.

Temporary kitchens at outside events

Temporary kitchens are set up to cater for outside public events and in most cases these kitchens operate on LP gas supplied from portable cylinders located nearby. They may be in trucks, trailers, caravans, marquees or even inside permanent structures such as community halls.

Every year, the Technical Regulator holds pre-event gas safety meetings including power point presentations with organisers of major events. This is done to ensure that the catering companies and

smaller itinerant operators on site are aware of gas safety requirements. Common issues that arise relate to installations assembled by the stallholder (e.g. using gas hose assemblies) rather than using a licensed gas fitter. Most appliances used at these events are portable burners or barbecue style appliances and it is not mandatory for a gas fitter to connect them.

The areas that are most closely monitored are the condition and protection of the appliances, gas cylinders, regulators and hoses and ensuring that there is sufficient provision for ventilation and clearance from combustibles especially where traders and the public are present. Figure G8 demonstrates an example of a temporary cooking setup found at an outside event. The operator was advised to secure and protect the flexible hoses connecting the portable appliances.



Figure G 8: Example of a damaged gas hose on a temporary cooking setup at an outside event

The Technical Regulator typically sends inspectors to patrol public event sites during the set up and then randomly during the event to ensure continuing compliance. The Technical Regulator works closely with inspectors from SafeWork SA and private event safety consultants to educate and improve the safe use of gas. Thus, gas related incidents at public events have declined over time and the safety standards demonstrated have improved significantly.

Figure G9 provides an example of a mobile catering food caravan trading in Adelaide's CBD. Here the portable power generators are installed too close to the gas cylinders and the operator was advised to have the generators relocated to provide the correct clearance from the LP gas cylinders.



Figure G 9: Example of non-compliant portable generators (Modifications have since been undertaken to the appliance installation to conform to the Standard)

Audits of permanent gas installations at tourist and caravan parks

The Technical Regulator also focuses on the safety of gas installations in caravans and tourist parks. Some of these parks are located close to major centres and use natural gas but most use LP gas for hot water and cooking as well as for on-site kitchen and laundry facilities.

In addition to communal facilities, the Technical Regulator inspects gas installations in permanently occupied caravans or cabins. Permanent residents pay rent to the park owner for the site but are responsible for their own utility bills as well as any repairs and maintenance to gas installations or appliances. Long term residents are sometimes in poor financial circumstances and gas installation and appliance maintenance may be neglected as a result.

The Technical Regulator may, in extenuating circumstances, extend the period allowed for the work to be made compliant provided there is no immediate danger to the resident or neighbours. In unavoidable circumstances, where remedial work cannot be delayed, the gas inspectors will either disconnect the gas supply or make an arrangement with the park owner/manager to have the work completed.

The example below shows a cooking facility that required the replacement of the LP gas regulator due to gas leaking and rectification of the high-pressure cylinder connection and prohibited jointing.



Figure G 10: Example of a communal cooking facility at a caravan park that required modification

Where a caravan is used as a permanent accommodation, it is unregistered and the wheels are usually removed and other structures may also be attached from the ground to the van. In this case the installation is treated as a residential dwelling and not a mobile home. The electricity, water and gas are permanently connected.

Flame Effect Burners used in Public Events or Productions

The Technical Regulator inspects flame effect burner systems and their associated controls manufactured/assembled by pyro technicians/gasfitters for use in public events such as the Fringe Festival, corporate events, or playwrights at the Festival Theatre.

Manufacturers and event organisers are made aware of their legal and technical responsibilities in relation to the *Gas Act 1997*, the *Plumbers, Gas Fitters & Electricians Act 1995* and Work Health and Safety (WHS) obligations. Event organisers, operators and flame effect designers/constructors must define the tasks, conditions and limitations of the performance or effect in their designs.

Safe Work Method Statements and Standard Operating Procedures must be formulated and risk assessed to eliminate/minimise risks of injury or damage to property. Participants must also be provided with appropriate training and Personal Protective Equipment and a hierarchy of controls need to be implemented to manage the risks in setting up, commissioning, operation and decommissioning. All relevant regulatory jurisdictions should be notified of the activity, i.e. MFS / CFS / SafeWork SA / Councils if permits are required.



Figure G 11: Examples of LP gas effect fires used at outdoor events

Enforcement activities for non-compliant gas installations

The Technical Regulator's enforcement activities with respect to non-compliant gas installation work are on a graduated scale which escalates according to the degree of non-compliance found during a proactive audit or as a result of an inspection prompted by a gas consumer complaint or safety report by the trade.

1. Minor technical non-compliance

A copy of the audit pro-forma is left with the owner and a warning letter together with a compliance statement is posted to the installation contractor with a request to remedy the situation. A follow up phone call is made to the owner to confirm that the non-compliance has been remedied once the compliance statement is returned by the contractor to the Technical Regulator.

2. Significant but non-hazardous non-compliance

A copy of the pro-forma accompanied by a warning letter and compliance statement is sent to the contractor. The letter, endorsed by the installation owner, asks the gas fitter return to the site within a given time frame, to remedy the non-compliances. The owner is notified that significant remedial work is required. A signed and dated compliance statement must then be sent back to the Technical Regulator by the contractor or owner to confirm that the remedial work has been completed. A follow up inspection may be done at the discretion of the Technical Regulator.

3. Non-compliance posing an immediate danger to persons or property

As above except to make such an installation safe the Technical Regulator's inspector may be required to isolate an appliance or part of the system or cut off the gas supply to the premises. After the defect has been remedied a signed and dated compliance statement must then be sent back to the Technical Regulator. A follow up inspection will definitely be carried out. An expiation notice may be issued for defective work. Expiation notices impose a fine of \$315 + \$60 victims of crime levy per breach for defective work. An expiation notice may include up to three breaches for any one gas installation job.

4. Prosecution

The Technical Regulator may prosecute a contractor where the non-compliance is so serious as to constitute gross negligence or where a contractor has a recalcitrant history of significant non-compliances.

The process is generally as above with the exception that no expiation is levied. The evidence, comprising of various interview/investigation notes, statements, photographs and measurements/observations/reports are gathered to the standards required to satisfy crown law requirements for legal action.

In some circumstances the original contractor cannot or will not return to the site to remedy the non-compliance/s due to licensing or commercial issues and sometimes the owner will not allow the contractor back on the site. In these situations, the owner must engage a third-party gasfitter to make the installation

compliant. A signed and dated compliance statement must then be sent back to the Technical Regulator and a follow up verification audit will be carried out.

5. Disciplinary interviews / desk top audits

Where repeated non-compliant gas installation work can be attributed to a specific worker or contractor, an interview is arranged. This has been found to be generally much more cost effective than prosecution. The interview is carried out with two authorised officers in attendance and is recorded after the person is first formally cautioned. The aim of the interview is to establish the following:

- To identify and emphasise the seriousness of the breaches.
- To ascertain whether the breaches occurred as a result of negligence or a lack of knowledge.
- If the person was working beyond the scope of their licence and personal competence.

Where a licensing issue is found, the contractor will be referred to CBS with a recommendation from the Technical Regulator that disciplinary action is considered to suspend or cancel the gas fitting worker's registration or contractor's licence.

Alternatively, or in addition, a recommendation may be made that the worker or contractor attends remedial upskill training to overcome knowledge/skill deficiencies.

Referrals to CBS

Where unlicensed work includes significant non-compliances with the Gas Installation Standards, the Technical Regulator prefers that a joint CBS and Technical Regulator interview be conducted. In addition to any penalty applied by the Technical Regulator, CBS can also apply various sanctions including licence suspension and, in extreme circumstances, licence cancellation.

If a person is found to be performing gas fitting work while unlicensed, CBS may, in extreme circumstances, prosecute or as a minimum seek a written assurance that the unlicensed person or entity desists from this work.

12.1.5. Gas incidents – Installations

Gas related incidents include natural gas or LP gas, or their products of combustion.

Figure G12 bellows shows the result of a gas BBQ fire resulting from gas leaking from the high pressure POL connection on the regulator/hose assembly. This happened due to operator error. The connection was not tightened in the cylinder valve correctly and was not tested with soapy water as per manufacturer operating instructions.

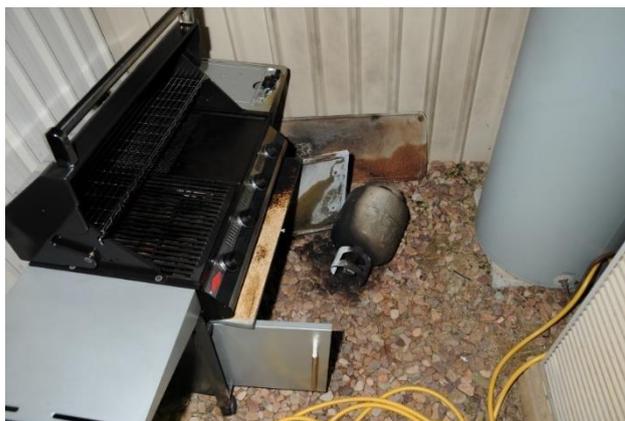


Figure G 12: Gas BBQ fire due to gas leaking from the high pressure POL connection



Figure G 13: House fire because of an incorrect DIY appliance installation (Pyrolysis, combustion of flammable material)

Figure G13 shows the result of a fire involving Pyrolysis, combustion of flammable timber Pine stud frames in an internal plasterboard wall because of a DIY installation where the single skin metal flue was located too close to the notched timber stud frame header in an internal plasterboard dividing wall. The fire commenced inside the wall and quickly spread up into the roof space causing approximately \$3400 damage.

Section 13: Gas Products

The *Energy Products (Safety and Efficiency) Act 2000* is administered by the Technical Regulator and requires certain proclaimed gas appliances to be tested, certified and labelled before they can be sold, installed and used in South Australia.

Other Australasian jurisdictions have similar legislation. The Technical Regulator works with other Australasian Regulators and Standards Committees to ensure a nationally consistent gas product safety regulatory regime.

13.1. Gas Appliance Certification

Gas appliances are classified as either Type A (generally mass produced, domestic and light commercial) or Type B (heavy commercial, industrial and often unique utilisation). There are currently five Conformity Assessment Bodies (CAB) that can certify Type A gas products in Australia. They are – the Australian Gas Association (AGA), Standards Australia International Global (SAIG) the International Association of Plumbing and Mechanical Officials R & T Oceana (IAPMO), Global Mark and Vipac Engineers & Scientists. Their commonly sighted certification labels are provided in Figure G14.



Figure G 14: Certification Label Examples

The Technical Regulator sits on the Gas Technical Regulators Committee (GTRC) and as such takes a pivotal role in their activities. The GTRC has introduced a national database for gas appliances certified by the approved CABs and is working towards a set of national Gas Scheme Rules and an associated Gas Compliance Mark.

13.2. Appliance and Component Recalls and Safety Notices

An approved CAB can suspend or cancel the certification of a gas appliance or component under certain circumstances. Typically, this would occur when:

- The manufacturer wishes to change to an alternate CAB.
- The manufacturer has ceased production of the appliance or component and product certification is surrendered voluntarily.
- The manufacturer has failed to pay ongoing fees or to provide the product to the respective CAB for annual verification inspections or label costs.
- The appliance manufacturer has been found to have modified the appliance, without notifying the respective CAB, so that it does not exactly replicate the appliance as originally certified.
- An appliance has been modified in a way that affects its safety or reliability. Where this happens, the Technical Regulators will call for a product recall or safety notice to be released.
- An appliance is found to be defective in service to a point where it is likely to create a hazard (this does not include normal wear and tear or the lack of maintenance by the operator). Where this happens, the Technical Regulator will expect a product recall or safety notice.

Note - certification may be reinstated if the manufacturer satisfactorily remedies the non-compliance.

13.3. Small Mobile LP Gas Appliances

Every year, the Technical Regulator conducts an auditing programme for appliance retail stores. This provides the Technical Regulator with an opportunity to check if the retailers are selling only approved, certified equipment and that their displays provide all the necessary safety information. In addition, it allows the Technical Regulator to check if these retailers have been notified of any product recall or suspensions and if (or whether) they act in accordance with the notice.

The audits are also an opportunity to educate the retailers to only accept certified goods for sale and to pass on the appropriate safety information to their consumers. It should be noted that any issues that were found during an audit were addressed immediately and the offending product(s) were removed from shop displays. If required, the stock shall be quarantined until the non-conformance had been rectified. This process was in general, well received by store managers.

How to check whether a gas appliance is certified or not?

If buying directly from a retail outlet, the retailer can be asked to show the data plate on the appliance. Examples of data plates are illustrated in Figure G15 and Figure G16. It contains two major indications of gas certification, the certification badge or label and the certificate number. However, if buying a gas appliance online, the certification information observed below can be verified by asking the provider.

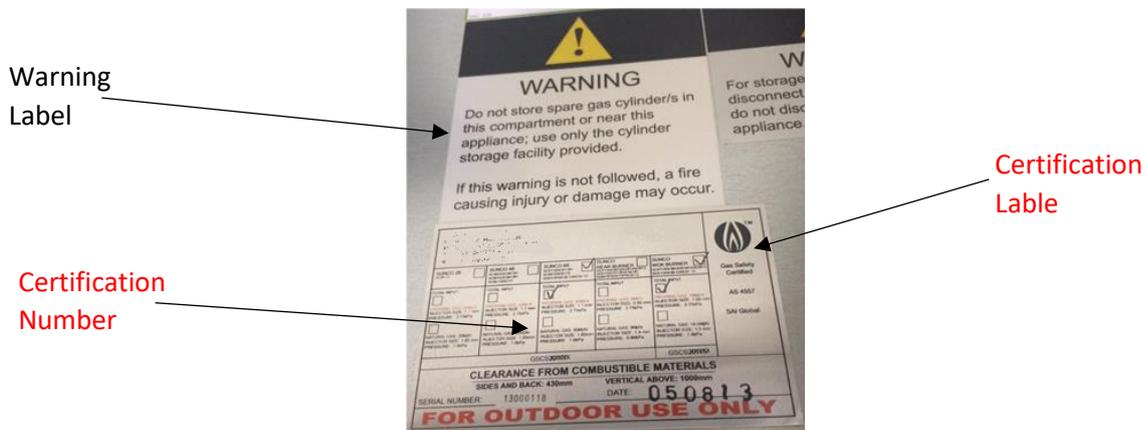


Figure G 15: Typical Appliance Markings: (Information Data Plate including certification number, warning and certification label)



Figure G 16: Information Data Plate including certification number and certification label

Section 14: Gas Regulatory Coordination

14.1. Safety and Technical Standards

The Technical Regulator is actively represented on the relevant Australian Standards committees and joint Australian and New Zealand Standards committees that deal with gas issues and plays an important role in developing and maintaining the Standards.

These technical Standards define the minimum requirements for the gas quality, design, installation, commissioning, operation, maintenance and decommissioning of gas infrastructure, installations and appliances and ensure that the gas distribution networks are being operated with a high level of safety and reliability. The Standards also address the quality of gas supplied.

14.2. Committee Representation

The Technical Regulator is represented on or has provided valuable technical comments to several Standards Australia committees as well as many other committees, forums and associations.

The Technical Regulator has been, and continues to be, directly involved in the development and promotion of a number of industry technical Standards. Several staff members represent the Technical Regulator on the key Standards committees generally on behalf of the GTRC. The resultant Standards are called up into legislation administered by the Technical Regulator. This provides the way forward in setting the minimum technical and safety requirements and a principle to ensure appropriate safety enforcement.

The Technical Regulator is represented on the following:

14.2.1. AG-006, Gas Installation Committee (AS/NZS 5601 & AS 4575)

This Standards committee is a gathering of industry subject matter experts representing industry stakeholders (i.e. technical regulators, appliance manufacturers, gas suppliers, utilities/network operators, installers, trainers) and industry bodies such as the Master Plumbers Association, the Plumbing Industry Commission and the Australian Building Construction Board (ABCB).

The Technical Regulator is able to communicate information to and from the industry stakeholders (e.g. the trade and GTRC) and Standards Australia to ensure that their views are represented in the development of the Standards.

AS/NZS 5601

The purpose of the committee is to maintain Part 1 Gas installation- general installations and Part 2 LP gas installations in caravans and boats for non-propulsive purposes. The activity in amending these documents is as a result of new innovations and changes to building and work practices, to advancements in materials and appliance technology.

AS 4575

The committee has been authorised to fully revise the aged Standard AS 4575 Quality of Gas Servicing. The revision is a result of new innovations, changes, work practices, advancements in materials and appliance technology. The scope of the Standard will be expanded to include worksite hazards, scoping work, appliance isolations, electrical safety, servicing protocols including fault diagnosis, testing, verification and commissioning in addition to records management and quality systems.

14.2.2. AG-001, Gas Appliances Committee

The purpose of the committee is to develop a new series of gas appliance Standards and to maintain the entire suite of gas appliance Standards that are within the committee's scope. These Standards cover the technical, safety and performance requirements of domestic and light commercial gas appliances, known as type A gas appliances.

The committee has been working on a new series of Standards known as the AS 5263 series of Standards with five new Standards having been published and five more to be published. These Standards are being developed in an attempt to avoid the need to provide a new Standard for every new gas appliance that comes out on the market. They concentrate on the fundamental safety principles of all gas appliances especially things like combustion and temperature hazard requirements and relate them across all gas appliances.

This approach has been adopted by New Zealand and now they are a joint AS/NZS 5263 series of Standards. The Technical Regulator has made a major contribution to this process and the changes that are being made in the gas appliance certification process in the future.

14.2.3. AG-008, Gas Distribution Committee (AS/NZS 4645)

The joint Australia and New Zealand Standards Gas Distribution Committee (AG-008) provides input in developing further revisions to some parts of the Australian/New Zealand Standard AS/NZS 4645 'Gas distribution networks' to ensure safe, reliable and affordable gas distribution systems. These parts are: Part 1: – 'Network Management', Part 2: – 'Steel Pipe Systems' and Part 3: – 'Plastic Pipe Systems'. AG-010, Natural Gas Quality Specifications Committee (AS 4564).

14.2.4. AG-038, Liquefied Petroleum Gas Quality Specifications Committee (AS 4670)

The function of AG-038, the LP Gas Quality Specification Committee, is to maintain AS 4670 Commercial propane and commercial butane for heating purposes. This sets out the gas quality requirements necessary to ensure the suitability of the liquefied petroleum gas for heating purposes.

14.2.5. AG-010, Natural Gas Quality Specifications Committee (AS 4564).

The function of AG-010, the Gas Quality Specification Committee, is to maintain the AS 4564 specification for general purpose natural gas. This specification sets out the gas quality requirements necessary to ensure the safety of general-purpose natural gas transported and supplied for use in natural gas appliances and equipment, and for use as fuel in natural gas vehicles.

14.2.6. Gas Technical Regulators Committee (GTRC)

All Australian jurisdictions as well as New Zealand are members of the Gas Technical Regulators Committee (GTRC). The GTRC held two meetings a year.

The Technical Regulator maintained close communications with interstate safety regulators through both the formal GTRC channels and informally with peers in those organisations to share technical knowledge, information on appliance safety issues, common interests and concerns. These relationships are vital to ensure that technical expertise is maintained in all areas covered by technical regulation.

Issues featuring highly included the pursuit of a set of "Rules" that can attempt to harmonise requirements across jurisdictions and provide consistency of information to CABs and other stakeholders. The Rules when recognised by a Technical Regulator will provide a set of requirements for the operation of a certification scheme when read in conjunction with each jurisdiction's legislation.

An ongoing example of an area of common concern and cooperation between interstate gas regulators is the issue of uncertified gas appliances offered for sale on internet auction sites. Regulators have continued to send out warning letters to the appliance retailers and the internet website agents to warn of this potentially misleading practice.

The GTRC is also monitoring the performance of a number of appliances that are considered to exhibit a higher risk of safety issues these include canister cookers and area heaters.

The GTRC has also been monitoring issues associated with carbon monoxide (CO) poisoning and the individual jurisdictional response to issues surrounding the risks associated with gas appliances and CO. It should be remembered that if gas does not burn correctly CO is produced. CO is a colourless, odourless and tasteless gas which is very poisonous and the human body doesn't recognise its presence. Given these properties it can kill and hence it is often known as 'the silent killer'.

The GTRC strategy of running a CO awareness campaign continues to be a major component of the Technical regulators safety awareness campaign. Information is contained on the "Be Energy Safe" website located at sa.gov.au/energysafe. The website emphasises the need for correct room ventilation and regular gas appliance maintenance as well as only using appliances for what they are designed to do (i.e. do not use appliances that are designed for outdoor, inside your home).

14.2.7. Other Committees, Forums and Representation

- **The Plumbing and Gas Fitting Advisory Forum.**
- **Standards Australia Gas Sector Advisory Forum:** The Technical Regulator has membership in this forum and is thus involved in the strategic direction for the development of all gas related Standards.
- **The Australian Institute of Energy:** The Technical Regulator has membership in this organisation to stay informed about activities being undertaken across the energy industry.
- **Gas Energy Australia:** The Technical Regulator has membership in this organisation to stay informed about development in the LP gas, compressed and liquefied natural gas industries.
- **River Murray Houseboat Hirer's Association:** The Technical Regulator liaises with the association and provides technical and safety information relating to LP gas installations on houseboats.
- **Plumbing Industry Technical Forum:** The Technical Regulator provides advice on legislation and Standards relating to natural gas and LP gas installation and appliance safety.
- **Caravan and Camping Association of South Australia (CCASA):** The Technical Regulator provides advice and technical assistance to ensure that gas installations and appliances comply with technical and safety Standards.
- **Domiciliary Care and Royal District Nursing Society (RDNS):** The Technical Regulator provides advice with respect to making installations and appliances safe where elderly, infirm or blind people are involved or where the householder may suffer from dementia.
- **National Gas Industry Training Package:** In 2015/16, the UEG06 Package (training package for workers employed by, or contracting to, gas distribution companies to work on their infrastructure) was again reviewed and further changes were proposed for endorsement as part of continual improvement.
- **Damage Avoidance Committee:** This committee was formed and facilitated by safework SA for Industry stakeholders / State and Federal Government interaction on water-gas-electrical and various communications utilities). The preliminary focus covers damage avoidance of infrastructure services, stakeholder representation to collaboratively formulate codes of practice and produce safety education material for industry. The OTR gas and electrical groups are represented on this committee.
- **SafeWork SA:** SafeWork SA is responsible (under the *Dangerous Substances Act 1979*) for the storage and handling of LP gas, where the quantity stored on site exceeds 560 litres. The Technical Regulator Gas Installation and Appliance section and SafeWork SA have excellent two-way feedback with respect to safety, installation and storage facilities.

SafeWork SA also works closely with the Technical Regulator when investigating workplace safety accidents where natural gas or LP gas are involved.

National Gas Emergency Response Advisory Committee (NGERAC)

Originally, The Ministerial Council on Energy (MCE) developed a National Gas Emergency Response Protocol. Since then the Council of Australian Governments ("COAG") has established the COAG Energy Council to provide national oversight and coordination of energy sector decision-making and the COAG energy market reform program. This replaces the MCE.

In Australia, a large proportion of the national gas supply network is interconnected across most State and Territory borders and the COAG Energy Council seeks to facilitate the development of a more reliable, secure and competitive national gas market. The COAG Energy Council has agreed that a National Gas Emergency Response Protocol ("the Protocol") should be retained to ensure natural gas supply disruptions are managed in a consistent manner across all jurisdictions.

The Protocol contains two main elements:

- Arrangements for inter-jurisdictional consultation on the use of statutory emergency powers in the event of a major natural gas supply shortage.
- Establishment of a government-industry National Gas Emergency Response Advisory Committee (NGERAC). The NGERAC usually meets twice each financial year.

During a major national gas supply shortage, in principle, NGERAC will be a key source of information and advice, but not necessarily the only source for energy Ministers and jurisdictions. The advice provided by the collective committee will seek to ensure efficient and effective responses to and management of major natural gas supply shortages (including the use of Emergency Powers). This advice is based on the need to be timely and to be consistent with maintaining the integrity of the gas supply system and public health and safety.

In the event of a major natural gas supply shortage however, market and commercial arrangements are to operate as far as possible to balance gas supply and demand as well as maintaining system integrity. NGERAC would be activated (time permitting) to assist in an event of a potential or actual multi-jurisdictional gas supply shortage or where a single impacted jurisdiction has requested that the NGERAC be convened for the purpose of sharing information.

Volume III – Water Industry

Preface

This volume covers the Technical Regulator's operations under the *Water Industry Act 2012*.

Water Industry Act 2012

Section 3 of the *Water Industry Act 2012* states that:

“The objects of this Act are—

- (a) to promote planning associated with the availability of water within the State to respond to demand within the community; and
- (b) to promote efficiency, competition and innovation in the water industry; and
- (c) to provide mechanisms for the transparent setting of prices within the water industry and to facilitate pricing structures that reflect the true value of services provided by participants in that industry; and
- (d) to provide for and enforce proper standards of reliability and quality in connection with the water industry, including in relation to technical standards for water and sewerage infrastructure and installations and plumbing; and
- (e) to protect the interests of consumers of water and sewerage services; and
- (f) to promote measures to ensure that water is managed wisely.”

The Technical Regulator is established by Section 8 of the *Water Industry Act 2012*.

Section 9 of the *Water Industry Act 2012* provides:

“The Technical Regulator has the following functions:

- (a) to develop technical standards in connection with the water industry;
- (b) to monitor and regulate technical standards with respect to—
 - (i) water and sewerage installations and associated equipment, products and materials (including on the customer's side of any connection point); and
 - (ii) plumbing;
- (c) to provide advice in relation to safety or technical standards—
 - (i) in the water industry to the Commission at the Commission's request; and
 - (ii) in the plumbing industry;
- (d) any other function assigned to the Technical Regulator under this or any other Act or conferred by regulation under this Act.”

The aim of the *Water Industry Act 2012* is “to facilitate planning in connection with water demand and supply; to regulate the water industry, including by providing for the establishment of a licensing regime and providing for the regulation of prices, customer service standards, technical standards for water and sewerage infrastructure and installations and plumbing, and by providing performance monitoring of the water industry; to provide for other measures relevant to the use and management of water; to make amendments to various related Acts; to repeal the *Sewerage Act 1929*, the *Water Conservation Act 1936* and the *Waterworks Act 1932*; and for other purposes”.

The Technical Regulator provides input and is involved in a range of activities in liaison with the water industry and other government agencies.

Section 15: Water and Sewerage Infrastructure

15.1. Introduction

Infrastructure is defined as the structures, systems and facilities that service the community, and water and sewerage infrastructure is the infrastructure into which the plumbing contractors connect on-site plumbing (including drinking water, non-drinking water (recycled water) and drainage installations).

Water and sewerage infrastructure includes but is not limited to:

- Drinking water distribution systems
- Drinking water treatment and storage facilities
- Sewage collection systems
- Sewage treatment and storage facilities
- Community wastewater management collection systems
- Wastewater treatment and storage facilities
- Non-drinking water distribution systems
- Non-drinking water treatment and storage facilities
- Non-drinking water harvesting and reuse systems

Water and sewerage infrastructure that provides a service to a customer is typically the responsibility of a water industry entity (such as SA Water, local Council or a private company). By comparison, on-site plumbing, drainage and associated equipment downstream of the meter or property connection is the responsibility of the property owner.

15.2. Water Industry Entities

A water industry entity is defined in the *Water Industry Act 2012* and designates any entity providing water and/or sewerage retail services in South Australia. There are three main categories of water industry entities: major, intermediate and minor, which are based on connection numbers (a full list of entities can also be found on the Commission's website).

There are currently 71 licensees in South Australia and a total of 67 Water Industry Entities (four water industry entities have two separate licences) across the three categories as presented in Table W1. There is a single major water industry entity in South Australia being SA Water.

Table W 1: Licences classifications

Classification	Number of connections	Number of Licensees in SA
Minor	Less or equal to 500	31
Intermediate	Between 500 and 50,000	39
Major	More than 50,000	1
Total for South Australia		71

SA Water provides drinking water and sewerage services to approximately 1.7 million people in SA. The remaining water industry entities are classified as intermediate and minor as per the above table and provide services across the whole of South Australia servicing metropolitan, outer metropolitan and regional townships, as presented in Table W2.

Table W 2: Water industry entities per region in South Australia

Region	Number of Water Industry Entities
Metropolitan	25
Northern Areas & Yorke Peninsula	15
Eyre Peninsula	12
South East	7
Riverland & Murraylands	8
Total for South Australia	67

The split between the services provided by the water industry entities is presented in Figure W1.

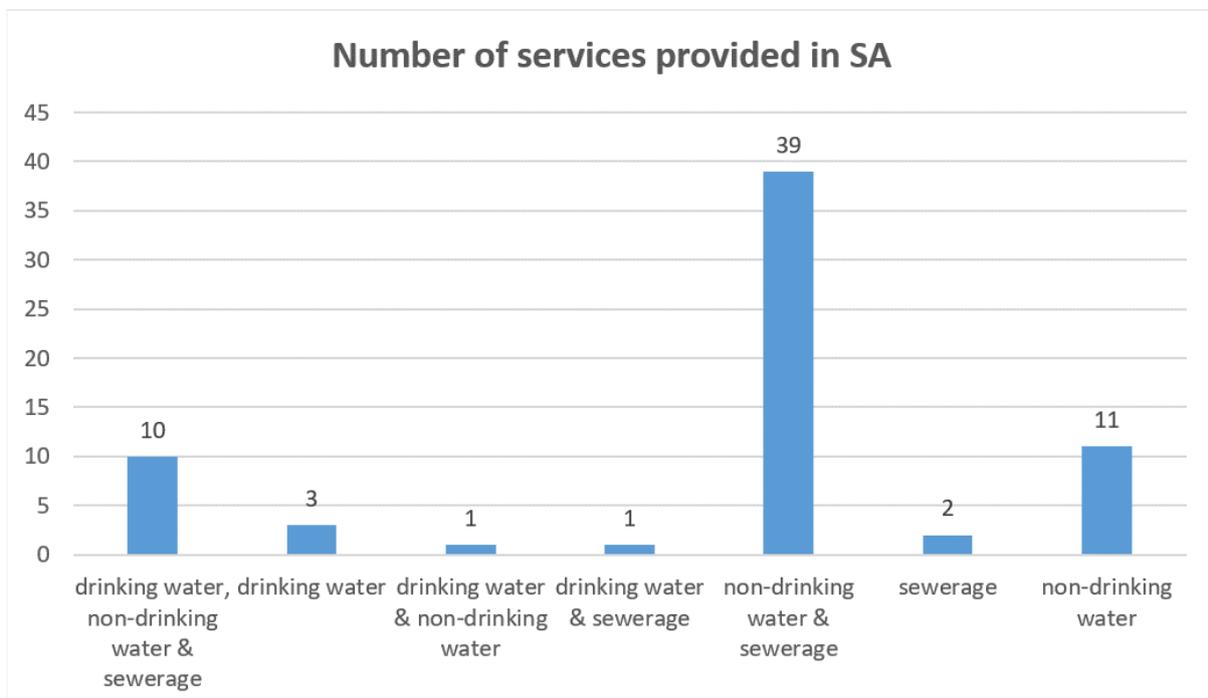


Figure W 1: Split between services provided by water industry entities in South Australia

Of the current 67 water industry entities in South Australia, most provide sewerage services (80% of all entities) via Community Wastewater Management Schemes (CWMS), formerly known as Septic Tank Effluent Disposal Schemes (STEDS). These schemes typically comprise a gravity drain collection network (connecting to customers' on-site septic tanks), which convey all of the septic tank effluents to a treatment system and disposal facility. CWMS are typically owned, operated and managed by local Councils as the water industry entity.

In addition to drinking and sewerage services, water industry entities can provide non-drinking water services which include the distribution of non-drinking water for irrigation and non-drinking water use, such as toilet flushing.

15.3. Regulation of Water Industry Entities

Water industry entities must provide their Safety, Reliability, Maintenance and Technical Management Plan (SRMTMP) to the Technical Regulator in accordance with the *Water Industry Act 2012* and *Water Industry Regulations 2012*.

The SRMTMP shall include the following matters, as a minimum:

- Safe design, installation, commissioning, operation, maintenance and decommissioning for water and/or sewerage infrastructure owned or operated by the water industry entity.
- Maintenance of water and/or sewerage services of the quality required to be maintained by or under the *Water Industry Act 2012*, the Water Industry Regulations 2012, Licence or other conditions.
- Monitoring compliance with safety and technical requirements imposed by or under the *Water Industry Act 2012*, the Regulations, Licence or the conditions of any exemption.
- Monitoring water and/or sewerage infrastructure owned or operated by the water industry entity that is considered unsafe or at risk of failing or malfunction.
- Establishment of indicators and the collection and recording of information to measure the water industry entity's performance.

SRMTMPs are 'live' documents and any changes and/or revisions are required to be approved by the Technical Regulator.

Following the submission and subsequent approval of a SRMTMP by the Technical Regulator, the water industry entity must complete audits as described in Sections 2.3.1 and 2.3.2.

SRMTMP Assistance

The OTR Guidance Document provides advice and assistance to water industry entities for the development of their SRMTMP that is acceptable to the Technical Regulator and deemed to comply with the *Water Industry Act 2012* and Water Industry Regulations 2012. In the absence of equivalent Standards pertaining to the water industry, the Guidance Document is structured in a manner that is consistent with Australian Standards for similar documents in the gas industry. The focus is placed on safe and reliable operation for people and plant to ensure a safe and reliable service to customers. In many cases, the water industry entity already has existing documentation which meets the minimum information required.

In addition to the Guidance Document, the Technical Regulator has supporting documents for water entities to better understand their obligations and technical requirements.

15.4. Water and Sewerage Infrastructure Incidents

15.4.1. Water and Sewerage Infrastructure Incident Classification and Notification Protocol

There is a Water and Sewerage Infrastructure Incident Notification and Communication Protocol, which provides water industry entities with a clear understanding of their notification and reporting requirements to the Technical Regulator. The Protocol is an overarching document, is applicable to all water and sewerage infrastructure, and provides incident classification and notifications requirements. The protocol does not absolve the entities from responsibilities to any other agencies, such as those that are included in the Department for Health and Wellbeing (DHW) / Environment Protection Authority (EPA) Water/Wastewater Incident Notification and Communication Protocol or other similar documents.

The Technical Regulator periodically updates the protocol to ensure that the information is current and accurately reflects all water and sewerage infrastructure incidents and regulatory requirements.

15.4.2. Other Incident Classification and Notification Protocol

The Technical Regulator is also included in the DHW and EPA Water/Wastewater Incident Notification and Communication Protocol as a notifiable agency. This Protocol is specific to SA Water, EPA and DHW and was first established in 1999. This protocol meets the *Safe Drinking Water Act 2011* requirements for an approved incident identification and notification protocol.

Section 16: Plumbing Installation

16.1. Plumbing Regulation

The *Water Industry Act 2012* and the *Water Industry Regulation 2012* provide the legislative framework for the regulation of the on-site plumbing industry in South Australia. The Technical Regulator monitors and regulates plumbing and associated equipment, under section 9 of the *Water Industry Act 2012*. On-site plumbing installations are audited for compliance with the Performance Requirements of the National Construction Code (NCC) Volume 3 – Plumbing Code of Australia (PCA).



Figure W 2: Plumbing categories that are monitored and regulated through on-site audits by the Office of the Technical Regulator

16.2. Plumbing Compliance

The Technical Regulator is responsible for monitoring and regulating technical Standards with respect to on-site plumbing. Licensed plumbing contractors must give due notice to the Technical Regulator where plumbing and equipment is installed on-site. Non-compliant plumbing installations identified through routine sample audits of plumbing installations or from feedback provided by industry and the general public are rectified to ensure technical compliance with the Plumbing Standard issued by the Technical Regulator under section 66 of the *Water Industry Act 2012*.

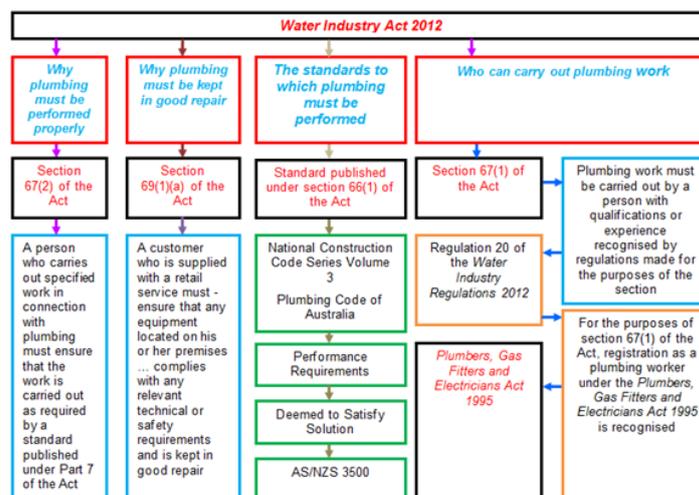


Figure W 3: Details of plumbing obligations under the *Water Industry Act 2012*

16.3. Plumbing Audits

16.3.1. Plumbing Bookings and Audits

The Technical Regulator audits plumbing installations in South Australia for compliance with the Plumbing Standard published pursuant to Section 66 of the *Water Industry Act 2012*. This Standard has adopted relevant sections of the PCA. All plumbing installations must meet the performance requirements of the PCA through the deemed-to-satisfy solutions of AS/NZS 3500 plumbing and drainage Standard or by a performance solution.

The plumbing installations audited can range from the addition of a toilet en-suite, a residential home, to more complex commercial installations within shopping centres or multi-storey high-rise apartments. Final audits are undertaken to monitor more complex multi-storey installations or in situations where ongoing non-compliance has been identified.

Auditing Policy

The Technical Regulator selects sites for auditing by:

- Scheduling a random selection of sites by relying on the integrity of the Plumbing case management system to identify all plumbing work being performed through the booking process.
- Focussing on a particular category of plumbing, based on the risk involved e.g. Maintaining a regular presence in the south-east region, where there are currently no local inspectors, by scheduling periodic visits from head office and maintaining a strong focus on non-drinking water installations and backflow protection.
- Responding to complaints from either the public or plumbing industry.
- Responding promptly to emergency situations.
- Failed jobs are monitored through a fortnightly review allowing the Technical Regulator to ensure all outstanding non-compliant installations are accordingly rectified.

Plumbing audits booking system

The Technical Regulator maintains a plumbing case management system to record information relating to on-site plumbing audits. This System records the plumbers audit request dates and the results of the audits carried out by the OTR plumbing installation officers.

Commercial and industrial plumbing inspections include:

- Above-Ground Sanitary
- Backflow Audits
- Drainage
- Encumbrance Investigations
- Final Inspections
- Fire Services
- Hot & Cold Installation
- Hot Water
- Rainwater Inspection
- Non-Drinking Water In-Ground
- Non-Drinking Water In-Wall
- Non-Drinking Water – Investigations

Residential plumbing inspections include:

- Above ground sanitary
- Building plans
- Drainage
- Final inspections
- Fire services
- Hot & Cold water
- Recycled water in-wall
- Hot & Cold Installation
- Hot Water
- Rainwater Inspection
- Non-Drinking Water In-Ground
- Non-Drinking Water In-Wall

- Sewer Investigations
- Site Meetings/Inspections
- Trade Waste Plumbing
- Underfloor Plumbing
- Water Inspections/Investigations
- Non-Drinking Water – Investigations
- Sewer Investigations
- Site Meetings/Inspections
- Trade Waste Plumbing
- Underfloor Plumbing

16.3.2. Policy for Acting on Non-Compliance

In each case of non-compliance, the seriousness of the offence is assessed by:

- Assessing the technical compliance of the plumbing work presented with the plumbing installation performance requirements set out under the Plumbing Code of Australia.
- Determining the technical and safety aspects of the non-compliant plumbing work for both the customer concerned and the general public.
- Identifying what actions are required to address the cause and correct the condition.

Once the seriousness of the breach is determined, the Technical Regulator acts on the non-compliance according to the severity of the breach by taking escalating measures such as:

- Education
- Warning
- Notice to rectify in the form of enforcement notices
- Enforcement Notice against the affected property
- Expiation of the Plumbing Contractor
- Prosecution for the most serious offences

16.3.3. Inter-Agency Referrals to Consumer and Business Services

The Technical Regulator provides CBS with information of serious breaches of the *Water Industry Act 2012* related to on-site plumbing work undertaken by specific plumbers. The Technical Regulator additionally advises CBS where a plumber is operating outside of the scope of their trade license.

16.3.4. Fees for Reinspection

The Technical Regulator introduced a reinspection fee to be charged to plumbing contractors who must rectify and re-submit plumbing installations for further auditing.

Commensurate with the reasonable costs associated with on-site reinspection of non-compliant plumbing, a service fee can be charged in accordance with regulation 35(1)(a) of the *Water Industry Regulations 2012*:

If-

- (a) a person's acts or omissions require the Technical Regulator (or a person acting on behalf of the Technical Regulator) to undertake a reinspection of any work, or to re-attend at any place for any other reason, in connection with the operation or requirements of a standard under Part 7 of the Act,

the person is liable to pay a fee of an amount equal to the reasonable costs of the reinspection or reattendance (as the case may be).

Fees are payable via cheque, money order, credit card or B-Pay and the plumbing work must not be covered over until the reinspection has occurred and the work is compliant.

16.3.5. Expiations

Regulation 41 of the *Water Industry Regulations 2012* provides for the expiation of breaches against the *Water Industry Act 2012*, allowing the Technical Regulator to enforce compliance of plumbing work.

While the decision to expiate is not taken lightly, it is used on occasions where the technical and safety aspects of an on-site plumbing and equipment installation place the customer or the integrity of the property at risk.

Non-drinking water installations have the potential to compromise public health through contamination of the drinking water network supply.

While every effort is made to work with the plumbing industry to assist plumbers in complying with the Plumbing Standard, it is ultimately up to the certifying plumber to ensure that their work is compliant.

16.3.6. Hydraulic design submissions

In addition to plumbing audits, hydraulic designs of sanitary plumbing and drainage installations are required by the Technical Regulator for commercial and more complex residential plumbing installations. Hydraulic designs are required by the Technical Regulator when auditing on-site plumbing installations and for desktop referencing of plumbing installations should information or advice be required by industry.

The Technical Regulator requires plumbers to submit hydraulic designs submissions for the following types of developments:

- Commercial and industrial developments, including extensions.
- Multi-storey developments of three or more floor levels.
- Building developments within the Adelaide CBD.
- Housing developments of three or more dwellings.
- Any building that includes an alternative performance based plumbing design.
- Non-drinking water irrigation installations for recreational and commercial/industrial sites, and residential sites.

The lodgement of hydraulic designs and the subsequent booking of inspections by the plumbing contractor is an important part of monitoring and regulating on-site plumbing. The hydraulic design submission process encourages compliant and safe plumbing work particularly in major developments across the State. Smart hydraulic design, in accordance with the National Construction Code Volume 3, ensures durability, ongoing quality and economic value for commercial developments within the Adelaide CBD and across the State of South Australia. Design plans can additionally identify the use of compliant products and materials on the customer's side of an installation.



Figure W 4: Examples of Drainage Plumbing Installations for Residential Developments

16.3.7. Metropolitan Areas

Most plumbing bookings of on-site sanitary underfloor and drainage inspections are undertaken in the Metropolitan areas and include sanitary underfloor and drainage inspections, related to residential and commercial developments.



Figure W 5: Installations auditor at the University of South Australia

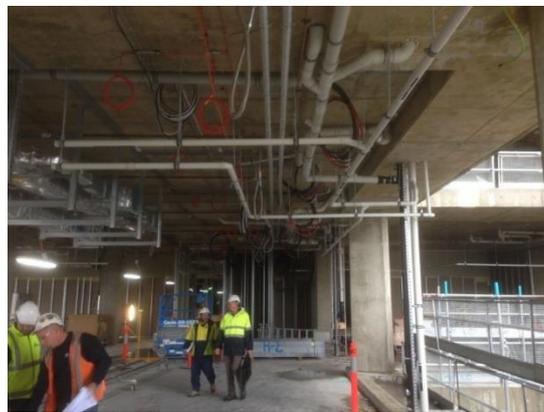


Figure W 6: Technical Regulator audit of the New Royal Adelaide Hospital (NRAH)

16.3.8. Regional Areas

The Technical Regulator has maintained the OTR's regulatory presence in regional areas through programmed audits of on-site plumbing. The Technical Regulator has one full time Regional Plumbing Installations Inspector based in Port Pirie. This inspector conducts audits of plumbing installations north of Adelaide including the Mid North and Eyre Peninsula regions.

Regional areas including the Barossa, Murray lands and the South-Eastern areas of the State are monitored by Adelaide based plumbing installations inspectors. This requires targeted regional visits to Kangaroo Island, Mount Gambier, Port Lincoln and the Yorke Peninsula.

The Technical Regulator is dedicated to ensuring the integrity of the State's drinking water supply and continues to highlight non-compliance issues and provide standard updates to the Department for Health and Ageing and those local Councils responsible for auditing on-site wastewater systems where the plumbing and equipment are not connected to SA Water's sewerage/water infrastructure.

16.4. Non-Drinking Water (Recycled Water)

Non-drinking water is water that has been generated from sewage, greywater or stormwater systems and treated to a standard that is appropriate for its intended use. In South Australia, recycled water is typically provided by a water industry entity through a reticulated water network system to dedicated properties for use. Most properties supplied with recycled water have a dual supply consisting of a drinking water supply for personal hygiene use and a non-drinking water supply (recycled water) for gardens and non-personal hygiene use.

In South Australia, the number of non-drinking water sources has increased with many residential developments (i.e. subdivision) adopting dual water reticulation services to properties. Consequently, this has dramatically raised the risk to the technical and safety integrity of on-site plumbing and non-drinking water infrastructure systems. Ensuring a safe drinking water network is paramount to the health of the community which is why non-drinking water systems require appropriate management systems to be in place to prevent cross-connection of drinking and non-drinking water supplies.

Water industry entities, consultants, landscapers, irrigators, plumbers and property owners involved with non-drinking water systems are to comply with requirements as set out in the *Water Industry Act 2012* and associated legislation. The Technical Regulator conducts numerous training and education sessions with the industry to raise awareness of their responsibility to ensure non-drinking water system installations are compliant.

Figure W7 shows most of the metropolitan areas supplied with non-drinking water in South Australia.



Figure W 7: Areas of metropolitan Adelaide with non-drinking water

Systems can vary in complexity and it is imperative that the industry is made aware of their obligation to ensure the integrity of both the water infrastructure and on-site plumbing systems. The requirement to upskill plumbers in this particular area has become evident through the number of non-compliant non-drinking water installations audited by the Technical Regulator.

All non-drinking water infrastructure and plumbing installations require appropriate warning and prohibition signage indicating that the non-drinking water is not suitable (fit) for human consumption in accordance with AS 1319 as shown in Figure W8.



Figure W 8: example of non-drinking water signage

The Technical Regulator requires the submission of a detailed plan for all sites with multiple water supplies. These must include information showing appropriate backflow prevention devices and accurate hydraulic designs showing there are no cross-connections between the drinking and non-drinking water services.

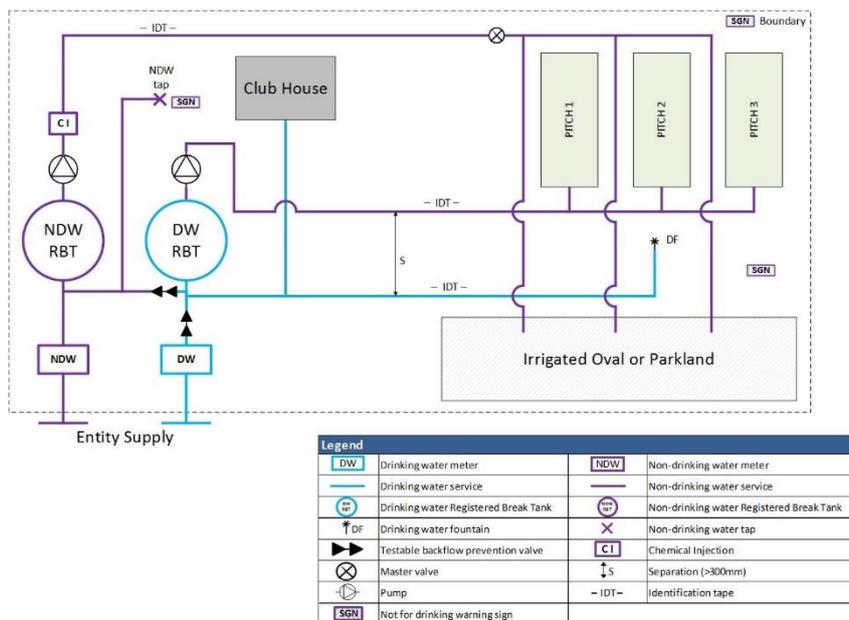


Figure W 9: Typical irrigation installation with Registered Break Tanks installed on both water systems

Figure W10 demonstrates a typical drinking water/non-drinking water installation on a community title development with appropriate signage and physical separation of services.



Figure W 10: Drinking and non-drinking water meters



Figure W 11: Plumbing installation showing in-wall non-drinking and drinking water pipework

16.5. Fire Fighting Water Services

16.5.1. Compliance of fire hydrant water services

The Technical Regulator regulates in-ground fire water service installations. Fire hydrant water services must comply with the PCA and referenced Standards AS/NZS 3500.1 - Water Services and AS 2419.1 - Fire hydrant installations - System design, installation and commissioning.

The current Standard requirements mandate that a booster assembly is constructed with WaterMarked products i.e. isolating and backflow prevention valves. There is also a requirement that all materials upstream (inlet side) of the backflow prevention valve be suitable for contact with drinking water. This requirement is covered by AS/NZS 4020 -Testing of products for use in contact with drinking water. Where existing fire services are replaced or upgraded they must meet current regulatory requirements.

The Technical Regulator has audited many sites where major additions and alterations have required fire hydrant water service extensions and in-turn an upgrade to the inlet/booster connections. These audits along with advice from the Technical Regulator have resulted in a higher level of compliance in this area. The Audits are to ensure the correct pipework including the backflow prevention device is installed and the system is hydrostatically tested at 1700Kpa for a period of two hours.

Following the audit the contractor must submit a plan of the work carried out along with a Certificate of Compliance to the OTR. This information is then forwarded to the Metropolitan Fire Service who then conduct a flow test of the system.



W 12: Fire Service Installation with Backflow Prevention Device

16.5.2. Example of a variation to a fire hydrant booster

Fire hydrant booster assemblies can vary depending on the requirements for a particular site. The Technical Regulator conducts sample audits of these installations to ensure they comply with the appropriate Standards. An example of a combined fire and sprinkler service connected within the booster assembly installed with compliant valves is shown in Figure W13.



Figure W 13: Variation to a standard fire hydrant booster service

There are several aspects of this combined fire booster which have been designed to comply with the performance requirements of the NCC. The installation includes a WaterMarked testable backflow prevention device on the inlet or upstream side of the connection to the Water Entities supply. The feed hydrant riser is constructed of copper which is compliant with AS/NZS 4020 the Standard for “Materials in contact with drinking water”.

All valves in the combined booster assembly are required to be WaterMarked, including the backflow prevention full flow, non-return and isolating valves.

16.6. Cross-connection Control and Backflow Prevention

The role of the Technical Regulator is to ensure drinking water and non-drinking water service installations meet the performance requirements of the National Construction Code Volume Three. The Technical Regulator’s Cross-Connection Backflow Prevention Program is the primary method of ensuring that testable backflow prevention devices are installed to protect the integrity of the drinking water supply.

The National Construction Code Volume 3 specifies the performance requirements for drinking and non-drinking water systems. AS/NZS 3500.1 is the deemed-to-satisfy provisions for ensuring the performance requirements are achieved.

AS/NZS 3500.1 defines a cross-connection as any connection or arrangement, physical or otherwise, between any drinking water supply either directly or indirectly connected to a water main, and any fixture, storage tank, receptacle, equipment or device through which it may be possible for any non-drinking water used, unclean, polluted or contaminated water, or any other substance, to enter any part of a drinking water supply.

For example, a cross-connection in a residential house can be described as a connection between a household drinking water supply and a contaminated source such as an unprotected irrigation system where pesticides or fertilizers can enter the drinking water system or the installation of douche toilet seats without appropriate backflow prevention devices being installed.



Figure W 14: Douche seat Installation with compliant backflow prevention

The Technical Regulator maintains a register of over 30,000 backflow prevention devices installed on drinking water services throughout South Australia. Each device is registered on the system when it is installed and a reminder letter is sent to the property owner each year to have the device retested to ensure the device is functioning correctly. Audits of backflow prevention devices are undertaken to ensure they are installed in accordance with the National Construction Code Volume Three and associated Standards.

Use of non-drinking water for irrigation purposes

The use of non-drinking water for irrigation of municipal parks and gardens, sports fields and school ovals has significantly increased over the last few years. The primary reason for the increased uptake of non-drinking water for such usage is sustainability and the efficient use of an alternative, cost-effective product. The availability and uptake of non-drinking water for irrigation has led to increased regulatory involvement of the Technical Regulator to ensure the ongoing safety in both plumbing and broad-scale irrigation systems.

The Technical Regulator has established technical sample monitoring to ensure that inter-connections between drinking and non-drinking water supplies are installed with appropriate backflow prevention devices. This requirement has been articulated through communication sessions with industry (see Section 16). Ongoing communication has focused on engaging directly with industry stakeholders to ensure compliance measures are adhered to.

16.7. Property Interest Reporting and Data Management

16.7.1. Property interest reporting

The Technical Regulator is required to disclose required information on the sale or change of ownership of a property under Section 12 of the *Land and Business (Sale and Conveyancing) Act 1994*, Regulation 16 of the *Land and Business (Sale and Conveyancing) Regulations 2010* and Regulation 12 of the *Regulations*. The Technical Regulator provides interested persons with information relating to encumbrances registered against a particular property. These encumbrances are comprised mostly of Backflow Prevention Devices (which require annual maintenance) and general non-compliant plumbing work.

The Technical Regulator receives daily correspondence from the Land Services Group (LSG) relating to the sale, potential sale or change of ownership of a property. The Technical Regulator is required to respond to the interested party within seven days.

16.7.2. Enforcement and Encumbrance Notices

The Technical Regulator places a notice on a property where plumbing audit results confirm a serious technical or safety issue associated with the on-site plumbing or where a backflow prevention device has been installed in connection with a drinking water service. Encumbrances held by the Technical Regulator

relate to backflow prevention devices. The remaining enforcement notices relate to non-compliant plumbing and drains crossing boundaries. These notices are registered on the South Australian Integrated Land Information System (SAILIS) which is operated by the Department of Planning, Transport and Infrastructure. A notice will remain on a property until the plumbing work is made compliant or the Backflow Prevention Device is no longer required.

16.7.3. Self-management of testable backflow prevention devices

The Technical Regulator has implemented a policy for the management of testable backflow prevention devices located on State Government and local Council properties. The policy allows State Government and local Councils to manage the testing and maintenance of their own backflow prevention devices. This change accords with the State Governments Red Tape Reduction Initiative.

Following consultation with several local Councils, the Technical Regulator saw an opportunity for customers to reduce administrative costs and produce a maintenance schedule suitable to their specific needs. Most Government departments and local Councils already maintain appropriate databases which made resubmitting details to the Technical Regulator repetitive and time consuming. The objective of the policy was to simplify administrative requirements for Government Agencies, local Councils and the Technical Regulator through a reduction of reporting requirements associated with testable backflow prevention devices maintenance. The Technical Regulator has approached relevant customers individually and worked collaboratively with them to promote self-management of their Backflow Prevention Device test records. Instead of sending all test records to the Technical Regulator at the time of testing, Government Agencies and local Councils will manage their own backflow devices. The Technical Regulator will conduct desktop and site audits at pre-determined intervals throughout the year to ensure compliance.

The response from customers has been overwhelmingly positive. One local Council wrote to the Technical Regulator stating that the 'benefits for Council are quite significant' and was appreciative of the Technical Regulator in recognising them as a suitable candidate for the introduction of the self-management project. One of the key requirements of implementing the Self-Management system is that the government department or local Council has no backflow devices that are delinquent or overdue for retest. The strong desire to self-manage is encouraging customers to keep all devices appropriately maintained. The Technical Regulator will continue to work with State and Local government to explore more opportunities for the self-management of testable backflow prevention devices.

BACKFLOW MANAGEMENT TEMPLATE											
Date Commissioned	Date re-tested	Date removed	Device Type	Device Serial Number	Bar Code Number	Device Name	Device Model	Device Size	Protection Type Level	Device location or GPS Co-ordinates	
3/06/16			DCV	851585		ValvCheQ	DC03	25	ZONE	ADJ WATER METER NORTH END OF RESERVE	
	8/06/16		DCV	515871		WILKINS	350	80	CONTAINMENT	LEFT SIDE OF MAIN GATE AT WATER METER	
	8/06/16		DCV	548625		WILKINS	990	40	INDIVIDUAL	IN FRONT OF HYDRANT RHS OF OFFICE CAR PARK	
	9/06/16		DCV	958742		WILKINS	350	80	CONTAINMENT	RIGHT SIDE OF ENTRANCE GATES ON METER	
		13/06/16	RPZ	364255		TYCO	RP03	50	ZONE	ADJACENT WATER TANK & WORKSHOP	
	21/06/16		RPZ	995682		FEBCO	RPZ	50	CONTAINMENT	EAST WING SLUICE ROOM	
	21/06/16		DCV	554865		TYCO	DC03	50	Containment	OPPOSITE SHED NEAR WATER METER	
	21/06/16		DCV	215468		FEBCO	850L	50	Zone	SOUTH EAST CORNER NEAR WATER TANK	

Figure W 15: Example of a section of a backflow management template

Section 17: Consumer Safety Awareness

17.1. Plumbing advisory notes

The Technical Regulator produces advisory notes to help people working in the plumbing industry interpret the requirements for on-site plumbing installations. Those notes are available on the website and refer to specific issues such as hydraulic submission applications, bath waste connections, legionella risk management, etc.

17.2. Training Sessions for Water and Plumbing Industries

Regular training, consultation and information sessions are conducted with the water and plumbing industries.



Figure W 16: Training session conducted by the OTR plumbing section at Tonsley TAFE.

The Technical Regulator uses these training sessions as an opportunity to discuss and clarify changes to regulatory Standards and practices. Examples of training session topics include:

- Updates on changes to National Construction Code Volume 3 – Plumbing Code of Australia (PCA).
- Updates to the AS/NZS 3500 Plumbing and drainage Standard series which include Water Services, Sanitary Plumbing & Drainage, and Heated Water Services.
- Release of Guidelines for Non-drinking Water in South Australia.
- Technical issues such as sanitary drainage, non-Drinking Water installations, Legionella Control, Fire Service installations, Backflow Prevention for irrigation systems and WaterMark compliance.

The Technical Regulator has strong relationships with the following groups and is regularly engaged to conduct or attend information sessions:

- Plumbing Industry Reference group (TAFE SA)
- Master Builders Association Technical Committee
- Aust. Hydraulic Association SA Chapter
- Master Plumbers Association of SA Inc.
- Peer Training Reference Group
- Training Prospects Reference Group
- Backflow Prevention Association of Australia
- Water Industry Technical Advisory Committee
- Country Fire Service (CFS)
- Building Consultants Forum
- Water Industry Alliance (WIA) – MARHub and WarDA
- Department of Health and Ageing
- Backflow Prevention Association of Aust.
- Planning SA
- The Commission
- Australian Building Codes Board
- Local Government Association of SA
- Regional Local Government Groups
- Fire Industry Association (FIA)
- Australian Water Association (AWA)
- Metropolitan Fire Service (MFS)
- Wastewater Special Industry Group (Environmental Health Officers)

Master Plumbers Association of South Australia Inc. (MPA)

The Technical Regulator consults with the MPA on a regular basis and has utilised their forum to improve plumbing regulation including conducting presentations at their regional and local Roadshows. The Technical Regulator has also collaborated with the MPA to actively address regulatory issues, licensing matters, the new Electronic Certificate of Compliance project and continuing professional development. The Technical Regulator provides regular articles for the MPA's Plumbing SA newsletter and is represented on the MPA selection panel for the Plumbing Gold Medal Award which is presented annually to the Apprentice of the Year.

Hydraulic Consultants Association Australasia (HCAA) (South Australia)

The Technical Regulator actively engages with members of the HCAA and seeks their input into proposed amendments to the Plumbing Code of Australia and associated Standards. Attendance at meetings provides the Technical Regulator with the opportunity to clarify issues as they are presented. The Technical Regulator has conducted presentations on non-drinking water and fire service installations.

Wastewater Special Industry Group (Environmental Health Officer)

The Wastewater Special Industry Group comprises predominately of Environmental Health Officers (EHO's) and SA Health Officers who monitor on-site wastewater treatment systems. The Technical Regulator provides updates on the National Construction Code Volume 3 and associated Standards. Presentations have been made on the Electronic Certificate of Compliance project and the as-constructed drainage plan project. The Technical Regulator engages with EHO's in regional areas and provides training on regulatory and on-site plumbing requirements. Training has been provided for EHO's in the South East Region, York Peninsula and Kangaroo Island.

The Plumbing Industry Reference Group (PIRAG)

PIRAG is an Industry Reference Group formulated within TAFE SA. PIRAG members represent various sectors of the plumbing industry including the Technical Regulator, MPA, Plumbing Contractors, the Construction Industry Training Board, manufactures and apprentice providers.

The committee meets quarterly to discuss matters that affect the training of apprentices which includes discussion on the following topics:

E-Learning	Reporting on the training package
Licensing matters	Quality and Industry Validation
Training and information sessions conducted to staff and students by the Technical Regulator	Training Gaps OHS&W
Continual professional development	Business Development

Building industry technical advisory committees

The Technical Regulator has involvement with the Master Builders Association (MBA) and the Housing Industry Association (HIA) technical committees. The Technical Regulator is represented on these technical committees for the purpose of keeping them informed of changes to plumbing regulation in South Australia.

SA Water Industry Regulators

The Technical Regulator has operational agreements and Memoranda of Understanding (MOUs) with key intra-government water regulatory agencies. These agreements and MOUs are intended to promote a streamlined regulatory process for the water industry by working with other government agencies to optimise each agency's regulatory input. Furthermore, the Technical Regulator has been fundamental in the development of an intra-government water regulatory consortium, where agencies are able to share key information about their current operations and any impacts of the water industry and/or other agencies. The water agencies involved in this consortium are:

- Office of the Technical Regulator
- Department for Environment and Water
- Essential Services Commission of South Australia (the Commission)
- Department for Health and Wellbeing
- Environment Protection Authority (EPA)

Section 18: Water and Plumbing Regulatory Coordination

18.1. Technical Standards

The Technical Regulator provides expert that has the power to publish Standards relating to infrastructure or equipment that is used, or is capable of being used, in the water industry under sections 66 of the *Water Industry Act 2012*.

18.1.1. Water and Sewerage Infrastructure Technical Standards

The Technical Regulator has published an Infrastructure Standard which adopts the Water Services Association of Australia (WSAA) codes as the principle minimum Standard for water and sewerage infrastructure

Water Services Association of Australia (WSAA)

The Water Services Association of Australia (WSAA) has developed National Codes (WSAA Codes) for the urban water industry detailing performance requirements for design, installation, inspection, alteration, repair, maintenance, removal, disconnection or decommissioning of water and sewerage infrastructure. The WSAA Codes have been widely adopted by water utilities across Australia and the water industry. The WSAA Codes allow for water industry entities to make appropriate modifications (where necessary) to accommodate their needs and preference as well as local construction practices and products.

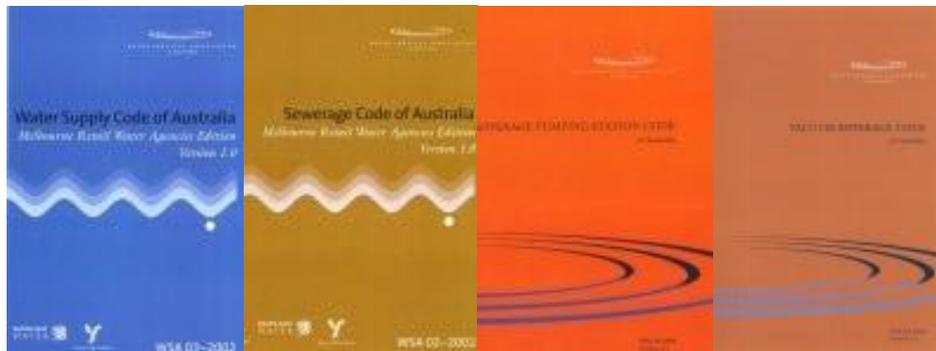


Figure W 17: Water Services Association of Australia (WSAA) National Codes

The Department for Health and Wellbeing, Local Government Association and Environment Protection Authority also have technical Standards, codes and guidelines for the water industry, in particular related to the design and installation of CWMS.

The Technical Regulator has identified the WSAA Codes, and any technical Standard, code or guideline stated in legislation as suitable Standards for the South Australian water industry. These codes, Standards and guidelines are referenced during the review and approval of water industry entities' SRMTMPs, and for the provision of advice in relation to safety or technical matters to the water industry.

If an alternative Standard is proposed, it is necessary for the water industry entity to identify all potential risks and develop associated mitigation measures and approaches to reduce or eliminate the relevant risks. Following the receipt of this information, the Technical Regulator will then determine whether the alternative approach adequately meets the required performance outcome.

18.1.2. Plumbing Technical Standards

The Technical Regulator has published a Plumbing Standard under section 66 of the *Water Industry Act 2012* that provides the basis for calling up the relevant sections of the National Construction Code (NCC) Volume 3 – Plumbing Code of Australia (PCA) (see Appendix 9).

National Construction Code (NCC)

The NCC is an initiative of the Council of Australian Governments (COAG) developed to incorporate all on-site construction requirements into a single code.

The NCC is model regulation developed by the Australian Building Codes Board (ABCB) and takes effect through legislation of the states and territories which administer and enforce building and plumbing regulation.

Building regulation is covered in Volumes 1 and 2 – the Building Code of Australia (BCA). Volume 3 covers plumbing regulation – the Plumbing Code of Australia (PCA).

Australian Building Codes Board and Plumbing Code Committee

The Plumbing Code Committee (PCC) is the ABCB’s peak plumbing technical advisory body. The PCC is a valuable national forum through which regulatory authorities and industry consider technical matters relevant to plumbing regulatory reform and plays an active role in assisting the Board in meeting its obligations under the COAG Guidelines and the Inter-Government Agreement.

The PCC operates in alignment with the ABCB’s Building Codes Committee (BCC) to ensure a coordinated approach to building and plumbing regulatory reform. The Technical Regulator regularly provides agenda items for discussion at PCC meetings. Issues including sanitary drainage, non-drinking water, fire service installations and water services have been presented to the committee with recommendations for amendments to the Plumbing Standards.

The NCC Series is drafted in a performance format allowing a choice of Deemed-to-Satisfy Solutions or the flexibility to develop Performance Solutions (refer to Figure W18).

One of the essential elements for introducing a performance mind-set is to re-educate the plumbing industry on the methods of achieving compliance by analysing the Performance Requirements against the standard Deemed-to-Satisfy Solutions and the Performance Requirements in the PCA.

The ABCB is undertaking a project to quantify plumbing and drainage performance. The information gathered from this project will allow the ABCB to develop existing performance requirements set out in the PCA into simpler, more measurable expression. The resulting performance requirements will be included in the next PCA edition due to be published in 2019.

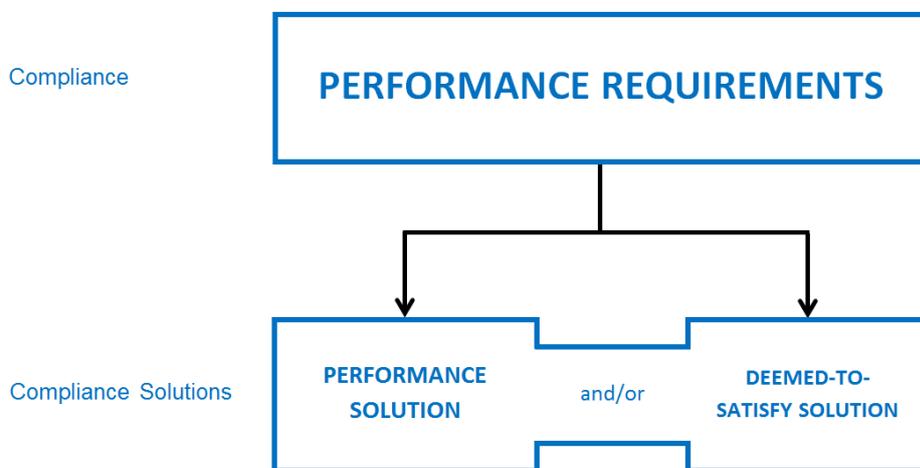


Figure W 18: NCC Compliance Structure

WaterMark Certification Scheme

The WaterMark Certification Scheme is a mandatory certification scheme for plumbing and drainage products to ensure that plumbing and drainage materials and products are fit for purpose and appropriately authorised for use in plumbing installations. The WaterMark Scheme is administered by the ABCB; the PCC, as the primary plumbing technical advisory committee, is regularly engaged to comment on changes to the Scheme.

The ABCB released a new improved WaterMark Scheme on 1 July 2016. The new WaterMark Scheme Product Database has also been published on the ABCB’s website. This database is based on a single material and product certification level (where previously there were 2 levels of certification).

The aim of the revised Scheme and data base is to streamline requirements, processes and enforcement creating a reliable, consistent and level playing field for scheme participants and mitigating risks to the ABCB. This enables the scheme to deliver plumbing and drainage products that are safe and fit for their intended use in and around buildings in an environment that is increasingly challenged by reduced resources for enforcement, increased product non-conformity and an ever-expanding global market.

AS/NZS 3500 Plumbing and Drainage Standard

Standards Australia has recently updated the following sections of the AS/NZS 3500 Plumbing and drainage Standard:

Revision of AS/NZS 3500 series:

Part 1	Water services	(version published 28 th May 2021)
Part 2	Sanitary plumbing and drainage	(version published 28 th May 2021)
Part 4	Heated water services	(version published 28 th May 2021)
Part 5	Housing installations	(Part 5 has been discontinued)

The AS/NZS 3500 Plumbing and Drainage Standard Series is prepared by Standards Australia to provide plumbers with Deemed-to-Satisfy Solutions to comply with the Performance Requirements of the PCA. The WS-014 Committee assists Standards Australia in the administration of the AS/NZS 3500 Series. This committee includes representatives from industry and state and territory plumbing regulatory administrations.

18.1.3. OTR Guidelines

Non-Drinking Water Guidelines

The Technical Regulator released non-drinking water guidelines namely, Guidelines for Non-drinking Water in South Australia. The guidelines were developed for the water and plumbing industries and are applicable to all non-drinking water installations in South Australia.

The guidelines are presented in three parts and outline requirements and responsibilities for installing, operating and maintaining non-drinking water systems in accordance with the *Water Industry Act 2012*, the Regulations, and appropriate technical Standards, and will be used by the plumbing and water industries, water industry entities and property owners with a non-drinking water supply.

18.2. Committee Representation

The Technical Regulator provides expert technical input for the revision of key Standards through representation of the following Standards committees:

<i>ABCC</i>	<i>Australian Building Codes Plumbing Codes Committee</i>
<i>WS-014</i>	<i>Plumbing and Drainage Standard – Part 1 – Water services</i>
<i>WS-014</i>	<i>Plumbing and Drainage Standard – Part 2 – Sanitary plumbing and drainage</i>
<i>WS-014</i>	<i>Plumbing and Drainage Standard – Part 4 – Heated water services</i>
<i>WS-039</i>	<i>Mirror Committee for ISO/TC 275 - Sludge recovery, recycling, treatment and disposal</i>
<i>WS-041</i>	<i>Mirror Committee for ISO/TC 224 – Service activities relating to drinking water supply systems and wastewater systems - Quality criteria of the service and performance indicators</i>

Appendix

Appendix: OTR Activity Report – 2020-21

This is an activity report that describes the operations of the Technical Regulator in the Electrical, Gas, Plumbing and Water industries over the 2020 – 2021 financial year.

The Technical Regulator is a statutory office established by:

- Section 7 of the *Electricity Act 1996*. Robert Faunt has held this office since he was appointed as the Technical Regulator under the *Electricity Act 1996* on 28 February 2003.
- Section 7 of the *Gas Act 1997*. Robert Faunt has held this office since he was appointed as the Technical Regulator under the *Gas Act 1997* on 28 February 2003.
- Section 8 of the *Water Industry Act 2012*. Robert Faunt has held this office since he was appointed as the Technical Regulator in 2012.

Robert Faunt has held this office since he was appointed as the Technical Regulator under the *Electricity Act 1996* and the *Gas Act 1997* on 28 February 2003, and since he was appointed as the Technical Regulator under the *Water Industry Act 2012* in 2012.

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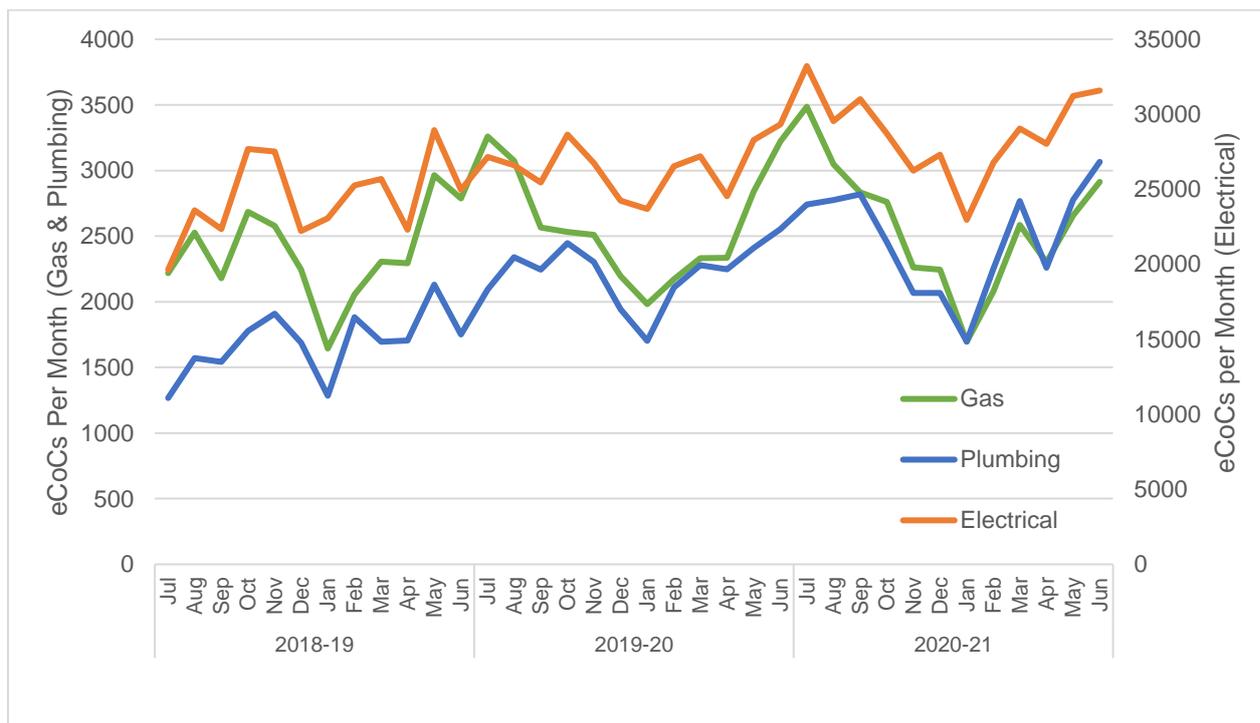
Section A1: Overall Activity

1.1. Electronic Certificate of Compliance (eCoC)

Certificates of compliance are an instrument used to demonstrate that an installation is compliant and can be used by a property owner to demonstrate that they have met their duty to ensure that their property is safe. The electronic certificate of compliance (eCoC) system was launched for registration only in August 2016 and for the creation and submission of eCoCs in January 2017. Following an 18-month transition; paper certificates were discontinued on 30 June 2018. Usage of eCoCs rose sharply after 30 June 2018, while new registrations peaked in June and July 2018. Registrations have since stabilised to a monthly average of 135 new eCoC users over the 2020-21 financial year.

Submission rates now exceed the volume of paper certificates which were printed previously and given there was some wastage of paper certificates this is indicative of increased levels of compliance. The vast majority of eCoCs relate to electrical work, and the Technical Regulator now typically receives up to 33,000 of these each month. Plumbing and gas work generates fewer certificates, with up to 3,500 gas eCoCs and 3000 Plumbing eCoCs per month.

Figure A1-1 indicates that rates of eCoC submission have undergone some significant fluctuations throughout the year, with historically high levels of eCoC submissions in July of 2020 and a continuation of a yearly trend of increased submissions overall. The rate of submission of eCoCs through the last year is indicative of high levels of compliance and does not show any obvious impacts due to period of Covid-19 restrictions. Instead, the continuation of a year-on-year trend of increased eCoC submissions may point to the resilience of these industries throughout the last year.



FigureA1- 1: Electronic Certificate of Compliance statistics as of 30 June 2021

Note that the right-hand scale relates only to electrical eCoC submissions, the left-hand scale is for gas and plumbing.

TableA1- 1: Electronic Certificates of Compliance statistics as of 30 June 2020:

		Electrical	Gas	Plumbing	Total
Submitted eCoCs	2018-19	293,244	28,591	20,251	342,086
	2019-20	318,442	31,021	26,672	376,135
	2020-21	401,659	36,180	35,227	473,066
	Total eCoCs	992,744	99,938	82,579	1,175,261
New Licences Registered	2018-19	4,609	1,380	1,425	5,195
	2019-20	1,728	425	434	2,587
	2020-21	1,285	324	341	2,587
	Total Licences	14,148	4,276	4,441	15,938

Note that many licences permit the holder to work in several industries, and so these licences contribute to the figures in several industry columns but are counted only once in the total.

1.2. Emergency Management

The 2020-21 summer was relatively mild compared to 2019-20. The generally milder conditions saw fewer significant events overall in 2020-21 (compared to the previous year) which necessitated personnel from the Office of the Technical Regulator being involved as departmental Support Agency staff during activations of the State Emergency Centre or in Zone Emergency Support Teams.

No declaration of an Electricity Supply Emergency was made pursuant to the *Emergency Management Act 2004* in 2020-21, nor were there any emergency declarations made under the *Gas Act 1997* or *Petroleum Products Regulation Act 1995*.

Events in 2020-21 consisted of:

- The Covid-19 response; and
- The Mount Gambier gas supply incident from 9 – 14 September 2020.

The Covid-19 response has involved personnel from the Office of the Technical Regulator participating at the State Emergency Centre from time to time, where it was activated. Personnel from the Office of the Technical Regulator have also responded to contact from energy industry participants and assisted with their understanding of requirements at times when border restrictions have periodically been implemented. Issues encountered have included industry contacting the Office of the Technical Regulator concerning the movement of highly specialised energy industry personnel, as well as interstate on-road movements of petroleum or gas tankers and movement of electrical infrastructure.

In relation to the Mount Gambier gas supply incident, approximately 9,300 customers in the township lost gas supply on Wednesday 9 September 2020. A Zone Emergency Support Team was formed to coordinate the response to the incident. Personnel from the Office of the Technical Regulator fulfilled the Department's role as Control Agency for gas emergencies. Police from the Limestone Coast region fulfilled the role of Coordinating Agency.

For safety reasons, the restoration process took a number of days after the supply from the pipeline was restored. There was a significant task required firstly to turn off gas taps at premises, followed by implementation of a plan to purge air from the township's gas distribution network, turn gas taps back on and relight gas appliances. All customers were restored by Monday 14 September 2020.

More broadly, the Technical Regulator has well-developed relationships with AEMO, State and Territory Governments and the Australian Government, as well as other bodies such as the Bureau of Meteorology to help facilitate information flows and maintain situation awareness in relation to power system issues.

The Technical Regulator monitors the National Electricity Market in real time, receives information from AEMO at least weekly in relation to supply and demand projections, and reports on the status of the power system weekly. The Technical Regulator also monitors the natural gas and liquid fuel industries and prepares regular periodic reports on the State of these industries and supply levels.

Personnel from the Office of the Technical Regulator have also participated in multiple emergency management exercises over the last twelve months (including preparing and conducting its own multi-agency electricity supply emergency exercise in April 2021). Energy exercises have encompassed issues and matters concerning the electricity, natural gas, and liquid fuels industries.

1.3. Consumer Safety Survey

For 2020-21, the Consumer Survey key outcomes were:

- 74% of the survey respondents indicated they were aware of the dangers of Carbon Monoxide (CO), which is similar to previous years. Overall, general awareness and safety behaviours is slightly higher than previous years. On average a quarter of the responders never service or test their gas and electrical appliances.
- Maintenance or repair undertaken by tradespeople has slightly increased across all areas (plumbing, electrical and gas) from previous years.
- Amongst those who had work done in their property in the last 12 months: 84% were aware that the law requires a plumber to hold appropriate license; 88% were aware that the law requires an electrician to hold appropriate license; and 85% were aware that the law requires a gas fitter to hold appropriate license. These results were similar to percentage obtained in previous years.
- Generally, provision of certificate of compliances and written quote for plumbing and gas work has slightly increased whereas for electrical work it has slightly decreased from previous years.
- The top three messages that survey participants recalled seeing or hearing were: Be aware of power lines (23%); Look after Your BBQ and it'll look after you (22%); Beware of toxic carbon monoxide in your home (19%). Across the sample, 42% recalled seeing some form of advertising, compared to only 30% in 2020.
- It was observed that the public was more likely to seek advice about gas and electrical safety from a qualified tradesperson (69%) while only 13% would consult with the OTR which decreased slightly from last year.
- About 32% of the public are buying appliances online (mainly electrical appliances) – this number is similar to previous years, showing that most appliances are still bought in physical stores.
- Approximately half of respondents indicated that the appliance they purchased came with safety certification or plumbing watermark certification. About 19% indicated the appliance purchased did not have safety certification and the remaining respondents didn't know. This shows that many people do not know what safety certification and watermark certification is and/or how to check it. 63% of the respondents that purchased appliances online indicated, they were provided with safety certification or plumbing watermark certification, increasing by 19% from last year.
- Overall, knowledge of safety, regulations and requirements generally increases with age but advertising recall (digital) is strongest amongst younger age groups. This highlights that a digital strategy is the best mean to target improved safety behaviours with the age groups needing it the most.

It is worth noting that the survey for 2020 and 2021 were conducted 100% online as opposed to 2019 where a mix between phone and online survey was used.

The results obtained were consistent with the last few years, pointing out that safety attitudes and behaviours may be influenced by demographic factors. The engagement with visuals was deemed satisfying overall, particularly with younger age groups. The Technical Regulator will take this feedback into account in designing the next safety campaign and redesign the messages.



Figure A1- 2: Survey participants recalled seeing or hearing Consumer campaign for 2021

Volume I – Electrical Industry

Section A2: Electrical Infrastructure

2.1. Audits by the Technical Regulator

2.1.1. SRMTMP Field Audits

In 2020-21 the operations of the Office of the Technical Regulator were impacted by the global Covid-19 pandemic leading to a reduced number of field audits of electrical infrastructure.

In addition to audits of compliance against an entity's SRMTMP, during the bushfire season OTR staff assists in the State's emergency management response as Control Agency for energy, and subsequently investigates bushfires where electrical infrastructure may have been involved in starting a major fire, including site visits, data analysis and compliance auditing.

The findings of these investigations are published on the department's website.

In 2020-21 Cathedral Rocks Wind Farm, Starfish Hill Wind Farm, Baroota Solar Farm, Port Lincoln Power Station and SA Power Networks were audited against compliance with their SRMTMP.

The areas audited variously included:

- Training systems
- Safe Work Systems
- Contractor management
- Isolation practices
- High voltage switching
- Work at height
- Dropped objects and drop zones
- Control systems, security and interdependencies with other Infrastructure
- Accident investigation and reporting and
- Maintenance management systems

Overall, no evidence was found that would indicate that the entities do not generally comply with the processes listed in their respective SRMTMPs. In each case the OTR provided advice and recommendations to the entity on opportunities for improvement to their processes.

2.1.2. SA Power Networks vegetation clearance audit

Cathedral Rocks Wind Farm is managed and operated by Acciona Energy Australia Global Pty Ltd (Acciona) and the operations and maintenance contractor Vestas. The Cathedral Rocks Wind Farm is located on the Eyre Peninsula, and consists of 33 wind turbines with a total generating capacity of 66MW.

2.1.3. Starfish Wind Farm

Starfish Hill Wind Farm is located near Cape Jervis and consists of 22 wind turbines with a total generating capacity of 33MW. Starfish Hill Wind Farm was commissioned in September 2003 and was the first large wind farm in South Australia.

2.1.4. Baroota Solar Farm

Baroota Solar Farm is owned and operated by Flagstaff Enterprises, the DC component of the solar farm is maintained by Watt Power Brokers (acting on behalf of Flagstaff Enterprises). Baroota Solar Farm has a generation capacity of 8.9MW DC.



Figure A1 E 1: OTR Officers inspect Baroota Solar Farm

2.1.5. Port Lincoln Power Station

Port Lincoln power station is owned and operated by Synergen Power Pty Ltd (SPPL) and comprises three 25MW EGT gas turbines. The operations and maintenance of the turbines are supported on site by a site manager and gas turbine technician, contractors such as SA Power Networks are used for additional services on an as needs basis.

2.1.6. SA Power Networks Transformer

Following recent incidents associated with distribution transformers, SA Power Networks' SRMTMP sections '4.0 Maintenance Framework' and '4.7 Distribution System Inspection' were selected for audit. On 20 January 2021, OTR officers observed SA Power Networks' inspections of pole and pad-mounted assets. SA Power Networks' transformer maintenance strategy was investigated through a virtual desktop audit that covered a review of the basis for and compliance with scheduled maintenance intervals for both higher corrosion/coastal areas and inland areas. This investigation is ongoing.



Figure A1 E 2: Overhead electricity infrastructure (left) and inspection of a pad-mount transformer (right)

2.2. Generation

Changes were made to the development regulations in 2017 which prescribe all new proposed generator plants of greater capacity than 5 MW to seek approval from the Technical Regulator to ensure it meets certain technical requirements to contribute to power system security in South Australia.

Since 1 July 2017, the Technical Regulator has technical requirements that proposed generators must achieve to receive a certificate from the Technical Regulator and progress to the Development Application stage.

The Technical Regulator has worked closely with the industry since these requirements have been put in place and continues to receive numerous generator applications throughout the year. The proposed projects cover a wide range of technologies and complexities. In 2020-21 the Technical Regulator issued 17 certificates to proposed generators.

2.3. Transmission

2.3.1. Transmission Line Availability

The electricity transmission system transports power from the power stations directly to a series of sub-stations and switchyards, which in turn supply the distribution system and directly connected transmission customers. The major transmission entity in the State, ElectraNet, owns and operates a network of over 6,267 circuit kilometres of transmission lines. The network operates at nominal voltages of primarily 275 kV and 132 kV with a smaller number of 66 kV lines. The transmission system also includes 97 substations and switchyards. Transmission line availability in 2020-21 was 100%. ElectraNet's Key Performance Indicators (KPIs) from its SRMTMP are listed in Table K1 in Volume IV.

2.4. Distribution

The distribution network delivers power to consumers. The major distribution network operator, SA Power Networks (formerly ETSA Utilities), owns and maintains over 89,482 kilometres of overhead and underground distribution lines. The lines operate at 132 kV, 66 kV, 33 kV, 19 kV (SWER), 11 kV, 7.6 kV and low voltage (400/230 V). SA Power Networks also owns 400 substations and switchyards.

The South Australian distribution network serves over 897,602 customers.

In 2020-21, fire starts attributed to distribution infrastructure showed a small decrease to 0.6 fire starts per 1,000 km of mains. SA Power Networks' KPIs are provided in Table K2 in Volume IV.

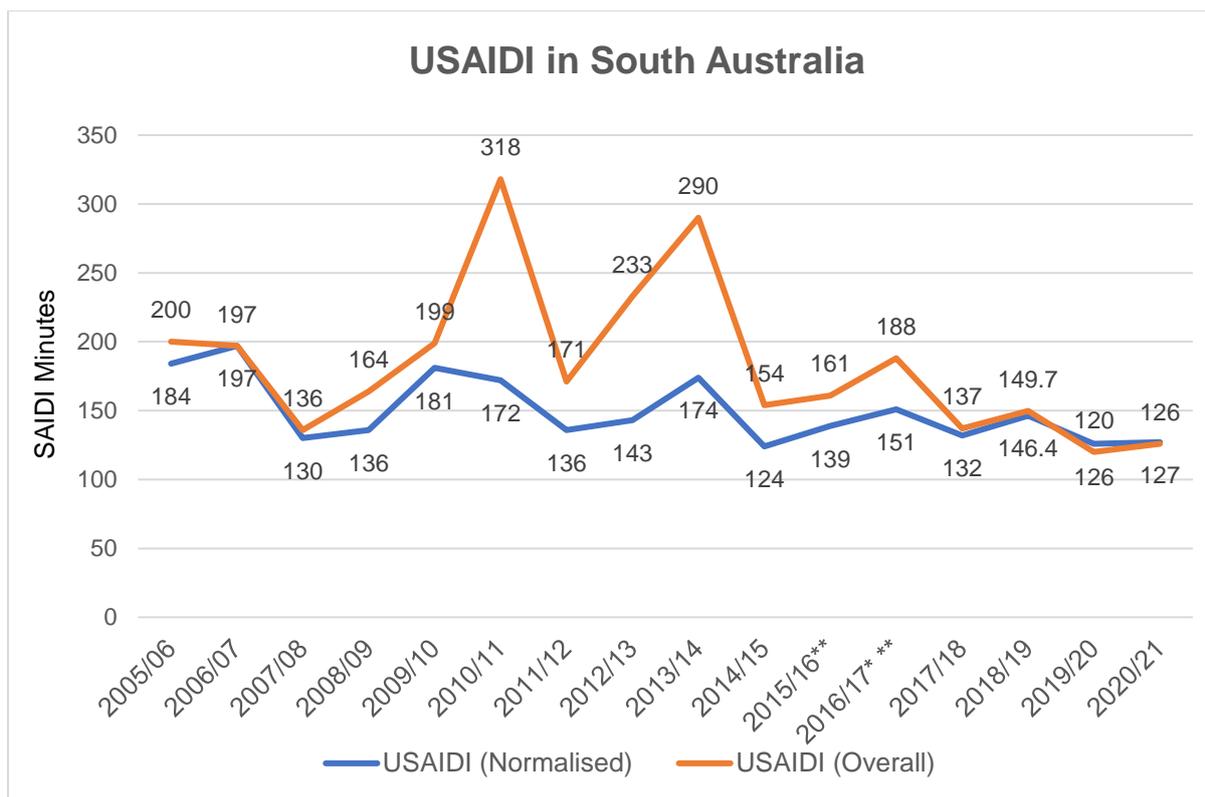
2.4.1. Reliability

The Bureau of Meteorology (BOM) advised of numerous severe weather events in 2020-21 of which many were categorised as Significant Weather Events (SWE), there were three days classified under the more severe category of Major Event Days (MEDs). Such events pose a major challenge for the reliability and management of the electricity distribution network.

The reliability indicator "Unplanned System Average Interruption Duration Index" (USAIDI) for the SA Power Networks' distribution system in 2020-21 was an average of 127 minutes per customer. This has increased incrementally from 126 minutes per customer reported in the previous year.

The calculations for SA Power Networks' normalised USAIDI ¹ performance, (i.e. excluding significant weather events) in accordance with a modified IEEE (The Institute of Electrical and Electronics Engineers) Standard 1366 ² resulted in a state-wide USAIDI of 126.7 minutes.

The Technical Regulator is continuing to monitor SAPN's performance across all areas.



FigureA1 E 3: State-wide Unplanned SAIDI for SA (minutes per customer)

SA Power Networks has excluded the major impact of significant weather events by excluding Major Event Day (MED) performance from the normalised performance. The MED is determined in accordance with the Australian Energy Regulator’s (AER) Service Target Performance Incentive Scheme Guideline which mirrors the IEEE Standard.

Note: Includes unplanned interruptions on the high voltage and low voltage distribution network.

The State-wide transmission outage (i.e. Black-start event) occurred on 28 September 2016 and is excluded from the above figures (as it was related to a transmission outage).

* The SAIDI experienced by SA Power Networks’ customers in 2010-11 and 2013-14 was significantly impacted by severe weather events

** SA Power Networks has excluded the major impact of significant weather events by excluding Major Event Day (MED) performance from the normalised performance. The MED is determined in accordance with the Australian Energy Regulator’s (AER) Service Target Performance Incentive Scheme Guideline which mirrors the IEEE Standard.

SA Power Network also provides quarterly reports to the Technical Regulator which detail all major outages in the previous quarter.

SA Power Network also provides quarterly reports to the Technical Regulator which detail all major outages in the previous quarter.

2.4.2. Outage Causes

The two major causes of unplanned interruptions across the State during the 2019-2020-21 regulatory period continued to be weather and equipment failure. Using the performance measure of SAIDI, these two causes accounted for 14% and 28% 68 minutes and 43 minutes respectively of the interruptions in 2019-2020-21.

SA Power Networks performance was generally relatively consistent with the previous years’ performance, (i.e. causes fall within the normally expected range). Outages due to equipment failure had a higher contribution to SAIDI than the ten-year average of 22%, while the weather contribution was equivalently less, the Technical Regulator will continue to monitor equipment failure reports.

There has been a slight increase in 2017-18 and 2020-21 USAIDI, due to a material increase in the number of interruptions caused by the grey-headed flying fox population increase, which mainly affects Urban Feeders.

2.5. Safety Clearances to Powerlines

2.5.1. Vegetation Clearance

Vegetation clearance regulation Review

The Technical Regulator's review of the Electricity (Principles of Vegetation Clearance) Regulations 2010 was completed in time for remake on 1 September 2021. Major changes implemented in the 2021 regulations included removal of both the bushfire risk area maps and the lists of trees approved for planting near powerlines. The maps are published on the Location SA Map Viewer, and the trees lists on sa.gov.au. This modernisation has resulted in the 2021 regulations being 200 pages shorter than the 2010 version. The 2021 regulations now provide for the removal of saplings i.e., trees less than 5 years old, before they grow into the clearance zone. Also, clearance zones calculated for a particular powerline span using for example, sag and swing characteristics, are now offered as an alternative to requiring a prescribed worst-case clearance distance for each voltage to be used.

Risks associated with Vegetation near Powerlines

Falling vegetation continues to be a major factor in electricity outages. Damaged powerlines are a risk that can lead to sparking, and fires along with a risk of electric shock. In recent times, damage to electricity infrastructure due to falling trees and other vegetation – at times from outside the prescribed clearance zone – has led to major bushfires.

These incidents highlight the risks associated with vegetation near powerlines and the continued need for an effective vegetation management scheme.

Vegetation Clearance Objections

During the year, the Technical Regulator assisted with two objections and numerous complaints regarding vegetation clearance issues. In all cases, a mutually acceptable outcome was achieved.

Exemption to Planting Restrictions

The Electricity (Principles of Vegetation Clearance) Regulations 2010 list species of vegetation that may be planted under or in proximity to powerlines. The selected species are not expected to exceed a certain height or encroach into the buffer or clearance zone.

In some instances, the Technical Regulator may allow non-listed vegetation to be planted in proximity to powerlines. This is done through a conditional exemption from planting restrictions. The conditions generally specify the minimum safety clearance between vegetation and powerlines and put an obligation on the exemption recipient to maintain these clearances at all times.

2.5.2. Building and Working Clearances

Building Clearance Approvals

The Technical Regulator is responsible for granting approvals under Section 86 of the *Electricity Act 1996* for the erection of buildings in proximity to powerlines.

Any requests for approval to build within the prescribed safety clearance area are assessed individually, by means of a risk assessment which takes into consideration the safety of building construction and maintenance as well as the finished building. Ten approvals were granted in 2020-21.

Equipment contacting overhead powerlines

Twenty incidents involving contact of equipment with powerlines were reported to the Technical Regulator in 2020-21. In each case the OTR reviews reports to ensure that the cause of the contact has been correctly identified, and measures put in place to mitigate the risk of future incidents.

Section A3: Electrical Installations

3.1. Audits

- OTR had audited 1572 electrical installations for compliance with the *Electricity Act 1996* and associated regulations. Due to the Covid-19 work and access restrictions over the last 12 months, the audit numbers over the past 12 months were impeded. These restrictions also affected intrastate auditing while delivering safety presentations. Audited installations are also randomly selected from eCoC system, lists of new connections supplied by the distribution network service provider, SA Power Networks, and other network operators. Other installations were targeted for audits due to complaints or a history of non-compliance.
- OTR officers assisted South Australia Police on 185 occasions, this includes attending 178 illegal cannabis growers' premises where dangerous wiring, including meter bypasses, were suspected. Numbers were low due to other commitments by SAPOL. Power was disconnected for installations deemed immediately dangerous until they could be rectified by a licensed electrician.
- Due to the Covid-19 work and access restrictions over the last 12 months, the renewable energy industry audits conducted overall were impeded resulting in 318 audits, 241 being Solar and 77 being Battery installations.

3.2. Enforcement

- A total of 27 expiations were issued, this number was impacted significantly due to the Covid-19 work and access restrictions to audit electrical work.
- The OTR referred two (2) electrical contractors to Consumer and Business Services for breaches of the *Plumbers, Gasfitters and Electricians Act 1995* for further disciplinary action.
- In the case of owner/occupiers of premises, there were 16 expiations issued against them for failing to maintain their electrical installation to an acceptable safe level which is lower due to SAPOL complaints being down and the Covid-19 work and access restrictions to audit electrical work.
- OTR issued 11 expiations to Electrical contractor / workers due to non-compliance or repeat non-compliance.

3.3. Safety Awareness and Education

- There were 22,296 phone enquiries for interpretations or technical advice in relation to various electrical installation standards, from industry stakeholders, government departments and members of the public.
- A total of 57 presentations were given to the industry. This number was impacted significantly due to Covid-19 work and access restrictions. These restrictions also affected intrastate travel delivering safety presentations.
- The Technical Regulator has retained a prominent profile in the electrical industry with a continued demand for a presence at industry functions. At these events, the Technical Regulator's officers are available to discuss electrical safety and compliance issues with electrical contractors and workers in depth.

The issues promoted to the electrical installations industry in South Australia at the Annual National Electrical and Communications Association (NECA) Roadshows includes changes to various Australian standards and an up to date on activity within the industry, unfortunately most of these roadshows were cancelled again this year.

The Technical Regulator's safety presentations to the industry continue to have a vital role in maintaining a good safety record within the industry and improving relations with electricians. The Technical Regulator also provides safety and technical presentations to apprentices, industry groups and other government departments on a regular basis.

The Technical Regulator was also present at the Master Builders Association and the Sunday Mail home building expos, and the Caravan and Camping Show earlier in the year, unfortunately some of the events held later this year have been cancelled due to Covid-19 restrictions. Such events create an ideal opportunity to further promote electrical safety, and answer queries from the general public in a relaxed and friendly environment while also increasing public relations.

3.4. Incidents

- Unfortunately, late last year we had three (3) electrical related deaths reported; one being a plumber with a restricted licence and two electricians working on air-conditioner units.
- There were two (2) major electrical incidents reported; one involving a fire related to the growing of cannabis using a hydroponics setup and the second, an unlicensed worker working on a spray booth located in an Automotive body repair shop.
- There were 100 minor electrical incidents, 19 being Solar fires, 6 hydroponic fires, 30 minor incidents (Including arcing incidents), 15 electrical related fires, 25 battery fires not related to a solar installation.
- The Technical Regulator received a total of 1208 electric shock reports over the last 12-month period. These shock reports include incidents with electrical installations, owner/occupier error and the electrical infrastructure which accounted for over 55% of events reported.

Section A4: Electrical Products

The Technical Regulator monitors suppliers of electrical appliances and accessories for compliance with the *Energy Products (Safety and Efficiency) Act 2000*. A certification service assists the industry to meet compliance obligations. A total of 110 applications for product approval were processed and 19 product related incidents were investigated. As a result, one voluntary recall notices were issued following negotiations with the suppliers.

Section A5: Electrical Safety Awareness

To help maintain a good safety record within the industry and to promote public awareness, the Technical Regulator:

- Attended industry events to discuss safety and compliance issues with electrical contractors. A total of 120 presentations were delivered, covering legislation and AS/NZS 3000 Wiring Rules and related Standards, the introduction of electronic certificates of compliance, changes to solar photovoltaic (PV) installation Standards, and reports on accidents and fatalities. Safety and technical presentations were also delivered to apprentices, industry groups and government departments.
- Attended home building expos and the Caravan and Camping Show to promote electrical safety, and answer queries from the public.
- OTR engineers frequently made site visits to share information about working safely near powerlines with building industry companies and local councils and provided advice on safety and regulatory compliance of buildings and structures.
- Continued the “Be Energy Safe” campaign, with advertisements in print and other media to support specific campaigns, warnings and recalls.
- Provided safety brochures on request to local Councils, electricity entities and the general public.
- Published two editions of the Regulation Roundup, focussing on the Wiring Rules and other electrical Standards, solar PV installations and safe working practices. Copies were posted to electrical workers and contractors registered in South Australia. The publication is also available online for general access.

Volume II – Gas Industry

Section A6: Gas Infrastructure

6.1. Utilisation of Natural Gas Industry in South Australia

Natural gas is delivered to the State from Moomba (SA), and Queensland via the Moomba to Adelaide Pipeline and from Victoria via the Port Campbell to Adelaide Pipeline. A large percentage of this gas is used for power generation with the remainder being provided to networks. The following table shows the amount of gas delivered to the State. About 58% of gas delivered in SA was used in generating electricity in 2020-21 which is in line with the previous year.

TableA1 G 1: Overview of natural gas delivered to the State

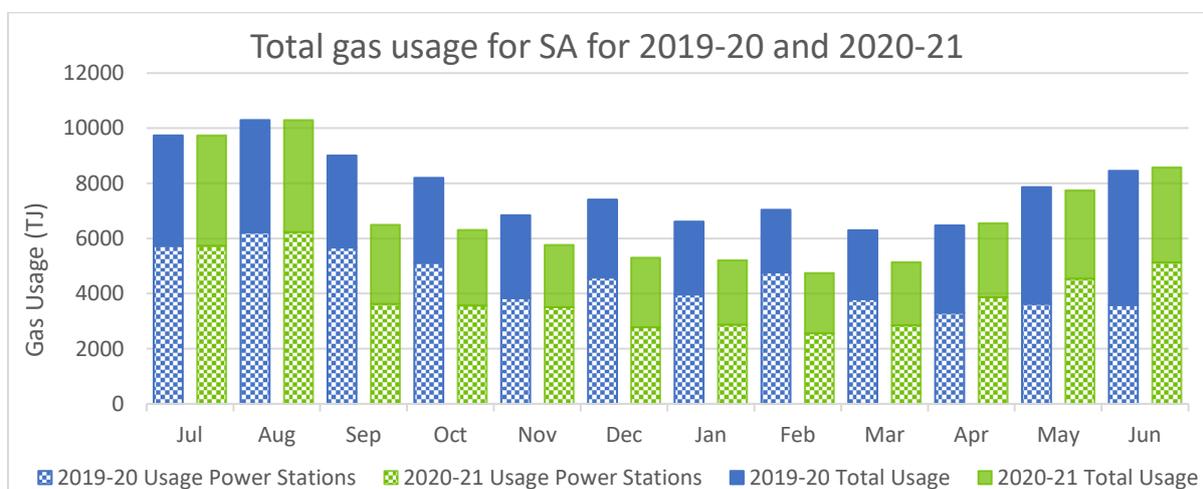
Financial Year	Total amount of gas delivered to SA	Amount delivered for electricity generation	Amount delivered to networks
2019-20	94.2 PJ	54.2 PJ	40 PJ
2020-21	81.9 PJ	47.3 PJ	34.6 PJ
Variation	-13%	-12.7%	-13.5%

In South Australia, natural gas is supplied from several sources and is transported to its destinations in the various transmission pipelines as indicated in TableA1 G2 below.

TableA1 G 2: Overview of natural gas delivered to the State

Source	2016-17	2017-18	2018-19	2019-20	2020-21
South Australia	8%	13%	21%	26%	36%
Victoria	62%	47%	43%	35%	36%
Queensland	30%	40%	36%	39%	28%

Figure A1 G1 shows the amount of gas being used in generating electricity in South Australia.



FigureA1 G 1: Total gas usage and usage for power generation in 2019-20 and 2020-21

Table A1 G 3: Annual quantity of gas entering AGN's SA networks (including Farm Taps)

Transmission pipeline	Gas Quantity (TJ) (1 July 2020 – 30 June 2021)
Moomba and QSN (MAP Gas)	15,543
SEA Gas	6,123
South East	397
Farm Taps	9,333
TOTAL	31,396

It can be seen from Figure A1-G2 that the overall amount of gas supplied to the networks in 2020-21 has slightly decreased from 2019-20. Despite the slight increase in 2018-19, there has been a steady decline while the total number of consumers increased by 5,379 customers over the same period, with the distribution of consumers across the State demonstrated in Table A1 G4.

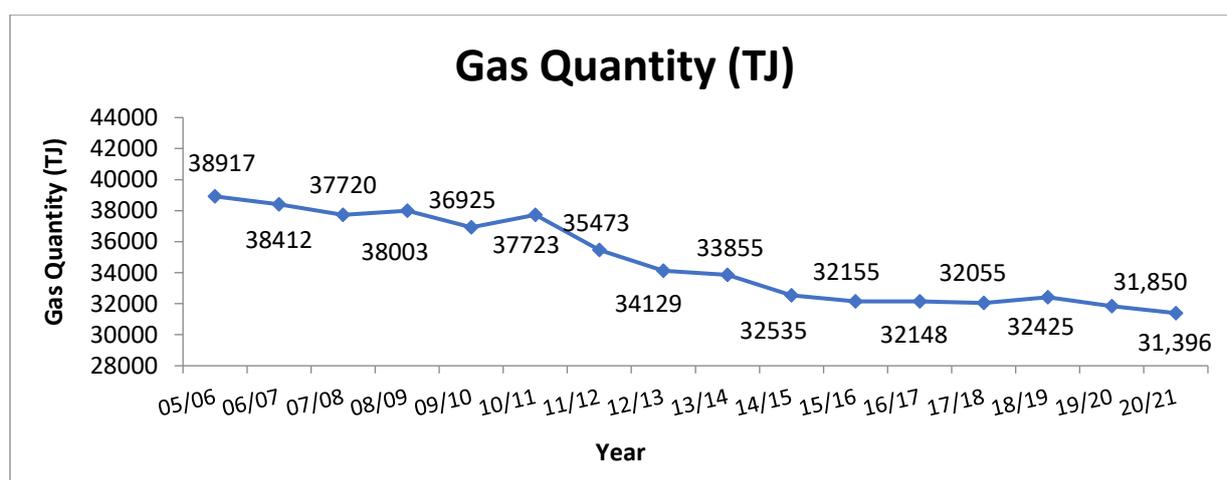


Figure A1 G 2: Trend in the quantity of gas entering the distribution system over the last 16 years

6.2. Natural Gas Infrastructure

The following table shows the number of consumers within the metropolitan and regional areas of SA.

TableA1 G 4: Approximate number of consumers in the natural gas distribution networks in South Australia

Network location	Consumers (as of 30/06/2021)
Adelaide (including Virginia, Waterloo Corner & Two Wells)	444,516
Whyalla	4,216
Port Pirie	5,461
Mount Gambier	9,307
Peterborough	76
Nuriootpa	1,253
Angaston	360
Tanunda	287
Berri/Glossop	108
Murray Bridge	475
Freeling/Wasleys	359
Total	466, 418

The number of consumers connected to natural gas has been steadily growing over the years.

In July 2019, Enwave Tonsley Pty Ltd commenced gas supply to the embedded natural gas distribution network at the new residential site at the Tonsley Innovation District. In September 2020, the Technical Regulator was advised that Enwave Tonsley Pty Ltd became CleanPeak Energy Tonsley Pty Ltd ('CPE') and the CPE gas distribution licence was issued by the Essential Services Commission of South Australia ('the Commission') which reflects this change of name. As a result of the change, the Technical Regulator reviewed and approved the appropriate changes which CPE has incorporated into their Safety, Reliability, Maintenance and Technical Management Plan.

The embedded network is a reticulated natural gas network with a capacity to supply approximately 850 residential customers and 20 commercial customers. Gas is supplied to the embedded network from the AGN natural gas distribution system via a non-pressure regulated metered supply point. As of 30 June 2021, there were 70 residential customers connected to gas supply at the site and further roll-out of the gas network is expected in 2021-22. In 2020-21, the network has been operated in conformance with the Safety, Reliability, Maintenance and Technical Management Plan approved by the Technical Regulator.

In 2020-21, AGN provided the regular updates to the Technical Regulator on the details and progress of a 5% hydrogen blended renewable gas project (HyP SA) at the Tonsley Innovation District.

From 19 May 2021, around 710 properties at the suburb of Mitchell Park, adjacent to the Tonsley Innovation District, have received a blend of 5% renewable hydrogen with natural gas via the existing

AGN gas distribution network. Blending hydrogen with natural gas helps to achieve a reduction of carbon emission because, when burned, hydrogen does not release any carbon emission (only water and heat) – so blended gas produces less carbon dioxide than 100% natural gas.

The Technical Regulator has reviewed and approved the AGN safety, legislative and technical requirements which have been achieved prior to the commencement of the operation of the hydrogen blended gas distribution network at Mitchell Park (e.g. approval of the Operational Management Plans before site commission). The Technical Regulator also carried out the field inspection of the hydrogen production facilities prior to the first injection of hydrogen into the gas distribution network at Mitchell Park.

6.3. Safety of Natural Gas Infrastructure

In August 2020, AGN submitted a revised GMMP for 2019-2020 which was reviewed and approved by the Technical Regulator. From July 2020, the Technical Regulator is responsible for an approval of the GMMP following the changes made to the Gas Metering Code by the Commission and effective from 1 July 2020.

The Technical Regulator was pleased with a further reduction in the number of overdue gas meters compared to 2019 – 20 (Table A1-G 5). The Technical Regulator was advised that the appropriate measures implemented by AGN (e.g. new program to organise access to meters and a process change in the way meters approaching the end of their approved service life are identified) contributed to the reduction and likely to trend downward the numbers in the future.

6.3.1. Gas measurement management plan (GMMP)

In August 2020, AGN submitted a revised Safety Reliability Maintenance and Technical Management Plan (SRMTMP). Discussions between the Technical Regulator and the stakeholders ensured that the SRMTMP met all the requirements of the legislation and the distribution licence, thereby safeguarding the interests of the community. The Technical Regulator approved the SRMTMP.

The Technical Regulator noted that the key performance indicators (KPIs) provided by AGN (see Table K3 in Volume IV) indicate that their distribution systems are generally in a sound condition and are being competently operated. There is some concern about the condition of the remaining cast iron (CI) and unprotected steel (UPS) mains and some classes of high-density polyethylene (HDPE) mains within the network, which is being addressed through an asset monitoring and replacement program.

In September 2020, the Technical Regulator approved the CleanPeak Energy Tonsley Pty Ltd SRMTMP. This document relates to the design, construction, commissioning, management, operation, maintenance and decommissioning of the embedded natural gas distribution network located at the Tonsley Innovation Centre. The SRMTMP has been prepared to describe how CleanPeak Energy's operations and maintenance staff ensure safe, reliable and sustainable management of the network. In 2020-21, the Technical Regulator assured the compliance with the SRMTMP by visiting and monitoring the construction, commissioning and operational field activities carried out by CleanPeak Energy's at the site.

Table A1 G 5: Overdue gas meters in 2017-18, 2018-19 and 2019-20

Overdue Gas Meters	With 10-year life	With 15-year life
As of July 2019	1,205	1,268
As of July 2020	389	239
As of July 2021	299	165

The Technical Regulator noted that AGN indicated that the measurement accuracy for the heating value determination was within the prescribed limits. The heating value is a measure of the energy being used and this must be provided accurately in the retailer's bill to gas consumers.

6.3.2. Auditing for safety and technical compliance

During 2020-2021, the Technical Regulator carried out a series of desktop and field audits against AGN's SRMTMP and GMMP. These audits included a review of the following:

- Evidence of completion of outstanding corrective actions on all recommendations noted during the Technical Regulator's audit in 2018-19. In 2019-2020, the Technical Regulator, following discussions with AGN and APA, has postponed the audits until such time that the risk associated with Covid-19 is deemed acceptable by State and Federal health agencies and both companies.
- APA's processes for the provision of gas connections to new domestic, industrial and commercial (I&C) premises – review whether APA actively seek evidence:
 - 1) that the gas installation work is compliant via an electronic certificate of compliance (eCoC) and how these eCoC are recorded and reviewed as being received.
 - 2) that the training for accreditation of APA's accredited gas fitters is current and adequate.
 - 3) that APA carries out the 5% audits of the accredited contractor's connection works and the outcomes from the audits are appropriately reviewed and actioned.
 - 4) that OTR acceptance has been provided for natural gas Type B/complex installations greater than 3 kPa.
- Systems and procedures to fulfil APA's obligations with respect to installations, operations, maintenance and emergency preparedness of the regional gas distribution networks in Berri and Murray Bridge.
- APA's operational failure and incident notification and investigation processes – review how APA manages the notification, response, repair and investigation processes of all reported incidents and then implement any generated recommendations. Review a role of the National Response Centre (NRC).
- APA's systems and procedures used for laying the gas distribution mains services at the new developments in the State – review processes used by APA for contractor's management and compliance, including APA's induction and training for the new and existing field contract crews.
- APA's Formal Safety Assessment (FSA) process - review the methodology used during the FSA and APA's risk management of the outcomes from the FSA.
- Dial Before You Dig (DBYD) Process - review how APA manage the processing of asset location requests from internal and external sources. Review how APA's operatives/contractors use the DBYD services for their own field activities.
- Distribution Mains and Services Integrity Plan (DMSIP) – review APA's compliance for 2020-21 (e.g. rates, resources, reporting, appropriate risk assessments etc.) with the approved mains replacement plan and preparation for compliance with the plan for the next 12 months (2021-22). Review the mains replacement prioritisation process. Review an impact of APA's mains replacement and other contributable factors, which are under control of APA, on the UAFG level over the last 12 months.

The Technical Regulator's audits carried out during 2020-21 found, in general, that the implementation of AGN's SRMTMP, DMSIP and GMMP (in the audited areas) were meeting the prescribed requirements from legislation, licence conditions, safety and technical Standards, and industry codes.

The APA Group provided documents which assured the Technical Regulator that their staff has appropriate systems in place to ensure that the risks to the South Australian community from the operation of the distribution networks are managed to an acceptable level. It also presented evidence that adequate systems are in place for ensuring the implementation of procedures for the training and assessment of competency of the APA Group staff (and contractors) in the audited areas.

6.3.3. Gas incidents

There were 20 major outages in 2020-21 (that is outages that affected more than five consumers) but no deaths or personal injuries were reported as a result of incidents in the distribution system. The Technical Regulator noted that the number of major outages in 2020-21 was slightly lower than the number of major outages (24) in 2019-20.

On 9 September 2020 South Australia experienced the biggest recorded interruption of gas supply from its distribution network. This occurred when more than 9,200 domestic, commercial and industrial customers in Mount Gambier were left without gas for a period of 3-6 days. This disruption resulted from a fault at the Epic Energy Meter Gate Station that supplies gas to the city. Epic Energy owns and operates the meter station, which directly connects Mount Gambier to the AGN owned distribution network. The APA Group, which operates Mount Gambier's natural gas distribution network on behalf of AGN, committed numerous staff to work closely with Epic Energy and State Emergency Service volunteers, to restore the gas supply.

It was essential, as a first step in restoring gas services safely, that all gas customers were turned off at their property meter. With gas pressure restored to the distribution network, supply was progressively returned to customers through a process of turning on meters and re-lighting appliances. This work had to be undertaken by suitably qualified personnel under the direction of the APA Group. The Mount Gambier hospital and a number of nursing homes were amongst the first customers to have their gas supply restored. Where the APA Group representatives were unable to gain entry to a premise the gas meter was left in the 'off' position with a card explaining how to turn on and relight appliances safely or who to contact to get assistance with the relighting process.

The Technical Regulator monitored closely the management of the Mount Gambier gas outage through participation in numerous teleconferences conducted by the State Emergency and by maintaining regular communication with APA Group, Epic Energy and AGN. In addition, a few gas inspectors from Office the Technical Regulator went to Mount Gambier and actively participated in the delivery of a safe relight process managed by the APA Group. The Technical Regulator noted and acknowledged the work undertaken by the APA Group and AGN to ensure customer supply was restored in the quickest possible time while effectively managing the potential safety issue that arise from a loss of supply event.

Subsequent to the Mount Gambier event an investigation into the cause of the fault at the Epic Energy Meter Gate Station has been conducted with the active participation of the Technical Regulator. The main purpose of the investigation was to ensure that the risk of a recurrence of a similar event is minimised.

In 2020-21, the Technical Regulator continued, as he did over the last few years, to support a program entitled 'Gas Awareness for Emergency Services' that the APA Group carried out for the Metropolitan Fire Service (MFS) and a number of Councils. This is a program to ensure that the appropriate parties are aware of the properties and characteristics of gases, how gas networks operate and how their employees can work in successfully with the APA Group crews to safely control a gas emergency.

6.3.4. Data reported by the APA group

APA Group provides the Technical Regulator with distribution system operational data on an annual basis. This data includes third party damage, gas leak public reports and Unaccounted for Gas (UAFG) values. Table G6 provides the trend in these parameters for the last five years.

Table A1 G 6: Data reported by the APA group over the last five years

Data reported by APA	2016-17	2017-18	2018-19	2019-20	2020-21
Third party damage	653	620	665	537	460
Gas leak public reports	3,596	2,606	2,338	2137	1,304
UAFG	735	716	692	603	437

During 2020-21, APA Group provided approximately 88,785 location services to various third parties via DBYD, lower than 2019-20 (97,244) highlighting the impact of the reduced construction activities during the Covid-19 lockdowns in 2019-20 but also indicating that the South Australian public is aware of using the DBYD service to minimise the risks of gas incidents.

In 2020-21, the Technical Regulator supported and promoted a use of six videos produced by SafeWork SA for all industry stakeholders which address the appropriate safety and procedural steps to be undertaken by third parties working in the proximity of the utilities' assets to reduce the safety risks to the public in South Australia. These videos have been established following a number of 'Utility Asset Strike Avoidance' workshops organised by SafeWork SA in which the Technical Regulator has participated.

Public reports for gas leaks have decreased over the last year the 1,764 recorded for 2020-21 can be divided between:

- 1,304 publicly reported gas mains and services leaks
- 460 public reports of third-party damage

The Technical Regulator noted that the reported UAFG value was 437 TJ, based on the Australian Energy Market Operator (AEMO) calculations (as of 30 June 2021) and has been greatly reduced over the last 12 years (2,155 TJ in 2009). This value represents approximately 1.4% of the total quantity of gas that entered the distribution system (including Farmtaps) and approximately 2.0% (excluding Farmtaps). The great reduction of UAFG seems to be mainly attributed to the amount of CI and UPS mains replacement which AGN carried over the last 12 years. This significant decreasing trend in UAFG to 437 TJ is a pleasing outcome indicating improvement into the integrity of the AGN distribution networks, reliability of gas supply and the significant reduction of methane emission into the atmosphere in South Australia.

Following a review of the AGN mains replacement program, as AGN reported to the Technical Regulator for 2019-20, the Technical Regulator noted that AGN replaced approximately 201.0 km and decommissioned approximately 2.8 km (in total 203.8 km) of old cast iron, unprotected steel and HDPE gas mains. The overall progress of mains replacement was approximately 2.2 km below the AGN annual target of 206 km.

The Technical Regulator was pleased that AGN has achieved its annual regulatory target of mains replacement in the Adelaide Central Business District (CBD) in 2020-21 and has successfully completed all Adelaide CBD mains replacement program with all extreme risks removed.

AGN advised the Technical Regulator that it has budgeted to replace a further 161 km of gas mains in 2021-22. The Technical Regulator noted that, in addition to block low pressure CI and UPS mains replacement (114 km), AGN will continue work in 2021-22 on the replacement of 47 km of HDPE mains prioritised as locations of greatest risk.

On 30 April 2021, the Australian Energy Regulator (AER), has released its final decision on the AGN Access Arrangement submission for the next five years 2021-26. Prior to the AER final decision, the

Technical Regulator have actively participated in numerous discussions/communications with AGN, AER, OTR staff and the Ministerial office on the technical details, accuracy and interpretation of some technical information stated in the AGN submission to the AER. Generally, the Technical Regulator supported most of the technical/field activities which AGN proposed to carry out on the gas distribution networks in South Australia to ensure safety and reliability of the networks over the next five years. The AGN mains replacement program during the 2021-26 Access Arrangement period was the major issue for the Technical Regulator consideration.

6.4. Safety of LP gas Distribution Networks

The Technical Regulator was advised by ELS about a further expansion of the LP gas distribution network at the Bluestone Estate development in Mount Barker. In 2020-21, The Bluestone Estate development was close to completion approximately 1,157 consumers connected to the LP gas distribution network.

The Technical Regulator monitored the progress of the construction of ELS' new LP gas distribution networks in Mt Barker located at the Aston Hills Estate (217 consumers already connected with the potential to increase to approximately 1,900 consumers), the Springlake Estate (295 consumers connected) and at Newenham Estate (110 consumers connected).

The Technical Regulator was advised that, in 2020-21, ELS continued the construction of the LP gas networks at the six new developments in Mount Barker (Minters Field, Matilda Rise, Blefari, Amblemead, Clover Park, The Lodge and Adore developments). In addition, in 2020-21, AGN continued the construction of its own LP gas distribution network at the Glenlea Estate in Mount Barker with approximately 45 customers connected to the network. The Technical Regulator will be monitoring all ELS and AGN field activities at the sites in Mount Barker to ensure that they are carried out in accordance with the correct technical requirements.

TableA1 G 7: LP gas distribution networks under development in South Australia

Network Location	Owner/ Operator	Length of Main (m)	Operating Pressure (kPa)	Number of consumers
Mount Barker (Bluestone Estate, Lifestyle Village and Scarlet Crest Estate)	ELS	18,050	120	1176
Mount Barker (Springlake Development)	ELS	6,133	120	295
Mount Barker (Aston Hills Development)	ELS	4,974	100	217
Mount Barker (Newenham Development)	ELS	3,886	70	110
Mount Barker (Minters Fields Development)	ELS	3,254	120	141
Mount Barker (Matilda Rise Development)	ELS	663	70	20
Mount Barker (Blefari Development)	ELS	4,101	100	148
Mount Barker (Amblemead Development)	ELS	1,777	70	78

Mount Barker (Clover Park Development)	ELS	2,300	70	53
Mount Barker (The Lodge Development)	ELS	330	70	49
Mt Barker (Adore Development)	ELS	188	70	N/A
Mount Barker (Glenlea Development)	AGN	3,300	1100	45

6.4.1. Auditing for safety and technical compliance

In 2020-21, the Technical Regulator carried out field audits of the approved SRMTMPs and held regular meetings and discussions as the mean of obtaining assurance that the owner operators effectively comply with their SRMTMPs in the operation of their LP gas distribution networks in South Australia (i.e. Origin Energy LPG at Cape Jaffa Anchorage, Victor Harbor, Renmark, Port Lincoln and Wallaroo, ELS at Mt Barker and Elgas Ltd at Clare). The Technical Regulator's general finding from the audits was that the operators of the LP gas networks had adequate systems in place for most of the areas audited to ensure the safe operation of their LP gas networks.

The Technical Regulator was satisfied that the risks to the community from the operation of the LP gas distribution networks are being managed to an acceptable level by competent and appropriately trained personnel.

6.4.2. Incident reporting

There were no deaths or personal injuries from the LP gas distribution networks incidents in South Australia during 2020-21.

ELS reported to the Technical Regulator that there were 18 gas leaks reported to ELS from the LP gas distribution networks in Mount Barker in 2020-21. All of them have been promptly repaired by ELS's field staff.

In May 2020, the Technical Regulator investigated a gas outage when LP gas customers at one new Estate in Mt Barker (approx. 14) lost their gas supply from the LP gas distribution network. Investigation has established that the LP gas tank run out of gas and was empty due to the very excessive consumption demand (residents at homes due to the Covid-19 restrictions and cold weather). Investigation has also revealed that there was not any warning to the gas delivery planner about the alarming level of gas in the tank. As a result of the investigation, in second half of 2020, the telemetry systems have been installed on all ELS' LP gas tanks in Mt Barker for real-time percentage gas level readings. Prior to the installation, a more frequent checks of the gas level were organised to prevent a similar outage. The Technical Regulator monitored the outage investigation and the installation progress of the remote telemetry systems.

During 2020-21, there were a few cases where the Technical Regulator undertook an investigation of issues in relation to the installation and supply of LP gas.

Section A7: Gas Installations

7.1. Natural Gas and LP gas Installations

7.1.1. Residential and Light Commercial Gas Installations

The Technical Regulator is responsible for ensuring that installation work is performed in a safe manner, using appropriate methods and materials that are compliant with relevant Standards. Generally, gas installation work involves the connection of new gas appliances, pipework, flueing and ventilation where necessary. The following table shows the approximate number of new or modified installations and connections over the year.

Table A1 G 8: New or modified installations and connections in 2017-18, 2018-19, 2019-20 & 2020-21

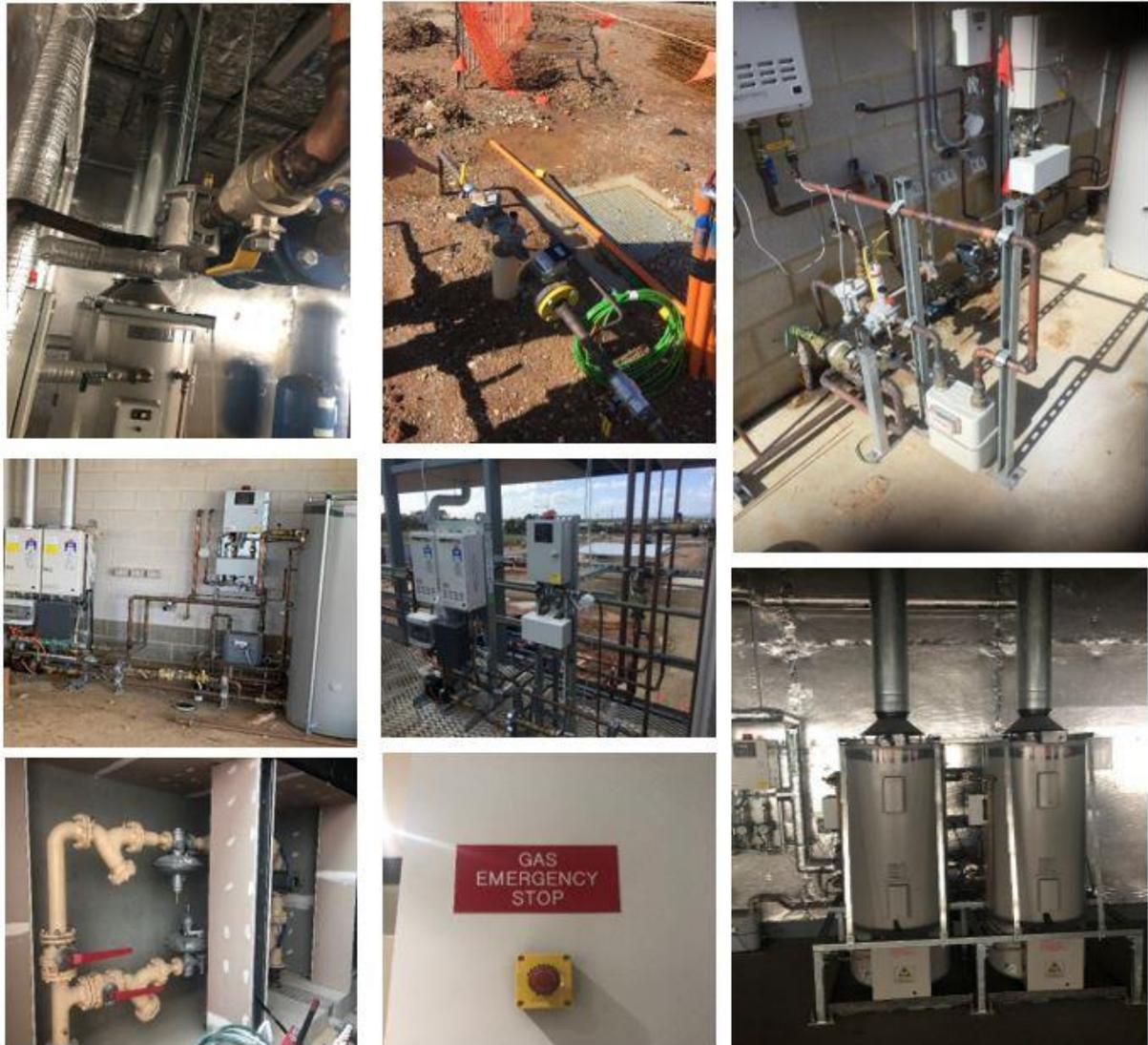
	2017-18	2018-19	2019-20	2020-21
New domestic and light commercial appliances sold and installed	54,500	52,100	62,040	61,325
Existing installations that required repair, replacement or extension	13,213	13,863	14,351	14,953
New natural gas connections to distribution network (residential & commercial/industrial)	8,732	7,979	8,323	8,005
New LP gas connections to residential and light commercial premise (estimated)	2,412	2,531	2,731	2,873

In larger new residential developments such as Mt Barker Estate where natural gas is not available, LP gas (Propane) is supplied by means of reticulated gas network systems supplied from large storage tanks located on the perimeter of the estate. The estimated 10,878 new natural gas and LP gas connections facilitated the supply of gas to 27,195 individual new gas appliances*.

** Based on an industry accepted average of 2.5 gas appliances installed per new residential/commercial connection*

7.1.2. Industrial and Large Commercial Gas Installations

The OTR monitors industrial and commercial, elevated pressure and complex gas installations in the design and construction phases. There were several significant projects throughout the 2020-2021 period such as the new Public Private Partnership (PPP) Schools at Angle Vale and at Aldinga and the ongoing extensions to the Adelaide Airport. The OTR undertook desktop reviews of all initial designs and visited the work sites on numerous occasions for each project to review the newly constructed work for compliance. Where compliance issues were identified the installations were modified by the contractors to meet the deemed to satisfy requirements of AS/NZS 5601.1 gas installation standard.



FigureA1 G 3: Photos showing gas installations in various stages of construction at the Aldinga and Angle Vale PPP schools, and the expansion project at the Adelaide Airport site.

7.1.3. Industrial and Commercial Type B Appliances

There is a legislative requirement for Type B (industrial) gas appliances to be certified to AS 3814 before commercial operation. The Office of the Technical Regulator monitors type B appliance certifications through accredited certifiers. Submissions are provided to certifiers by equipment suppliers, manufacturers, or commissioning agents for desktop review. If satisfactory, temporary commissioning gas is granted. The equipment can then be commissioned under supervision before on-site safety testing and certification. The OTR monitors Type B appliance certifications by certifiers. In the 20/21 period, there were 159 Type B appliances tested and certified.



FigureA1 G 4 demonstrates a type B afterburner appliance that removes obnoxious odours from industrial processes. Type B appliances are individually tested and certified by private certifiers accredited by the Technical Regulator prior to commercial operation.

FigureA1 G 4: Photo of a type B afterburner appliance

7.1.4. Investigation

The OTR reactively investigates complaints and reports of incidents / accidents involving gas installations and appliances. The following snapshot illustrates some of the examples of cases attended throughout 2020-21. With the emergence of Covid-19 the OTR has enacted effective management plans to reduce the risks to employees and the public. Those plans are regularly reviewed to maintain currency given government advice in response to community infection rates and restrictions / lockdowns.



FigureA1 G 5 shows water heater failure due to a reported overpressure event. The overpressure event was caused by the failure of a single component that then resulted in excess supply pressure to the installation that exceeded the maximum safe appliance supply pressure hence the appliance failed catastrophically during operation. Investigations are continuing into the component failure and means of providing over pressure protection for this scenario.

FigureA1 G 5: Failed water heater



FigureA1 G 6 showing DIY gas work by a recalcitrant homeowner who has had his reticulated LPG gas supply cut off for non-payment. Inspectors visited the premises, made safe and defected the installation. Homeowner / gas fitter was expiated for multiple offences. Inspectors are currently working with the owner to have the installation rectified to an acceptable standard.

FigureA1 G 6: DIY gas work

7.1.5. Auditing for Compliance

Proactive Audits

30,868 residential and light commercial gas installation jobs were completed in South Australia during 2020-21 and of these installation jobs 1427 were audited in this manner. While auditing, the processes were changed to adapt to the constraints imposed by the Covid-19 pandemic. Audits were targeted to outdoor gas appliances while auditors were given PPE and training to minimise risks of interfacing with customers. Customers were vetted with health questions and employees were monitored to ensure health markers were met

Table A1 G 9: Results of installation auditing

Area of Audit	2016/17	2017/18	2018/19	2019/20	2020/21
Domestic/light commercial audits	1,025	1,353	1,419	1542	1427
100% Domestic safety checks at all new meter connections *	8,663	8,345	7,580	8323	8,005
I&C audits	95	82	97	80	76
Caravan & tourist park gas safety audits	5	9	0	0	0
Caravan Retailer audits **	-	-	13	23	4
Complaints resolved	577	633	605	421	462
Investigative interviews	5	3	6	4	2
Warning letters sent	69	169	150	147	106
Expiation notices issued	0	0	0	1	3
Referrals to Consumer and Business Services (CBS) – re: licensing issues	5	2	7	3	3
Referrals for remedial training. (Self-initiated enrolment)	2	2	1	1	2

* New residential consumer installation and appliance safety checks were performed by Phoenix Pty Ltd and McPlumb technicians (contractors for the APA Group) prior to connection to the natural gas distribution system for the first time under an agreement with the Technical Regulator.

** Caravan retailers audited commenced in 2018-19.

An estimated 164 large commercial and industrial gas installation jobs were completed during the period and the Technical Regulator pro-actively audited 76 of these jobs for compliance with AS 3814– Gas Fired Industrial and Commercial Appliances and AS/NZS 5601 – 2013 Gas Installations.

When undertaking complex audits, OTR inspectors inspect the following as applicable: NG meter or LPG cylinder/tank placements, pipe work is fit for the application, appliance types and evidence of certification, over pressure protection, flueing, ventilation systems and compliance documentation covering certificates of compliance/pressure test result, purge plans and commissioning approval for type B appliances. Installations are assessed to ensure that they meet the requirements and standards called up by the *Gas Act 1997*.



Figure A1 G 7: Gas Valve Train serving a Kiln Preheater (type B Appliance) and installation audited by an Authorised Officer

Audits of permanent gas installations at tourist and caravan parks

Eight caravans were audited at four caravan retailers or manufacturers during 2020-21. The inspections were part of an ongoing investigations scoping faulty RV storage water heaters which form part of a product recall investigation listed with the ACCC.

The product is the subject of an ongoing recall via the ACCC. And the water heater manufacturer and Australian agent is remediating / replacing affected appliances.

Installation Audit Results

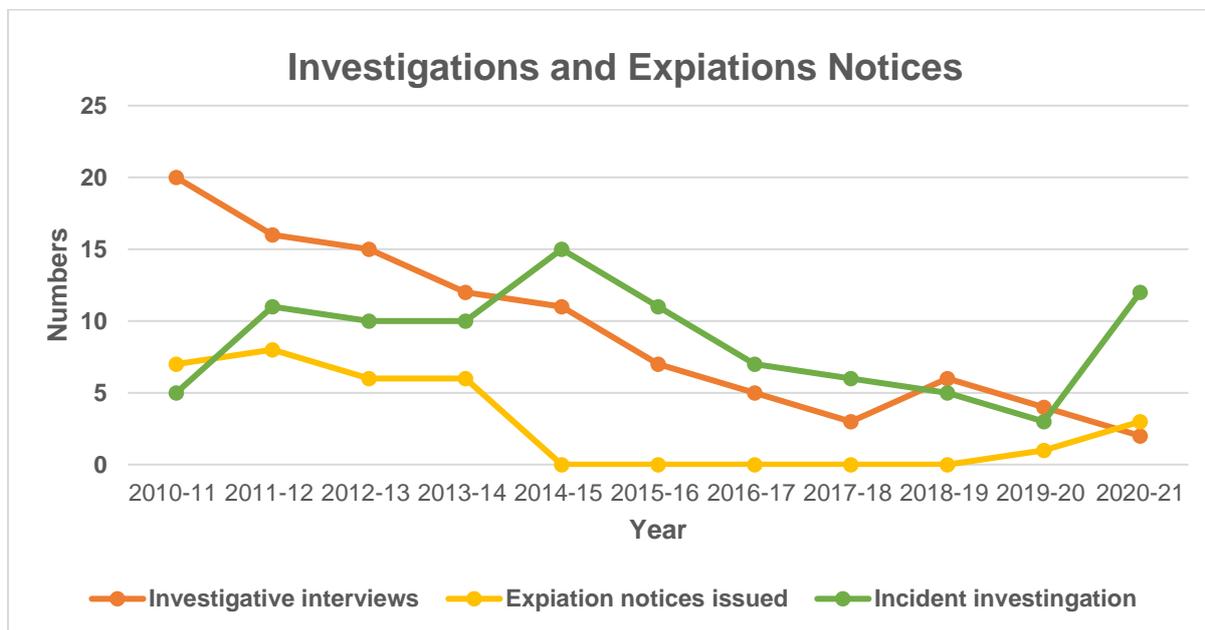
The number of proactive audits of residential and light commercial installations that were completed in the year was 1427 with a split of 1427 inspections for natural gas versus 1211 for LP gas installation. LP gas installations are audited at a higher relative rate for the population base for several reasons:

- LP gas is potentially a more hazardous fuel that is heavier than air with a higher heating value.
- Because these jobs are often found in more remote locations there may be the perception that compliance with the Standards is not so important because there is less chance that the Technical Regulator will audit the work.
- Often existing gas work on site has been performed by unlicensed persons due to the limited availability of skilled licensed persons in some areas or the DIY mentality in some remote areas.

Enforcement activities for non-compliant gas installations

A total of 106 warning letters were issued during the year, 83 to gas fitting contractors, 23 warning letters to owners. Three expiation notices containing were issued in 2020-21. The Technical Regulator prefers that non-conformances are addressed and rectified by the gas fitter as part of their

rehabilitation and education. This results in a positive outcome for the consumer in that the installation is made compliant and the gas fitter actively learns from their mistake. Gas fitters also lose income earning opportunities while rectifying their work. Taking legal action may introduce the risk of not facilitating remediation of the actual non-conformance.



FigureA1 G 8: Investigations and Expiation Notices

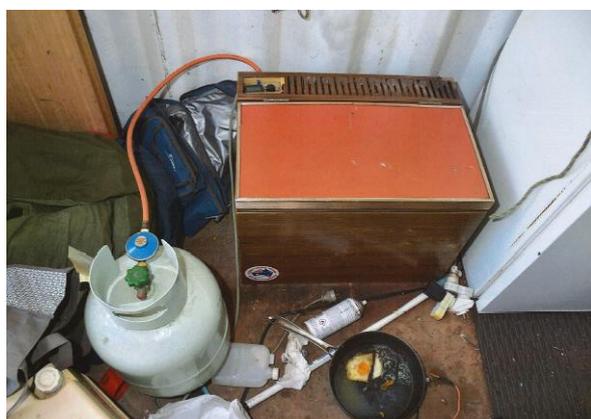
Referrals to CBS

There were three people found to be performing gas installation work whilst unlicensed, unregistered or performing work outside the scope of their licence or registration and they were referred to the licensing authority CBS for action. CBS investigated the matters and considered the recommendations made by the Technical Regulator in making their deliberations.

7.1.6. Gas incidents – Installations

In 2020-21 there was a total of 12 gas related incidents, 11 resulted in injury or property damage, and one resulted in a fatality. Four reported incidents were LPG and seven were NG, they were all investigated and are summarised as follows:

- Single occupant deceased due to Carbon Monoxide poisoning after operating an outdoor model portable gas camping fridge inside an unventilated shipping that had been converted into living quarters.



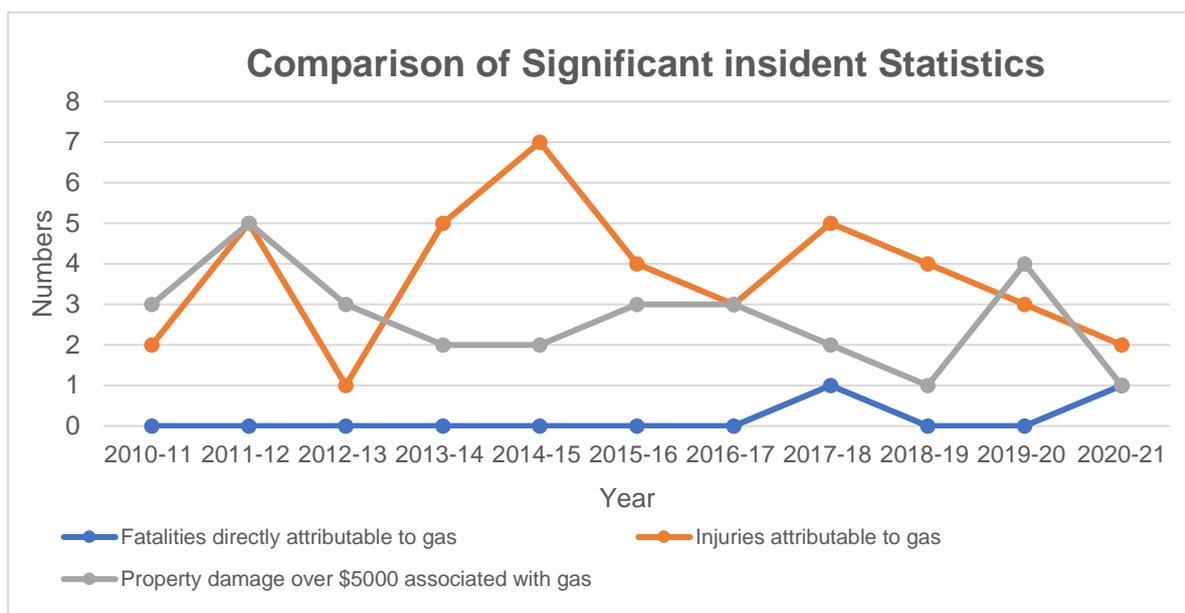
FigureA1 G 9: Deceased Due to Carbon Monoxide Poisoning

- LPG Propane. Domestic residence. The occupant was using a LPG BBQ certified for outdoor use, under the veranda and attempted to change the cylinder out whilst operating. High pressure gas leaked when the cylinder connection was loosened which initiated a house fire. \$8,000 damage



FigureA1 G 10: LPG BBQ caused house fire

- LPG Propane. Domestic residence, two occupants injured when lighting a gas BBQ, they did not follow instructions and allowed gas to build up before igniting resulting in a flame flash ignition and superficial burns to face and arms.
- Natural gas decorative log fire experienced a delayed ignition explosion which shattered the front glass when the main burner did not light reliably from the pilot. Gas fitter on site servicing the heater. Nil injuries just broken glass recorded as a near miss incident.
- Case involving LPG, individual barricaded themselves in a residence with a LPG cylinder as a siege weapon, the individual threatened to release and ignite LP gas if approached by SAPOL.
- Seven cases of delayed ignition explosions in storage hot water systems attributed to insufficient gas network supply pressure experienced in the Mt Gambier outage in August 2020.



FigureA1 G 11: Comparison of Significant Incident Statistics

7.1.7. Gas Certificates of Compliance (GCoC)

By now most Gas contractors have transitioned to the new electronic Certificates of Compliance, (eCoC) however the Technical Regulator is still assisting some individual contractors that have difficulty migrating to the new system. To create a gas eCoC, a contractor registers online to create an account in the eCoC portal. This enables contractors/workers to just log in to the eCoC portal to complete the details of their work. Once the eCoC draft is submitted by the contractor, the system compiles a PDF eCoC and emails it to nominated recipients. Emails can be dispatched in real time thus improving communications and gas contractors can visit the portal and access their historic certificates at any time.

7.1.8. Communication and Education

Industry Liaison and Support

The Technical Regulator provides information about Standards to gas fitting contractors, architects, and engineers, as well as to commercial and industrial users of gas. During the year staff handled approx. 7408 technical enquiries relating to gas installations or appliances.

The Technical Regulator has developed several technical guides and bulletins which address the most commonly asked technical gas enquiries. These are provided at no charge and, in some cases, we have versions for the public and the trade depending on the target group.

Technical Presentations

The Technical Regulator delivered two technical gas presentations relating to the effects of various blends of Hydrogen on Type B gas appliances for the Future Fuels Committee, and requirements for elevated pressure, complex installations, and type B appliances for the Hydraulic Consultants Association of Australia (HCAA) before the emergence of Covid-19 lockdowns / restrictions. All other public speaking and presentations were cancelled due to the Covid-19 pandemic.

Section A8: Gas Products

The program to audit and monitor gas appliance retailers with a view of eliminating the sale of uncertified gas appliances in South Australia targeted major, larger retailers that sell gas appliances e.g. Bunnings, and minor retailers, small stores that are less likely to be aware of certification requirements for gas appliances. The objective was to increase community awareness and change the behaviours of sellers.

Audits of minor gas appliances retailers conducted by the Technical Regulator in the Adelaide Metropolitan Area in 2021 showed that approximately 15% were selling one or more uncertified gas appliances. While the numbers mentioned above may not seem high, they demonstrate that uncertified appliances reach SA consumers and cause incidents.

A 'Risk Assessment Tool' was developed to optimise the monitoring of retailers and to produce an audit schedule based on the retailers' risk rating. This tool records information, including when the stores were visited and whether uncertified appliances were found or not. The tool returns a risk rating and the subsequent audit date for each store based on the information collected.

Currently, the primary issue is the regulation of appliances sold via online marketplace, i.e. eBay or Amazon. The OTR has identified a number of activities that could assist reducing uncertified appliances sold via online marketplace. Collaboration has started with Consumers business services (CBS) and other regulatory agencies in other jurisdictions to achieve better outcomes at a national level.

Section A9: Gas Regulatory Coordination

9.1. Committee Representation

The Technical Regulator is represented on or has provided valuable technical comments to several Standards Australia committees as well as many other committees, forums and associations.

9.1.1. AG-001, Gas Appliances Committee

In 2020-21, the Technical Regulator participated on the AG-001 Gas Appliance committee as a representative of the GTRC. The committee convened periodically throughout the year to discuss and review gas appliance safety issues and to carry out the ongoing review of the gas appliance standards.

The committee presides over the harmonisation of the old AS 455x series of Standards (16 in all) as they are drafted across into the new joint AS/NZS 5263 series of Standards. This process began in 2010 and is ongoing and likely to be finalised by early 2022 with the final catch-up draft of the central Part 0 Standard.

The following projects were undertaken during 2020-21:

- Publishing of a revision AS/NZS 5263.1.7 Domestic outdoor gas cooking appliances.
- Publishing of amendment for AS/NZS 5263.1.3 Gas space heating appliances and AS/NZS 5263.1.8 Decorative effect gas appliances to add safety requirements related to open flue heaters.
- Publishing of AS/NZS 5263.1.11 Small gas engine driven appliances (new standard).
- Revision of AS 2658 LPG portable and mobile appliances went through the public comments stage, review of comments and ballot, it is expected to be published by end of 2021.
- Completion of draft of AS/NZS 5263.0 – General Requirements, the draft will go through public comments in the second half of 2021 and publication is expected in 2021-22.

9.1.2. AG-008, Gas Distribution Committee (AS/NZS 4645)

In 2020-21, the Technical Regulator participated in the AG-008 Gas Distribution committee as a representative of the GTRC. The committee members carried out numerous discussions throughout the year to address the future amendments to all three Parts of Gas Distribution Standard AS/NZS 4645 (Part 1: 'Network Management', Part 2: 'Steel pipe systems' and Part 3: 'Plastic pipe systems').

The main areas of the amendments for the Committee consideration covered the following: gas meter locations requirements, formal risk assessment criteria, gas quality assessment, gas incidents register systems and implementation of standardisation for Future Fuels e.g. Hydrogen, Biomethane and Biogas. The issues related to gaps in legislation and technical and standards requirements to enable safe blending of hydrogen, biomethane and biogas in gas distribution networks represented the main focus of the recent discussions between the Committee members.

During the committee's activities, the Technical Regulator communicated information to and from industry stakeholders (e.g. gas distribution networks operators, Future Fuels Cooperative Research Centre (FFCRC) researchers, the general public in South Australia, and GTRC) and Standards Australia (e.g. ME 093 Committee- Hydrogen Technologies) to ensure that their views are represented in the development of the future improvement to AS/NZS 4645.

Numerous changes of the Project Manager and the cancellations of the Committee's members participation in 2020-21 have constrained the actual progress of the agreement and implementation of the amendments.

9.1.3. AG-010, Natural Gas Quality Specifications

The Technical Regulator is a member of the AG-010 Natural Gas Quality Specifications committee as a representative of the GTRC. The committee convened periodically throughout the year to discuss matters related to AS 4564 – General Purpose Natural Gas which had last been published in

June 2020. In line with many pilot projects taking place around Australia to blend hydrogen into natural gas distribution networks, the committee discussed the potential inclusion of hydrogen into the Standard. It is expected that this work will take place based on further learnings from the existing pilot projects.

AS 4564 lists the general characteristics of natural gas in order to be used for industrial, commercial or domestic use. Most jurisdictions call up this Standard in their legislation relevant to natural gas.

9.1.4. ME-093 Hydrogen Technologies

In 2020-21, the Technical Regulator participated in the ME-093 committee as a representative of the GTRC. This committee was created as a mirror committee of the International Standard Committee ISO TC 197.

It incorporates a broad scope including hydrogen fuel cells, generators, production, storage, transport, use in networks and appliances and liaise on regular basis with other Standards Australia Committees to identify gaps in Standards in regard to hydrogen.

In 2019-20, the committee published seven Standards related to hydrogen, four of them were direct adoption of ISO Standards while the other three were modified version of the ISO Standards. The role of the committee is to review existing ISO Standard and to adapt them to Australian conditions were required.

The Technical Regulator is also involved with two working groups within ME-093, one related to gas distribution networks and one related to gas appliances, which are responsible for developing guidance documents for the industry as the first step of developing specific hydrogen Standards.

9.1.5. AG-006, Gas Installation Committee (AS/NZS 5601)

In 2020-21, the OTR provided committee representation as a GTRC nominated member. The committee continued to convene throughout the year via Teams' meetings to progress public comments associated with the full revision of AS/NZS 5601 (Part 1 Gas Installations-General installations).

The full revision of part 1 defines and aligns performance based and deemed to satisfy clauses, revisits and provides additional pipe sizing tables, homogenises defined terms with other standards where possible, introduces new terms and aligns the content to Standards ISO requirements for terms and language.

The projects also provide further iterations to the Appendix R combustion spillage testing. The committee is also implementing requirements to ensure fire protection for gas installations where some proprietary pipe systems fail at lower temperatures.

Volume III – Water and Plumbing Industry

Section A10: Water and Sewerage Infrastructure

10.1. Regulation of Water Industry Entities

10.1.1. Technical review of licence applications

One licence application, two licence exemption applications and three licence variation applications were received or reviewed during 2020-2021.

10.1.2. Safety, reliability, maintenance and technical management plans (SRMTMPs)

The Technical Regulator reviewed and approved the following SRMTMPs during 2020-21:

TableA1 W 1: Number of SRMTMPs received, reviewed and approved

Year	SRMTMPs Received and Reviewed	SRMTMPs approved
2020-21	34	26
2019-20	32	29
2018-19	19	14
2017-18	30	16
2016-17	38	23
2015-16	41	15

10.1.3. Water industry entity audits

During the 2020-21 financial year, a total of 19 audits of water industry entities were undertaken to confirm compliance with their SRMTMP and to ensure the safe and reliable operation of the infrastructure. The services that the water industry entities provided is included in Table W2.

TableA1 W 2: Number of audits undertaken in per type of services

Type of services	Audits undertaken 2018-19	Audits undertaken 2019-20	Audits undertaken 2020-21
Drinking water, non-drinking water and sewerage	1	1	2
Drinking water	2	1	1
Drinking and sewerage	0	2	0
Non-drinking and drinking water	0	1	0
Non-drinking water and sewerage	2	1	12
Non-drinking water	2	1	3
Sewerage	4	3	1
TOTAL	11	10	19

The licence type of water industry entities audited is included in Table W3.

TableA1 W 3: Number of audits undertaken per type of licence

Type of licence	Audits undertaken 2018-19	Audits undertaken 2019-20	Audits undertaken 2020-21
Minor	4	6	7
Intermediate	6	3	11
Major	1	1	1
TOTAL	11	10	19

Section A11: Plumbing Installations

11.1. Plumbing Compliance

11.1.1. Expiations & Enforcement

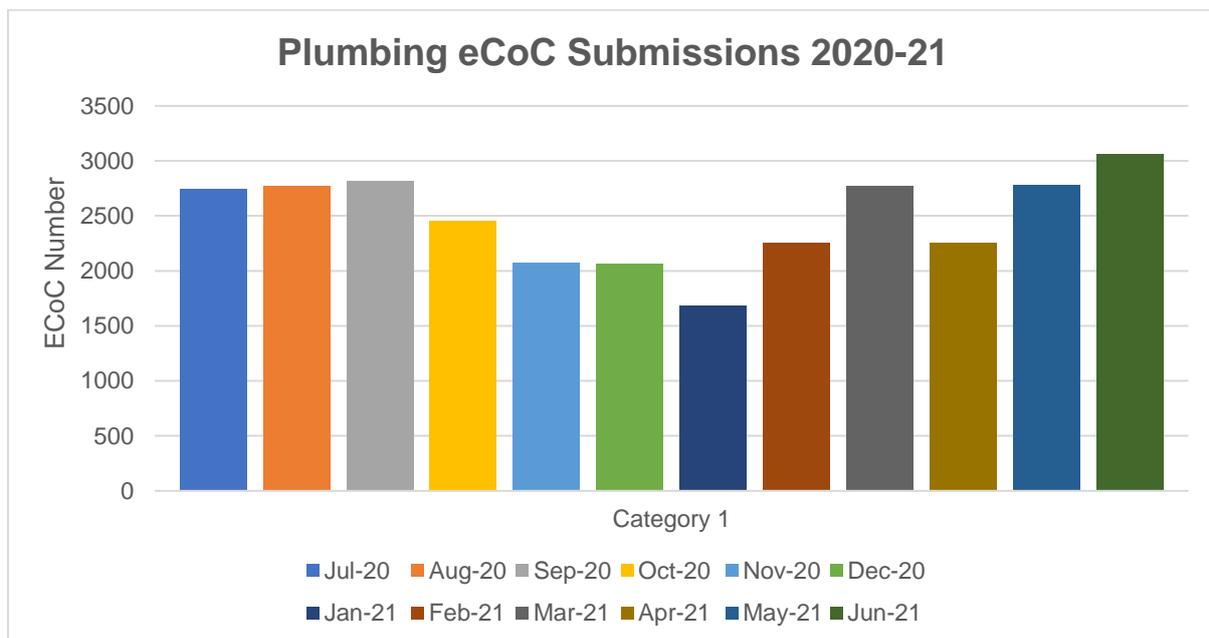
The following compliance activities were undertaken between 1 July 2020 to 30 June 2021:

- 5,638 plumbing audits were conducted
- 27 enforcement notices and 1 warning letter were issued for breaches of the *Water Industry Act 2012*
- seven expiation notices were issued for non-compliant plumbing
- 155 compliance investigations were initiated
- five interviews were conducted to discuss non-compliant plumbing installations
- five re-inspection fees were issued

Plumbing compliance investigations are instigated as a result of reports from customers alerting the OTR to non-compliant plumbing or non-compliant plumbing being identified through sample audits of on-site plumbing installations. Plumbing installation audit results are monitored through a fortnightly review allowing the Technical Regulator to ensure all outstanding non-compliant installations are rectified. The OTR Plumbing Section works with industry to achieve a high level of technical and safety outcomes for on-site plumbing installations in South Australia.

11.1.2. Plumbing Certificates of Compliance

For the period 1 July 2020 to 30 June 2021, 35,227 plumbing Certificates of Compliance were submitted to the Office of the Technical Regulator (34% increase on the previous year).



FigureA1 W 1: Plumbing Certificates of Compliance statistics

11.2. Plumbing Audits

11.2.1. Plumbing Bookings and Audits

Plumbers are required to notify the Office of the Technical Regulator when on-site plumbing and drainage installations are connected to SA Water infrastructure. Site audits are sample selected via the Electronic Certificate of Compliance (eCoC) 'Plumbbookings' case management system. OTR audit allocations depend upon the particular category of plumbing, associated risks & relevant public safety issues (for example in-ground drainage, backflow protection, non-drinking water).

The Technical Regulator conducted a total of 5,638 on-site plumbing audits and 787 desktop hydraulic design audits in the 2020-21 financial year. On-site audit included 135 final audits on newly constructed residential and commercial developments. Final audits examine the entire components of the on-site plumbing installation.

Table A1 W 4: On-site Plumbing Audits 2020-21

Audit Category	Commercial	Residential	Total
Above Ground Sanitary Plumbing	253	879	1132
Relining of Sanitary Drainage Pipework	4	6	10
Sanitary Drainage Installations	296	1197	1493
Trade Waste Plumbing	293	N/A	293
Underfloor Plumbing	246	1293	1539
Non-Drinking Water (in ground)	54	123	177
Non-Drinking Water (in wall)	9	149	158
Non-Drinking Water Irrigation - Parks/Recreational	11	4	15
Drinking Water Irrigation- Parks/Recreational	22	1	23
Fire Service	1	1	2
Fire Services (in ground)	159	8	167
Hot Water Heater Installations	18	183	201
Hot and Cold (first fix)	21	39	60
Backflow Audits	88	10	98
Encumbrance Investigation		32	32
Site Inspection	23	22	45
Site Meeting	20	7	27
Final Audit	103	32	135
Sewer Investigations	1	19	20
Water Investigations	2	7	9
Rainwater Inspections		2	2
Total	1624	4014	5638

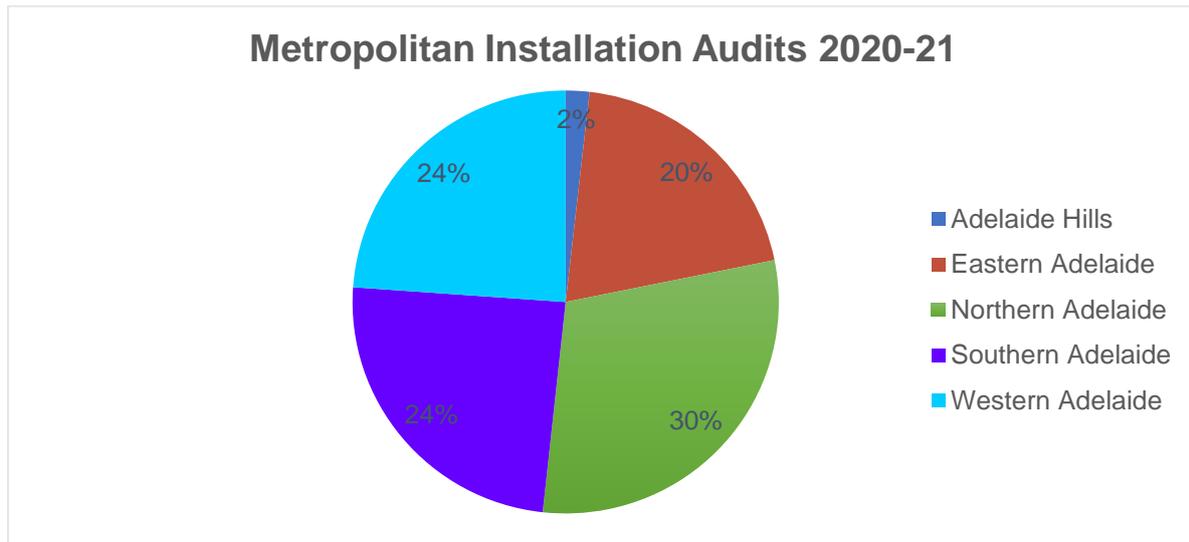
Plumbing and drainage installations can range from the addition of a toilet en-suite on a residential home, to more complex commercial and industrial installations within shopping centres, industry, or multi-storey high-rise apartments. All plumbing audits are assessed against the Plumbing Standard (published by the Technical Regulator pursuant to Section 66 of the *Water Industry Act 2012*). This Standard has adopted relevant sections of the Plumbing Code of Australia (PCA). All plumbing

installations must meet the performance requirements of the PCA through the deemed-to-satisfy solutions as set out under the AS/NZS 3500 plumbing and drainage Standard or, in some cases, by a Performance Solution in accordance with the performance criteria set out under the PCA.

Fewer On-site audits have been undertaken in 2020-2021 due to Covid-19 restrictions and reduced staff levels through secondment to Covid-19 related operations

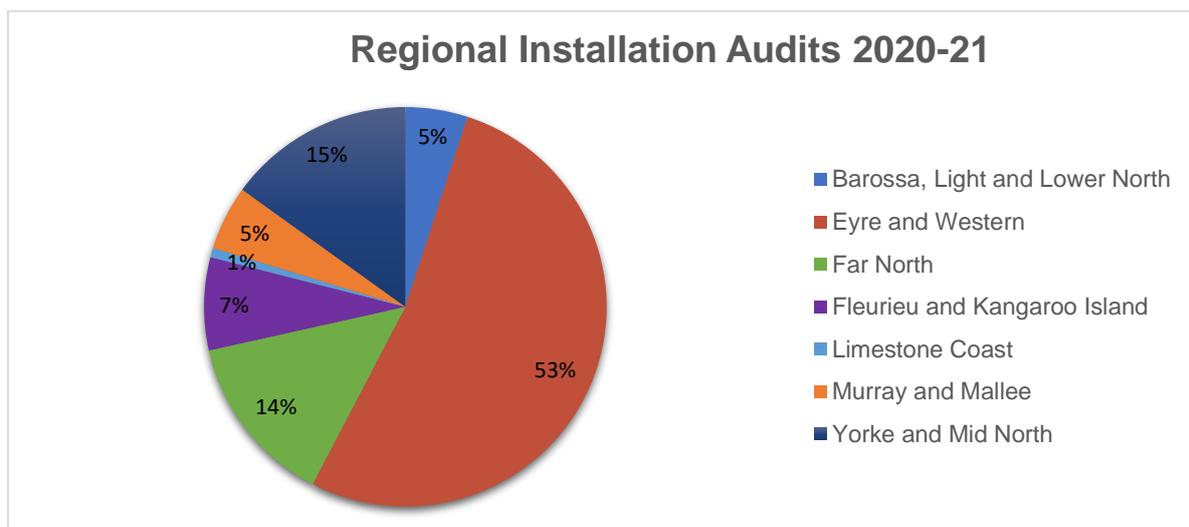
11.2.2. Metropolitan and Regional Audits

The OTR undertake audits of plumbing installations in both the metropolitan and regional areas of South Australia (refer to Figure A1 W2: Metropolitan on-site plumbing installation audits for the 2020-21 financial year).



FigureA1 W 2: Metropolitan on-site plumbing installation audits for the 2020-21 financial year

The Technical Regulator has continued to maintain its regulatory presence in regional areas of South Australia via programmed audits of on-site plumbing. In the 2020-21 financial year 519 audits were conducted in regional areas of South Australia (refer to Figure A1 W3: Regional on-site plumbing installation audits for the 2020-21 financial year).



FigureA1 W 3: Regional on-site plumbing installation audits for the 2020-21 financial year

11.3. Fire Fighting and Non-drinking Water Services

The Technical Regulator consults with plumbing practitioners, hydraulic consultants, designers, and industry stakeholders on installations and hydraulic designs relating to inground fire hydrant services, drinking and non-drinking water services.

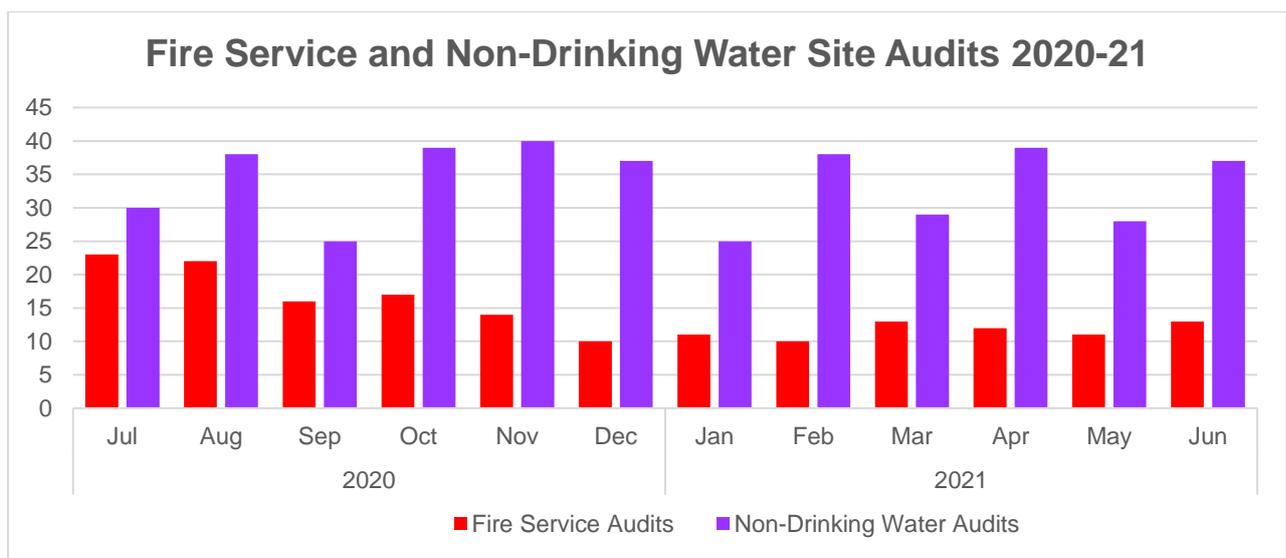
11.3.1. Fire Service Audits

During the 2020-21 financial year, 167 fire service audits were carried out. Hydraulic Design Submissions were reviewed to provide an inter-face between the industry and the OTR to capture any design non compliances before installation and subsequent audits of on-site water services.

The Office of the Technical Regulator is not the regulator for fire sprinkler systems, however where fire sprinkler systems are interconnected with a building's drinking water pipework the OTR undertakes sample audits of these systems to ensure the safety of the drinking water supplies to the building.

11.3.2. Non-Drinking Water Services Audit

OTR Plumbing Installations Inspectors conducted 350 Non-drinking water audits on new residential dwellings and municipal parks plumbed with dual water services (drinking water and non-drinking water services). The trend to use non-drinking water as the primary irrigation supply for municipal parks and gardens remains constant, these public areas are audited to ensure separation of the services and public safety.



FigureA1 W 4: Fire service and non-drinking water audits for the 2020-21 financial year

11.4. Cross-connection Control and Backflow Prevention

The Technical Regulator audits on-site plumbing water service installations to ensure the safety of the drinking water network and to prevent cross-connections and backflow events. Testable Backflow prevention devices where required are connected to residential, commercial, and industrial sites to prevent contaminants entering a properties water service.

Interactive Water Features (IWF) have become a popular installation in children's play areas. The Office of the Technical Regulator have consulted with SA Health and produced an Industry Advisory Notice to assist in providing advice on the design of the plumbing and equipment installations associated with the interactive water features.

The OTR is working with SA Water on a project to audit a range of metered water services identified on high-risk sites, the audits are to ensure the properties containment backflow prevention devices are compliant.

The Technical Regulator continues to monitor backflow prevention devices installed in on-site plumbing systems. Property owners are obligated under Section 69 of the *Water Industry Act 2012* (the Act) to maintain equipment on the customer's side of the connection point.

11.5. Industry Information and Training

The Technical Regulator continues to work in support of the plumbing industry by providing important updates on regulatory matters which include amendments to the National Construction Code Volume 3 (Plumbing Code of Australia) and the AS/NZS 3500 Plumbing and drainage series. The OTR also advise industry on procedural and administrative matters, this ensures that industry has a full understanding of its responsibilities under *the Act* when designing and installing plumbing and drainage systems.

Seminars and Information sessions are conducted both in person and by webinar. The Technical Regulator is chair of the Water Industry Technical Advisory Committee (WITAC) and is represented on the Plumbing Codes Committee (PCC) and the Plumbing Industry Reference Group (PIRG). Information is distributed through the publication of advisory notes, articles for the OTR's Regulation Round Up newsletter and articles prepared for the Master Plumbers Association magazine. The OTR regularly hosts seminars and information sessions which are an effective tool for engaging the plumbing industry with the Office of the Technical Regulator by providing valuable feedback when raising and clarifying concerns with regulatory and technical matters.

The Office of the Technical Regulator, in conjunction with the Master Plumbers Association of SA Inc, conducted plumbing industry Roadshows in Mount Gambier, Port Lincoln, Port Augusta, Gawler, Mount Barker, Kadina and Tonsley during the 2020-21 financial year.

The general theme of the roadshows revolved around providing updates on Watermark technical specifications, AS/NZS 3500 Plumbing and drainage standard series, and refreshing plumbers and stakeholders knowledge on the Plumbing code of Australia. Topics covered this year included interactive water features, backflow provisions for high hazard appliances connected to plumbing systems, and changes to the Plumbing standard published by the Technical Regulator.

Several information sessions were also conducted with TAFE and Peer plumbing students on Fire Hydrant Service, Non-Drinking Water and Backflow Prevention installations. The OTR also provided advice to local council environmental health officers via local government association webinars and face to face meetings at local councils.



2021 Plumbing Roadshow

Presented by:
**Office of the Technical Regulator
Department of Energy and Mining**

Master Plumbers SOUTH AUSTRALIA

SOUTH AUSTRALIA

PLUMBING TOPICS:

- Fire services
- Backflow prevention, keeping up with AS2845.2
- Booking jobs for inspection
- Interactive water play features
- Trade waste installations
- Drainage installations
- Douche seats
- Recently published advisory notes
- Changes made to the Standard published by the Technical Regulator
- Hydraulic design submissions
- Chemical dispensers

FigureA1 W 5: 2021 Roadshow Seminar Topic

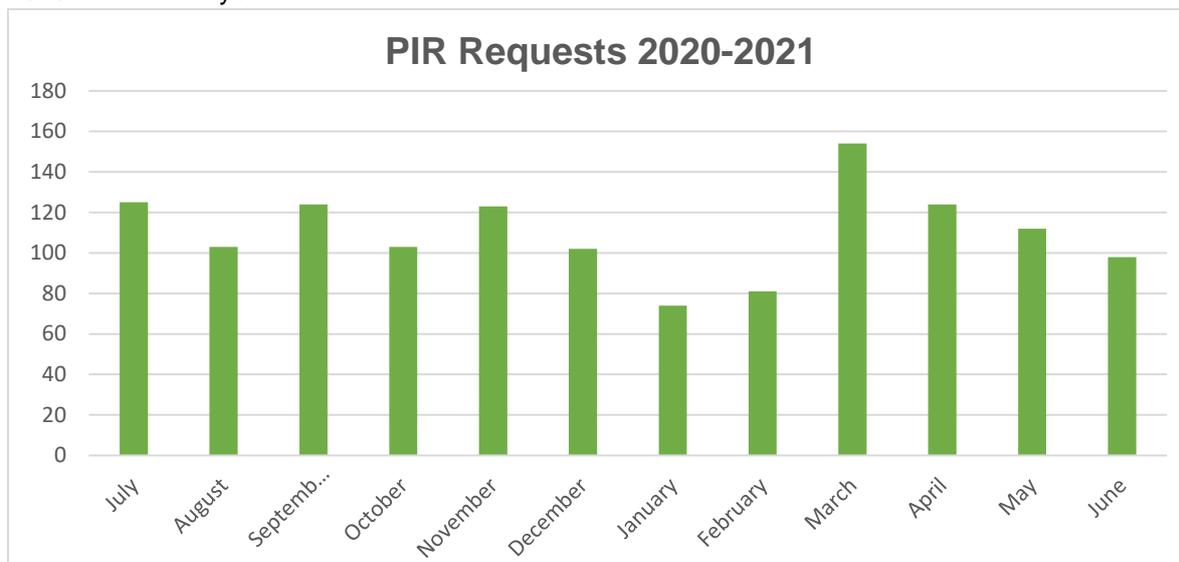
11.6. Property Interest Reporting and Data Management

11.6.1. Property Interest Reports

Property Interest Report responses are initiated when a vendor (such as a conveyancer or homeowner) submits a Form 1 Vendors Statement through the Land Titles Office. If the OTR has a registered interest in the property listed on the Form 1 Vendors Statement, the OTR will respond with details of the interest. The OTR holds an interest in properties that have been identified to have non-compliant plumbing work or backflow prevention device maintenance requirements. This process is usually initiated when a property is being prepared for sale or transfer.

The Technical Regulator processed a total of 1323 Property Interest Reporting (PIR) requests for the 2020-21 financial year, which is 12% higher than the number received the previous year.

Figure A1 W6 provides the monthly breakdown of Land Services Group (LSG) requests for the 2020-21 financial year.



FigureA1 W 6: PIR monthly statistics for 2020-21

11.6.2. Data Management

We are continuing to improve the procedures that are in place to prevent the receipt of unnecessary PIR requests. We refine these practices by completing regular cleansing of the database and interests held. This has kept the number of requests received at an optimal level without dramatic increase, as previous years have held.

It also prevents requestors, such as lawyers and conveyancers, waiting for unnecessary responses from the OTR. Response from stakeholders regarding these changes continue to be positive.

Section A12: Plumbing Products

12.1. Plumbing Products certified under the WaterMark Certification Scheme

The National Construction Code Volume Three – The Plumbing Code of Australia (PCA) sets out the performance requirements and deemed-to-satisfy-solutions for the design and construction of plumbing and drainage systems. The PCA also sets out the requirements for plumbing products used in the construction of a plumbing and drainage installation. Plumbing products are certified and authorised through the application of the WaterMark Certification Scheme.

The Australian Building Codes Board (ABCB) manage the Scheme, with the Plumbing Codes Committee including State and Territory administrations helping in the administration of this Scheme. It is important to note that not all plumbing and drainage products require WaterMark certification and authorisation. All products proposed to be used in plumbing and drainage installations require a risk assessment to be undertaken. Products that have been identified through the risk assessment process as requiring WaterMark Certification are listed in the Schedule of Products (WMSP), Products that are low risk and not required to be Watermarked are listed on the Schedule of Excluded Products (WMEP).

The scheme's objective is to deliver plumbing and drainage products that are safe and fit for their intended use in and around buildings in an environment that is increasingly challenged by reduced resources for enforcement, increased product non-conformity and an ever-expanding global market. The Office of the Technical Regulator represents South Australia on plumbing product certification matters.

South Australia assists the ABCB and product manufactures in the development and revision of Watermark technical specifications and Standards for the plumbing products.

Section A13: Regulatory Coordination

13.1. Regulatory Reform - Plumbing Code and Technical Standards

13.1.1. Revision of the Plumbing Code of Australia

The Australian Building Codes Board (ABCB) has two primary technical advisory committees, the Building Codes Committee (BCC) and the Plumbing Code Committee (PCC). These Committees provide advice to the Board to deliver its work program by providing a national forum for regulatory authorities and industry to consider technical matters relevant to building and plumbing regulation reform.

The Technical Regulator represents South Australia on the PCC, examples of recent and current work projects undertaken by the PCC include:

- Review of the 2022 National Construction Code.
- Review of the Revised AS/NZS 3500: 2021 plumbing and drainage series.
- Undertaking research and development projects to provide valuable information and input into the development of the Plumbing Code of Australia (PCA). Recent research projects have included Sanitary plumbing and drainage pipe sizing and lead in plumbing products.

13.1.2. AS/NZS 3500 Plumbing and Drainage Standards projects

Standards Australia is a standards organisation recognised through a Memorandum of Understanding with the Australian Government as the peak non-government standards development body in Australia

The Technical Regulator represents South Australia on several working sub-committees that review the AS/NZS 3500 Plumbing and drainage standard series and other Australian Standards which are referenced under the Plumbing Code of Australia.

The AS/NZS 3000 Plumbing Standard suite is periodically amended and revised to accommodate innovation or development in materials, equipment and methods, these changes are timed to coincide with the publication of the National Construction Code series. The last revision of AS/NZS 3500 Parts 1,2,3 & 4 was published on 28 May 2021. The revised standard parts will be referenced under the Plumbing Code of Australia 2022 edition.

13.1.3. Dual Reticulation Infrastructure Standard

The Technical Regulator has published the [Standard for Dual Reticulation Infrastructure \(259.9 KB PDF\)](#). It prescribes the minimum requirements and responsibilities of all parties involved in dual reticulation infrastructure to ensure the safety and reliability of the water services provided to South Australian consumers.

The Standard has been published after extensive consultation with stakeholders from the South Australian water industry.

The intent is not for legacy assets to be updated, but that going forward, the design, installation and construction of dual reticulation infrastructure including — up to the point of connection to a property — will be in accordance with the Standard.

This Standard is in addition to requirements set out in the [Water Services Association of Australia \(WSAA\)](#) codes.

A 12 month transition period was in place to allow all water industry entities time to adapt to the new requirements. The transition period ended on 30 June 2021 and it is now expected that all new infrastructure will comply with the Standard.

13.1.4. Infrastructure Standard

The Technical Regulator has published an [Infrastructure Standard](#) which adopts the [Water Services Association of Australia \(WSAA\) codes](#) as the principle minimum Standard for water and sewerage infrastructure.

The intent is not for legacy assets to be updated, but that going forward, WSAA codes, supplementary notices and supporting documents which are equivalent to or exceed WSAA requirements shall be used for any design, installation, inspection, alteration, repair, maintenance, removal, disconnection or decommissioning of water and sewerage infrastructure.

The WSAA codes complement standards, codes and guidelines in current legislation – a copy is available for viewing at the Office of the Technical Regulator.

By formalising the WSAA codes as the Infrastructure Standard, the Office of the Technical Regulator (OTR) recognises that the WSAA codes have gone through a peer-review process and are widely accepted for the requirements of water and sewerage infrastructure.

If utilities produce supplementary notices and supporting documents which are equivalent to or exceed WSAA requirements, then these will be recognised as suitable as part of this standard.

13.2. Water Industry Technical Advisory Committee (WITAC)

For the period from 1 July 2020 and 30 June 2021, two technical advisory meetings were held on 11 August 2020 and 19 April 2021. Topics covered at the meetings included:

- Dual Reticulation Infrastructure Standard
- Update on water and sewerage infrastructure
- Infrastructure Standard
- Water and Sewerage Infrastructure audit feedback
- National Performance Report Indicator review submission
- Plumbing roadshows and industry communication
- Plumbing regulation report
- Plumbing Code of Australia projects
- Continuous professional development
- Plumbing National Standard/specification reviews
- Certificates of Compliance Scheme
- Community Wastewater Management System Program
- *Water Industry Act 2012* review

Volume IV – Key Performance Indicators

Table K 1: ElectraNet Key Performance Indicators

Performance Indicator	Performance Measured	Definition of Indicator	2017- 18	2018- 19	2019- 20	2020- 21
Substation Routine Task Rate	Volume of planned substation maintenance	Number of Substation Routine Tasks completed	5,056	5,343	5, 910	5,668
Line Routine Task Rate	Planned line maintenance during the period	Number of Line Routine Tasks completed during the reporting period	1,690	1,555	1, 790	1,889
Substation Corrective Task Rate	Unplanned Substation maintenance during the period	Number of Substation Corrective Tasks completed during the reporting period	6,288	6,398	7, 768	6,079
Line Corrective Task Rate	Unplanned Line maintenance during the period	Number of Line Corrective Tasks completed during the reporting period	4,206	7,180	7, 791	8,609
Vegetation Infringements	Vegetation maintenance	Number of reported vegetation infringements unresolved within 7 days during the fire season	0	0	0	0
Fire Starts	Line maintenance	Number of fire starts caused by ElectraNet transmission assets.	0	0	0	3
Major Plant Failure Events	Events reported under 73(3)(a) of the Electricity (General) Regulations 2012	Number of failures of major plant requiring replacement (eg. HV transformers, circuit breakers, disconnectors, instrument transformers)	10	0	0	5
Electric Shock Reports	Safety	Number of shock reports	0	0	1	0

Switching Incident Rate	Switching safety	Number of switching incidents per number of switching plans issued	0.26%	0.45%	0.08%	0.40%
Lost Time Injuries	Safety	Number of injuries resulting in more than one day lost	1	0	0	0
Lost Time Injury Frequency Rate	Safety	Number of injuries resulting in more than one day lost per million hours worked	1.97	0	0	0
Medical Treatment Injuries	Safety	Number of medical treatment injuries	0	0	0	0
Medical Treatment Injury Frequency Rate	Safety	Number of medical treatment injuries per million hours worked	0	0	0	0
Contractor Safety Incidents involving Injury	ElectraNet's contract or safety	Number of reported construction and maintenance contractor safety incidents involving injury	7 (1 LTI & 6 MTI)	8 (2 LTI & 6 MTI)	7 (2 LTI & 5 MTI)	8 (0 LTI & 8 MTI)
Emergency Management Plan Exercises	ElectraNet's emergency response preparedness	Number of completed Emergency Management Plan exercises	4	6	7	5

Table K 2: Some of SA Power Networks Key Performance Indicators

Safety Management Indicators	2017/18	2018/19	2019/20	2020/21
Annual cumulative numbers of lost time accidents and near misses involving SA Power Networks personnel (including contractors)	3 Lost Time	3 Lost Time	8 Lost Time	15 Lost Time
Hazard logs greater than 30 days old	1,627 Near Miss	1,196 Near Miss	964 Near Miss	1,186 Near Miss
Number of in progress hazard logs	0	52	5	67
Actual workplace inspections carried out per annual inspections planned ¹	1	52	15	100
Number of shock reports per 1000 km of mains	1,076 ¹	1,921 ¹	2,604 /2179	N/A ²
Number of damage claims per 1000 km of mains	7.1	5.7	8.5	7.7
Number of fire starts per 1000 km of mains	2.3	1.5	2.0	2.4
Number of switching incidents	0.88	0.8	0.7	0.6
Number of completed emergency plan exercises	13	27	27	24
Technical Management Indicators				
% meters within tolerance (per planned sample)	5	4	6	5
General Information				
Number of requests for underground locations provided per year	99.04%	95.37%	96.68%	88.30%
Number of revenue metering investigations carried out per year	108,545	113,132	118,638	113,485
Audited compliance against internal vegetation clearance procedures and agreements	4,316	1,746	1,276	1,451
Number of network access permits requested and number of network access permits issued ³	Completed by GHD in December 2017	Completed by GHD in December 2018	Completed by GHD and OTR in November 2019	Completed by GHD in November 2020

Note 1: Estimated only by SA Power Networks

Note 2: Access Permits are issued for all Requests for Network Access (RNA) & for ad-hoc requests to cut trees by SA Power Networks engaged tree cutters or to dig near SA Power Networks cables

Table K 3: APA Group's Key Performance Indicators

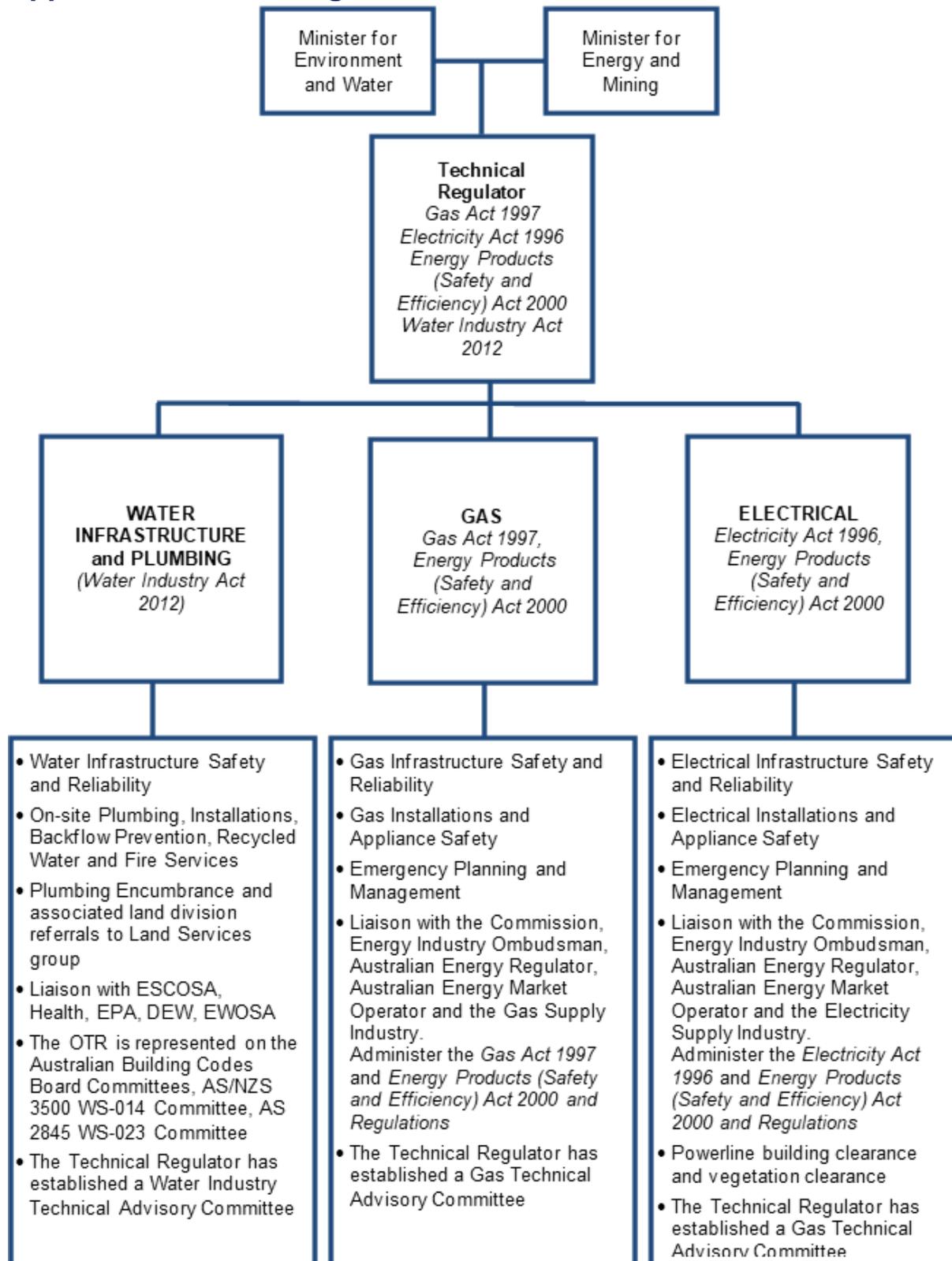
Key Performance Indicators (KPIs) for the distribution networks, as supplied by AGN, owner of the distribution networks in South Australia, and the APA Group, operator of these networks, are as follows:

KPI Section	Aspects measured
1. Safety	Network and public safety
2. Measurement	Accuracy and reliability of gas metering and measurement of gas heating value
3. Quality	Natural gas quality
4. Reliability	Reliability of gas supply and equipment
5. Connections	Safety and soundness of customer connections to the pipeline network

Key Performance Indicator	2018/19	2019/20	2020/21
1. Safety			
1.1. The maintenance of continuous, reliable gas supply			
Number of complaints of poor supply pressure	3	3	4
Number of gas outages (>5 consumers affected)	28	24	20
1.2. Instances of third-party damage			
Number of damages to the mains and services, caused by third parties	665	537	460
Number of DBYD locations provided to third parties	92,032	97,244	88,785
1.3. Dealing with potential accidents or unsafe situations			
Emergency plan exercises	4	5	3
Number of evacuations directly attributed to a gas leak from mains or inlet services	1	4	1
Number of instances where a gas leak from a network enters a building	2	15	6
Number of fires or explosions caused by a gas leak from a network	0	0	1
2. Measurement			
2.1. Extent to which meters are being changed over (Gas Measurement Management Plan)			
Number of meters changed:			
Domestic	35,522	16,441	17,184
Industrial/commercial	972	994	533
Number of overdue meters with:			
10 years' life	1,205	389	299
15 years' life	1,268	239	165
3. Gas Quality			
3.1. The quantity of gas entering the Distribution System			
Total gas entering the Distribution System (including farm taps) (TJ)	32,425	31,850	31,396
3.2. The maintenance of continuous, reliable gas supply			
Number of poor combustion/poor pressure incidents reported	3	3	4

Number of excursions exceeding one-fifth of the Lower Explosive Limit (LEL)	1	3	6
Number of excursions below 7 mg/m ³ total odorant	9	16	20
Total number of excursions from the gas quality requirements, as specified in AS 4564	0	0	0
4. Reliability			
4.1. Description and specification of Distribution System and its components			
Length of distribution system (km)	8,353	8,420	8,498
4.2. Mains replacement program²			
Total Length of mains replaced (km)	224.6	209.4	203.8
4.3. Total amount of UAFG lost from the Distribution System as a result of leakage or an activity referred to in Section 82(1) of the Gas Act 1997			
Total UAFG (TJ) (Based on AEMO data as at 30 June of each year)	692	603	437
4.4. The extent to which the public are reporting gas leaks – mains and inlets services			
Number of public reports of leaks (mains and services, excluding third party damages)	1,673	1,600	1,304
Percentage of publicly reported gas leaks where gas leak was found	87%	87%	85%
Number of leaks detected by Leakage Surveys (per km of surveyed mains)	0.27 ²	0.27	0.15
4.5. Extent of Training			
Percentage of refresher training compliance to scheduled volumes	99%	89%	87%
5. Connections			
5.1. Extent of access to system as required by return			
Number of consumer connections (at 30 June each year)	454,416	461,059	466,438
Number of new connections completed	7,979	8,323	8,005

Appendix 2: OTR Background



Appendix 3: Electronic Certificates of compliances Form

ELECTRICAL CERTIFICATE OF COMPLIANCE			
<i>As required by the Electricity Act 1996</i>			
			
Certificate Number:	E0000000		
Owner/Client name	Ms Jane Doe		
Installation Address	1 Doe St, ADELAIDE, SA 5000		
Premises Type	House/Domestic		
Date of Electrical Work	Started: 01/01/2018	Finished: 01/01/2018	Submitted: 01/01/2018
Network Operator	SAPN		
SECTION A - JOB DETAILS			
Work Category	Work Type	Work Performed	
New Install	Other	Install 2 gang socket outlet to north wall in bedroom 2 on existing RCD protected power circuit P2.	
SECTION B - WARNING : Owners & operators of electrical installations must take reasonable steps to ensure that the electrical installation is safe. Maximum penalty \$250,000. Listed below are any items considered to be unsafe or requiring remedy.			
Risk Assessment	None Observed		
REGISTERED ELECTRICAL WORKER: I certify that the work detailed in Section A complies with and has been inspected and tested by me as required by the <i>Electricity Act 1996</i> .			
Name	John Doe		
Licence Number	PGE0001		
Date Certified	13/02/2018		
CONTRACTOR/AUTHORISED PERSON: I certify that I am the contractor/duly authorised agent of the contractor and have or had a supervisory role in relation to the worker above and I am satisfied that the standards and requirements of the <i>Electricity Act 1996</i> have been complied with. Also where applicable, I am satisfied that the auxiliary gas fitting and/or water plumbing work detailed above meets the requirements of the <i>Gas Act 1997</i> and <i>Regulations and/or Water Industry Act 2012</i> including <i>Regulations and Standards</i> .			
Name	John Doe		
Business Name	J Doe Electrical		
Licence Number	PGE0001		
Phone/Mobile	0412345678	Email	ian.furness@sa.gov.au
Address	2 Does St, ADELAIDE, SA 5000		
Date Certified	13/02/2018		
The Technical Regulator does not endorse the contents of this eCoC. The Technical Regulator does not accept responsibility for the truth or accuracy of the contents of this eCoC and will not be held liable for any loss or damage suffered in consequence of reliance upon the contents of this eCoC.			
Page: 1 of 2			
Office of the Technical Regulator, GPO Box 320 ADELAIDE SA 5001 Email: otrmail@sa.gov.au Office: (08) 8226 5518 Fax: (08) 8226 5529 Information for owners and operators please visit: www.sa.gov.au/otr			

GAS CERTIFICATE OF COMPLIANCE

under the Gas Act 1997

Certificate Number: **G9999999**

Owner/Client name	Joe Owner		
Installation Address	1 Example Rd, ADELAIDE, SA 5000		
Premises Type	House/Domestic		
Date of Work	Started: 03/01/2018	Finished: 04/01/2018	Submitted: 04/01/2018
Council	Adelaide City Council		

SECTION A - JOB DETAILS

Work Category	Work Type	Work Performed	
New Install	Consumer Pipework	Composite Labels Fitted and Reversion Fitting Installed - No Copper	Gas Supply: NG Metering Pressure: 1.4

SECTION B - WARNING : Owners and operators of gas installations must take reasonable steps to ensure that the gas installation is compliant, safe and safely operated to meet the requirements of the *Gas Act 1997*.

Faults identified and brought to Customer's Attention (Mention if any)	
Have you placed defect tag/s on the faults identified?	N/A
Risk Assessment	None Observed

GAS FITTER: I certify that I have carried out the following tests/checks on the gas installation work detailed in this certificate and the results satisfy the requirements of the *Gas Act 1997* and Regulations, or I have placed a defect tag on those faults noted in the 'Faults Identified' field above.

Test for soundness	Yes
Commissioned to manufacturer's requirements	Yes
Name	Example Worker
Licence Number	PGE000111
Date Certified	04/01/2018

CONTRACTOR/AUTHORISED PERSON: I certify that gas fitting work is in compliance with the *Gas Act 1997* and Regulations. Also where applicable, I am satisfied that the auxiliary electrical work and/or water plumbing work detailed above meets the requirements of the *Electricity Act 1996* and Regulations and/or *Water Industry Act 2012* including Regulations and Standards.

Contractor Name	Example Contractor		
Business Name	Example Contracting		
Licence Number	PGE1917		
Phone/Mobile	0489765432	Email	contractor@email.com
Address	11 WAYMOUTH STREET, ADELAIDE, SA 5000		
Date Certified	04/01/2018		

The Technical Regulator does not endorse the contents of this eCoC. The Technical Regulator does not accept responsibility for the truth or accuracy of the contents of this eCoC and will not be held liable for any loss or damage suffered in consequence of reliance upon the contents of this eCoC.

Page: 1 of 2

Office of the Technical Regulator, GPO Box 320 ADELAIDE SA 5001 | Email: dsd.otr@sa.gov.au | Office: (08) 8226 5722 | Fax: (08) 8226 5866
Information for owners and operators please visit: www.sa.gov.au/otr

PLUMBING CERTIFICATE OF COMPLIANCE

under the Water Industry Act 2012



Certificate Number: **P100179**

Owner/Client name	John Smith		
Installation Address	11 WAYMOUTH STREET, ADELAIDE, SA 5000		
Premises Type	House/Domestic		
Date of Work	Started: 27/11/2017	Finished: 27/11/2017	Submitted: 27/11/2017
Council	Adelaide City Council		

Work Category	Work Type	Work Performed	
New Install	Above Ground Sanitary Plumbing	En suite on first floor	
New Install	Heated Water	Make/Model: ACME Hot Water Capacity: 20 litres Serial No.: M123456	Heated Water Type: Instantaneous Energy Source: Gas
New Install	Non Drinking Water System	In-ground	
New Install	Rainwater System	Above-ground storage tank	
New Install	Sanitary Plumbing	Bathroom Ensuite Kitchen Laundry WC	

REGISTERED PLUMBING WORKER: I certify that the plumbing and equipment referred to above complies with the *Water Industry Act 2012* including Regulations and Standards and/or the *South Australian Public Health Act 2011*.

Name	Plumbing Worker
Licence Number	PGE584
Date Certified	27/11/2017

RESTRICTED GAS WORKER: I certify that auxiliary gas work I have carried out meets the requirements of the *Gas Act 1997* and Regulations.

Name	Plumbing Worker
Licence Number	PGE584
Date Certified	27/11/2017

CONTRACTOR/AUTHORISED PERSON: I certify that the plumbing and equipment referred to above complies with the *Water Industry Act 2012* including Regulations and Standards and/or the *South Australian Public Health Act 2011*. Also where applicable, I am satisfied that the auxiliary gas fitting and/or electrical work detailed above meets the requirements of the *Gas Act 1997* and Regulations and/or *Electricity Act 1996* including Regulations and Standards.

Name	Greg Contractor		
Business Name	Plumbing Contractor		
Licence Number	PGE1228		
Phone/Mobile	0411111111	Email	worker16@test.com
Address	11 WAYMOUTH STREET, ADELAIDE, SA 5000		
Date Certified	27/11/2017		

The Technical Regulator does not endorse the contents of this eCoC. The Technical Regulator does not accept responsibility for the truth or accuracy of the contents of this eCoC and will not be held liable for any loss or damage suffered in consequence of reliance upon the contents of this eCoC.

Office of the Technical Regulator, GPO Box 320 ADELAIDE SA 5001 | Email: otr.plumbing@sa.gov.au | Office: 1300 760 311
Information for users and operators please visit www.sa.gov.au

Appendix 4: Electrical Products

A4.1. Proclaimed Electrical Products

Following are the 64 classes of products currently proclaimed under the *Energy Products (Safety & Efficiency) Act 2000* for safety purposes:

- | | |
|--|--|
| 1. Air conditioner incorporating flammable refrigerant | 33. Inspection Handlamp |
| 2. Appliance Connector | 34. Iron |
| 3. Arc Welding Machine (stick and gas shielded) | 35. Kitchen Machine |
| 4. Bayonet Lampholder | 36. Lawn Care Appliance |
| 5. Bayonet Lampholder Adaptor | 37. Light Emitting Semiconductor Lamp (Self-Ballasted) |
| 6. Beauty Care Lamp | 38. Lampholder Adaptor |
| 7. Blanket | 39. Liquid Heating Appliance |
| 8. Bread Toaster | 40. Luminaire – Portable Type |
| 9. Building Wiring Cable | 41. Massage Appliance |
| 10. Clothes Dryer | 42. Microwave Oven |
| 11. Control or Conditioning Device | 43. Miniature Over-Current Circuit Breaker |
| 12. Cooking Appliance – Portable Type | 44. Nightlight-Mains Socket-Outlet Mounted |
| 13. Cord Extension Socket | 45. Outlet Device |
| 14. Cord-Line Switch | 46. Over blanket / Duvet / Wrap |
| 15. DC Isolator | 47. Plug |
| 16. Decorative Lighting Outfit (chains) | 48. Power Supply or Charger |
| 17. Dishwashing Machine | 49. Range |
| 18. Double-capped light emitting semiconductor lamp | 50. Range Hood |
| 19. Edison Screw Lampholder | 51. Razor/Hair Clipper |
| 20. Electric Hot Water Bottle | 52. Refrigerating Appliance |
| 21. Evaporative Cooler | 53. Residual Current Device |
| 22. Fan | 54. Room Heater |
| 23. Fence Energiser | 55. Socket-Outlet |
| 24. Flexible Heating Pad | 56. Socket-Outlet With Supply Flexible Cord |
| 25. Fluorescent Lamp Ballast | 57. Soldering Iron |
| 26. Fluorescent Lamp Starter | 58. Supply Flexible Cord |
| 27. Glue Gun | 59. Swimming Pool/Spa Equipment |
| 28. Hair Care Appliance | 60. Therapeutic Lamp |
| 29. Heating Pad – Flexible | 61. Tool, Portable Type |
| 30. Hedge Clipper | 62. Vacuum Cleaner |
| 31. Immersion Heater | 63. Wall Switch |
| 32. Insect Electrocuter | 64. Water Heater |

Appendix 5 Electrical definitions, formulas and units

A5.1. Definitions

Availability	Percentage of time over a year when generating plant was available (after megawatt losses due to outages are taken into account); based on megawatt hours.
Cogeneration	Production of useful heat and electricity from the same quantity of fuel.
Distribution Licence	An industry code administered by ESCOSA (adherence to the Code is a condition of a distribution licence).
Meshed	Part of a ring main where failure at one point can be isolated and supply system backfed from elsewhere in the system as opposed to radial system, which has only one point of supply.
Network Outage Time Reliability	A measurement of the time that the network cannot supply energy Indication of capability of electricity supply system to meet demand; measured by the number of hours when plant was out of service.
SAIDI	The total of the duration of each customer interruption (in minutes) divided by the total number of customers averaged over the year.
SAIFI	The total number of customer interruptions divided by the average total number of customers over the year.
Generation	Production of electricity in power stations, solar arrays and wind farms.
Transmission	Transport of electricity to the distribution network by high voltage transmission lines.
Distribution	Delivery of electricity to consumers through the network
Reliability of supply	Ability to maintain sufficient generation or flow of electricity to meet the demand of end users.
Security of supply	Ability to provide responses to the failure of plant and equipment so as to continue the supply of electricity.
Transmission	Circuit availability Measured by the hours all circuits are available expressed as a percentage of the total possible hours they could be available.
Distribution reliability	Total duration of customer supply interruptions (minutes off supply) per customer per annum, averaged over the year Measured by the System Average Interruption Duration Index (SAIDI).

A5.2. Performance Indicator Definitions

Planned outages	Planned outages generally involve overhaul work, either on a unit or components, planned well in advance, usually by more than a year.
Maintenance outages	Maintenance outages require the removal of a unit or component from service for work which can be deferred beyond the next weekend but must be carried out before the next planned outage.
Forced outages	Forced outages involve the removal of a unit or component from service for work that cannot be deferred beyond the next weekend. The term “equivalent” refers to the conversion of partial outages to equivalent full outages.

Starting reliability Starting reliability is the percentage of time the plant actually starts when called upon. This is only reported for power stations classed as peaking plants. For base load plants, starting reliability is not applicable as the plant is run continuously.

A5.3. Performance Indicator Formulae

Planned Outage Factor

$$\frac{\text{MWh out of service due to planned outage} \times 100\%}{\text{Installed plant capacity (MW)} \times 8760 \text{ hours}}$$

Maintenance Outage Factor

$$\frac{\text{MWh out of service due to maintenance outages} \times 100\%}{\text{Installed plant capacity (MW)} \times 8760 \text{ hours}}$$

Equivalent Forced Outage Factor

$$\frac{\text{MWh out of service due to forced outage} \times 100\%}{\text{Installed plant capacity (MW)} \times 8760 \text{ hours}}$$

Equivalent Availability Factor

$$\frac{(\text{Installed plant capacity (MW)} \times 8,760 - \text{MWh losses due to outages}) \times 100\%}{\text{Installed plant capacity (MW)} \times 8760 \text{ hours}}$$

Medical Injury Frequency Rate

$$\frac{\text{Number of occurrences in the period}}{\text{Number of hours worked in the period}} \times 1,000,000$$

A5.4. Units

J	Joule – unit of energy
W	watt (1W = 1 joule/second) – unit of power
Wh	watt-hour (1Wh = 3,600J) – unit of electrical energy
V	Volt – unit of Voltage
VAR	Volt Amp Reactive – unit of reactive power

A5.5 Prefixes

m(milli)	10 ³
K(kilo)	10 ³ (thousand)
M(mega)	10 ⁶ (million)
G(giga)	10 ⁹ (billion)
T(tera)	10 ¹² (trillion)

Appendix 6: Plumbing Standard

WATER INDUSTRY ACT 2012

Plumbing Standard

Technical Regulator

This Standard varies the Plumbing Standard published in the Gazette on 9 January 2014.

This Standard is published by the Technical Regulator pursuant to section 66 of the *Water Industry Act 2012* (the Act). This Standard comes into effect on the date on which it is gazetted.

This Standard relates to plumbing, including plumbing work or any equipment, products or materials used in connection with plumbing.

This Standard applies to the following persons:

1. licensed plumbing contractors (under the *Plumbers, Gas Fitters and Electricians Act 1995*) contracting for plumbing work.
2. licensed building work contractors (under the *Building Work Contractors Act 1995*) contracting for plumbing work.
3. registered plumbing workers (under the *Plumbers, Gas Fitters and Electricians Act 1995*) carrying out plumbing work.

The above mentioned persons, must comply with the following requirements:

(a) Relevant components of the National Construction Code Volume 3 (Plumbing Code of Australia) (including any standards referred to therein) as amended from time to time, as follows:

1. Section A Governing Requirements, Section A, Parts A1, A2, A3, A4, A5, A6 and A7;
2. Section B Water Services, Parts B1, B2, B3, B4, B5 and B6;
3. Section C Sanitary Plumbing and Drainage Systems, Parts C1 and C2;
4. Section D Excessive Noise, Part D1;
5. Section E Facilities, Part E1;
6. Schedule 1 State and Territory Variations and Additions, Appendix South Australia- Sections B, C, SA Section F, Schedule 3 and Schedule 4;
7. Schedule 2 Abbreviations and Symbols;
8. Schedule 3 Defined Terms;
9. Schedule 4 List of Referenced Documents;

(b) The requirements outlined in the Government of South Australia Verification Method for an Electric Resistance Storage Water Heater Supplied by On-Site Renewables (Supply).

The Technical Regulator may grant an exemption from this Standard, or specified provisions of this Standard, with or without conditions as the Technical Regulator considers appropriate.

Dated: 23 April 2019

R. Faunt
Technical Regulator

Appendix 7: Scheme for Plumbing Certificates of compliance

WATER INDUSTRY ACT 2012

TECHNICAL REGULATOR

Scheme under section 69(2)

Plumbing Certificate of Compliance

(1) **Title**

This Scheme is established by the Technical Regulator under section 69(2) of the *Water Industry Act 2012* (the Act) and may be cited as the *Plumbing Certificate of Compliance Scheme*.

(2) **Commencement**

The Scheme will come into operation on 9 January 2017.

(3) **Interpretation**

In the Scheme:

- (a) **contractor** means a plumbing contractor licensed under the *Plumbers, Gas Fitters and Electricians Act 1995* (PGE Act) or a building contractor licensed to contract for plumbing work under the *Building Work Contractors Act 1995*;
- (b) **Electronic Certificate of Compliance** means the electronic Certificate of Compliance approved by the Technical Regulator;
- (c) **equipment** includes pipes, fittings and apparatus and any component of any equipment;
- (d) **Paper Certificate of Compliance** means the Plumbing Certificate of Compliance approved by the Technical Regulator as in operation immediately prior to 9 January 2017;
- (e) **plumbing** means water plumbing, sanitary plumbing or draining work on the customer's side of any connection point or any other work defined in the regulations.
- (f) **plumbing worker** means a plumbing worker registered under the PGE Act;

(4) **Application**

- (1) The Electronic Certificate of Compliance must be used by contractors and plumbing workers.
- (2) The Electronic Certificate of Compliance must be used to verify that plumbing and equipment are compliant with the *Water Industry Act 2012* and/or the *South Australian Public Health Act 2011* including regulations and standards as applicable, and the work falls within the terms of the contractor's licence and the worker's registration.

(5) Use of Certificates of Compliance

- (1) The Paper Certificate of Compliance may be used until and including 30 June 2018. Requirements relating to completion of the Paper Certificate of Compliance remain as they were prior to 9 January 2017.
- (2) The Electronic Certificate of Compliance may be used from 9 January 2017, and must be used on and after 1 July 2018.

(6) Completing the Certificate of Compliance

- (1) To complete an Electronic Certificate of Compliance:
 - (a) If you are a plumbing worker employed by a contractor -
 - (i) you must complete the details of the worker sections and provide it to your employing contractor.
 - (b) If you are the contractor employing a plumbing worker -
 - (i) after receiving the Electronic Certificate of Compliance from the plumbing worker you must complete the contractors section.
 - (c) If you are the contractor and the plumbing worker -
 - (i) you must complete both the contractors and workers sections.
 - (d) If you are a plumbing worker and -
 - (i) not operating a plumbing business as a contractor and undertaking work for no financial gain; or
 - (ii) are employed as a plumbing worker to perform plumbing work at the employers place of business –you need only complete the workers sections.
- (2) After completion of the work you must:
 - (a) within 7 days, provide the Electronic Certificate of Compliance to the Technical Regulator and the owner or operator of the installation; and
 - (b) within 28 days, provide the Electronic Certificate of Compliance to the relevant Council if applicable.

(7) Additional required documentation

Where applicable the following must also be provided to the Technical Regulator with the Certificate of Compliance:

- (1) 'internal sanitary drain as constructed drawings' showing the position and dimensions of the pipes, fittings and equipment associated with sanitary drains; and/or
- (2) backflow prevention device commission, inspection and maintenance reports, when commissioning or re-testing backflow prevention devices; and/or
- (3) fire service installation reports.

(8) Copies of Certificate of Compliance

A copy of the Certificate of Compliance must be retained by the contractor for 5 years.

(9) Official forms

A Paper or Electronic Certificate of Compliance must be completed using only an electronic or hard copy form published or produced under the authority of the Technical Regulator.

(10) Variation or revocation of Scheme

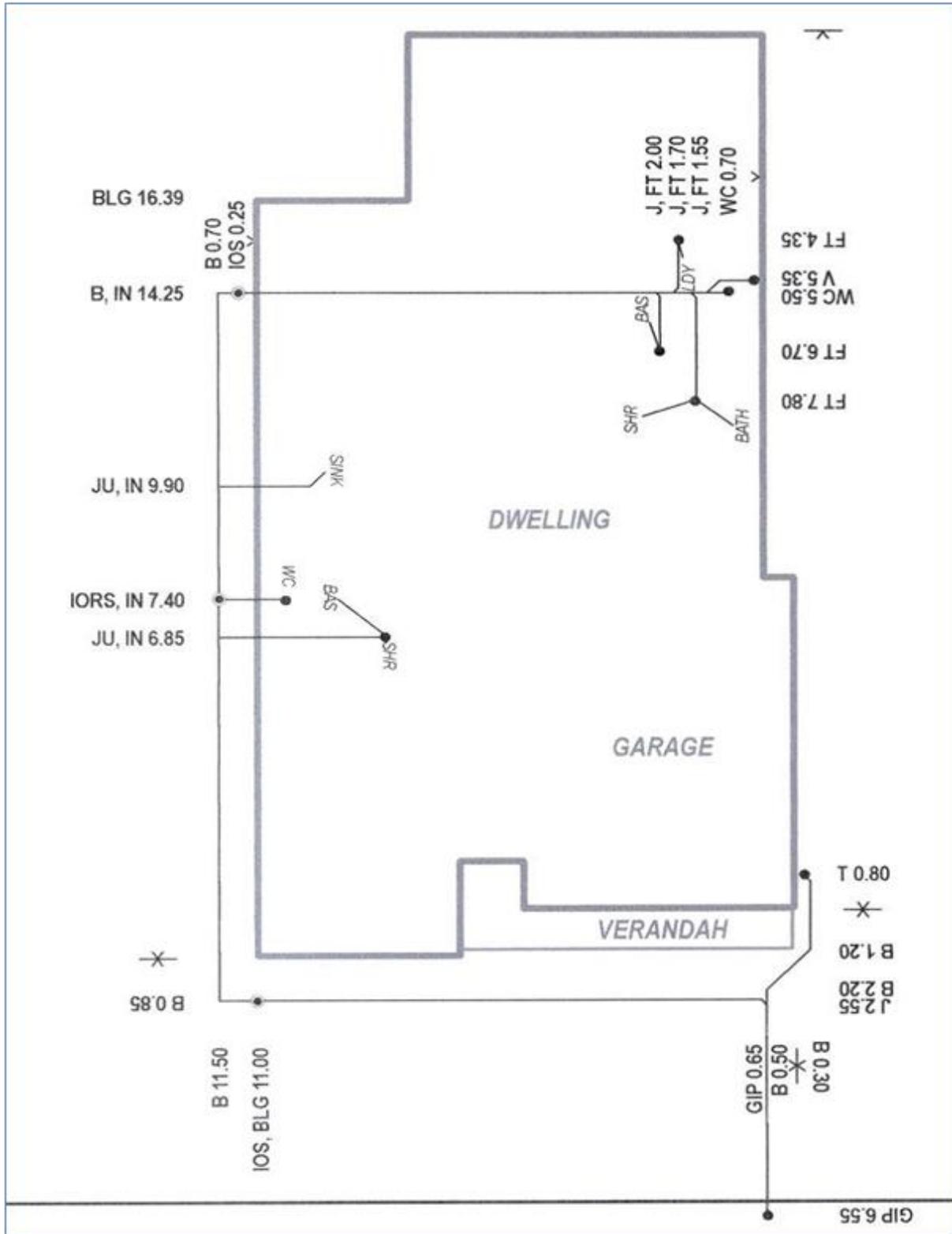
This Scheme may be varied or revoked by the Technical Regulator.

Dated 5 January 2016



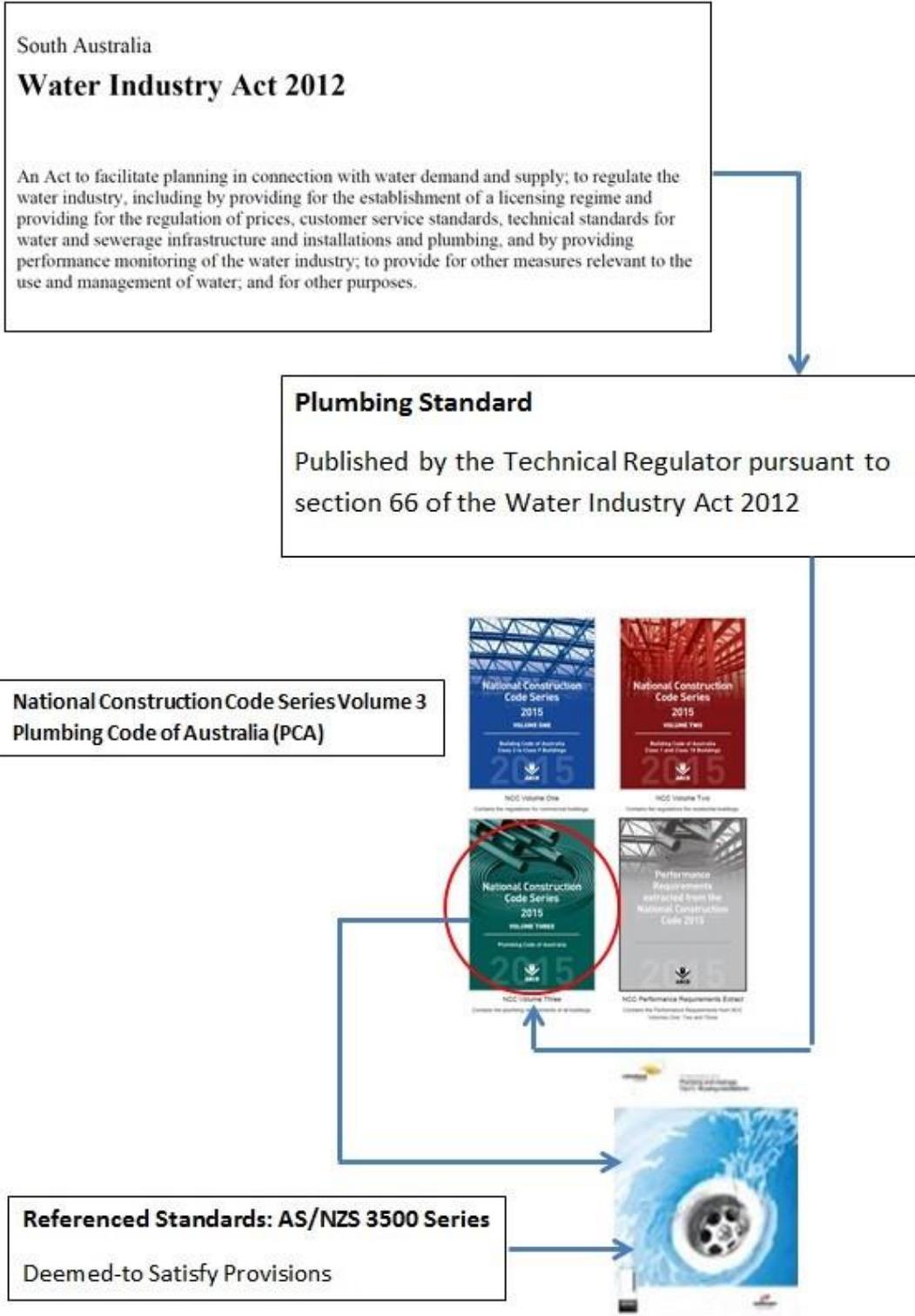
R. FAUNT
TECHNICAL REGULATOR

Appendix 8: Example of internal Drain as Constructed Drawing



Appendix 9: Plumbing Code within the regulatory framework

How the Plumbing Code of Australia fits into the Regulatory Framework



Appendix 10: Water Industry Entities and licences

Licensee	Licence category	Drinking water	Non-drinking water	Sewerage
Adelaide Hills Council	Intermediate	No	Yes	Yes
Adelaide Plains Council	Minor	No	Yes	Yes
Alano Utilities Pty Ltd	Minor	No	Yes	Yes
Alexandrina Council	Intermediate	No	Yes	Yes
Berri Barmera Council	Intermediate	No	Yes	Yes
BHP Billiton Olympic Dam Corporation Pty Ltd	Minor	Yes	No	No
Cape Jaffa Anchorage Essential Services Pty Ltd	Minor	Yes	No	Yes
City of Onkaparinga - sewerage	Intermediate	No	Yes	Yes
City of Onkaparinga - water	Minor	No	Yes	No
City of Port Adelaide Enfield	Minor	No	Yes	Yes
City of Port Lincoln	Minor	No	Yes	No
City of Salisbury	Intermediate	No	Yes	No
City of Tea Tree Gully	Intermediate	No	Yes	Yes
City of Playford	Minor	No	Yes	No
Clare & Gilbert Valleys Council	Intermediate	No	Yes	Yes
Coorong District Council	Intermediate	No	Yes	Yes
Copper Coast Council	Intermediate	No	Yes	Yes
CPE Tonsley Pty Ltd	Intermediate	No	Yes	No
District Council of Barunga West	Intermediate	No	Yes	Yes
District Council of Ceduna	Intermediate	Yes	Yes	Yes
District Council of Cleve - Arno Bay	Minor	No	Yes	Yes
District Council of Cleve - Cleve	Minor	No	Yes	Yes
District Council of Coober Pedy	Minor	Yes	Yes	Yes
District Council of Elliston	Minor	Yes	Yes	Yes
District Council of Franklin Harbour	Minor	Yes	Yes	Yes
District Council of Grant	Intermediate	No	Yes	Yes
District Council of Karoonda East Murray	Minor	No	Yes	Yes
District Council of Kimba	Minor	No	Yes	Yes

District Council of Lower Eyre Peninsula	Intermediate	No	Yes	Yes
District Council of Mount Barker	Intermediate	No	Yes	Yes
District Council of Mount Remarkable	Intermediate	Yes	Yes	Yes
District Council of Orroroo Carrieton	Minor	No	Yes	Yes
District Council of Peterborough	Intermediate	No	Yes	Yes
District Council of Robe	Intermediate	No	Yes	Yes
District Council of Streaky Bay	Intermediate	No	Yes	Yes
District Council of Tumbly Bay	Intermediate	No	Yes	Yes
District Council of Loxton Waikerie	Intermediate	No	Yes	Yes
ERA Water	Minor	No	Yes	No
F.B. Pipeline Pty Ltd	Minor	Yes	No	No
Fairmont Utilities Pty Ltd	Intermediate	Yes	Yes	Yes
Flinders Ranges Council - Hawker	Minor	No	No	Yes
Flinders Ranges Council - Quorn	Minor	No	No	Yes
Kangaroo Island Council	Intermediate	No	Yes	Yes
Kingston District Council	Intermediate	No	Yes	Yes
Light Regional Council	Intermediate	No	Yes	Yes
Lightsview Re-Water Supply Co Pty Ltd	Minor	No	Yes	No
Michell Infrastructure Pty Ltd	Minor	No	Yes	No
Mid Murray Council	Intermediate	No	Yes	Yes
Monarto Water Network Ltd	Intermediate	No	Yes	No
Municipal Council of Roxby Downs	Intermediate	Yes	Yes	Yes
Naracoorte Lucindale Council	Minor	No	No	Yes
Northern Areas Council	Intermediate	No	Yes	Yes
NWIC Pty Ltd	Intermediate	No	Yes	No
Port Augusta City Council	Intermediate	No	Yes	Yes
Port Pirie Regional Council	Intermediate	No	Yes	Yes
Regional Council of Goyder – Burra	Minor	No	Yes	Yes

Appendix 11: Checklist for SRMTMPs and audits



Safety, reliability, maintenance
and technical management plans
Office of the Technical Regulator

Internal audit checklist

This checklist is to be used by water industry entities.

It should be used when completing an annual internal audit of compliance with their safety, reliability, maintenance and technical management plan.

Contact details			
Water industry entity			
Contact name		Phone	
Contact title		Email	

1. Introduction			Comments
a)	Is the Safety, Reliability, Maintenance and Technical Management Plan (SRMTMP) effective and functional?	<input type="radio"/> Yes <input type="radio"/> No	
b)	Has the purpose of the SRMTMP changed?	<input type="radio"/> Yes <input type="radio"/> No	
c)	Have the scope and objectives changed?	<input type="radio"/> Yes <input type="radio"/> No	
d)	Is the responsible person for the SRMTMP still current?	<input type="radio"/> Yes <input type="radio"/> No	
e)	Is the organisational chart up to date?	<input type="radio"/> Yes <input type="radio"/> No	
f)	Have any roles and responsibilities for the key position(s) changed?	<input type="radio"/> Yes <input type="radio"/> No	
g)	Is the communication strategy for the plan still current?	<input type="radio"/> Yes <input type="radio"/> No	
h)	Are relevant legislation, codes and standards listed?	<input type="radio"/> Yes <input type="radio"/> No	
i)	Are the major approvals and licenses listed?	<input type="radio"/> Yes <input type="radio"/> No	

2. Description of the operation			Comments
a)	Do the assets summary and the high level descriptions including system/scheme list reflect your current infrastructure?	<input type="radio"/> Yes <input type="radio"/> No	
b)	Is there additional asset design and operational information?	<input type="radio"/> Yes <input type="radio"/> No	
c)	Who is responsible for operations?	Name	
		Phone	
		Email	

3. Operational safety and reliability			Comments
a)	Leadership and commitment Has there been any changes to: <ul style="list-style-type: none"> the person who is responsible for water and/or sewerage infrastructure safety WHS policy statement employee selection, competency and training commitment contractor and end-user training commitment? 	<input type="radio"/> Yes <input type="radio"/> No	

Internal audit checklist

b)	Effective planning Has there been any changes to: <ul style="list-style-type: none"> • design management approach • design life of plant in line with nominated standards or otherwise • safety in design requirements adopted • procurement systems and processes? 	<input type="radio"/> Yes <input type="radio"/> No	
c)	Controlled implementation Has there been any changes to: <ul style="list-style-type: none"> • construction and commissioning management systems • safe operational procedures • maintenance and reliability considerations • decommissioning, demolition and abandonment/disposal • emergency response management? 	<input type="radio"/> Yes <input type="radio"/> No	
d)	Monitoring and evaluation Has there been any changes to: <ul style="list-style-type: none"> • incident management, including classification, reporting and investigation • document management system • reporting requirements? 	<input type="radio"/> Yes <input type="radio"/> No	
e)	Audit and review Has there been any changes to auditing processes, reviews and responsibilities (including, but not limited to, long-term evaluation plans)?	<input type="radio"/> Yes <input type="radio"/> No	
4. Formal safety and reliability assessment			Comments
	Has there been any changes to the: <ul style="list-style-type: none"> • hazard identification and rating system • risk response mitigation and controls • risk assessment principles and guidelines? 	<input type="radio"/> Yes <input type="radio"/> No	
5. Asset management			Comments
	Has there been any changes to the: <ul style="list-style-type: none"> • asset management system • change management system • operations and maintenance strategies • maintenance program? 	<input type="radio"/> Yes <input type="radio"/> No	
6. Contract management			Comments
	Has there been any changes to the: <ul style="list-style-type: none"> • contract management system • contract assessment process • contractor management - that is, CMS? 	<input type="radio"/> Yes <input type="radio"/> No	
7. Customer/public protocols and agreements			Comments
	Has there been any changes to the: <ul style="list-style-type: none"> • stakeholder communication protocols • public communication protocols • education and notices related to recycled water • supply agreements - statement and/or list of recipients • register of customer contact — issues raised, identified and the response? 	<input type="radio"/> Yes <input type="radio"/> No	

Internal audit checklist

8. Compliance monitoring		Comments
Has there been any changes to the: <ul style="list-style-type: none"> • performance monitoring and compliance structure • KPI measurement and reporting processes • periodic operations audits / water quality monitoring and compliance • corrective actions and continuous improvement strategies? 	<input type="radio"/> Yes <input type="radio"/> No	
9. Emergency response and incident reporting		Comments
Were there any emergencies or incidents? If yes; <ul style="list-style-type: none"> • How many? • Were the incident(s) reported in accordance with the OTR requirements? • Were the incident(s) investigated (internally/externally)? 	<input type="radio"/> Yes <input type="radio"/> No	
10. Update of the SRMTMP		Comments
a) Has the version table in the SRMTMP been updated and all changes noted?	<input type="radio"/> Yes <input type="radio"/> No	
b) Has the updated version of the SRMTMP been provided to the OTR for approval?	<input type="radio"/> Yes <input type="radio"/> No	

Submission

This form should be submitted via email to DEM.OTRWS@infrastructure.sa.gov.au

Submit

Appendix 12: Glossary and Abbreviations

ABCB	Australian Building Codes Board
AC	Alternating Current
ACCC	Australian Competition and Consumer Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AGA	Australian Gas Association- this is a gas appliance certification body (CAB) proclaimed by the Governor
AGN	Australian Gas Network Limited formally known as Envestra Limited – entity holding a gas distribution licence in South Australia
AHSCA	Association of Hydraulic Services Consultants Australia (South Australia)
AMP	Asset Management Plan
APA Group	Australian Pipeline Group and other associated entities
AS	Australian Standard
AS/NZS	Australian or Joint Australian/New Zealand Standards
AWA	Australian Water Association
BBQ	Barbecue
BCA	Building Code of Australia
BCC	Building Codes Committee
BOM	Bureau of Meteorology
CAB	Conformity Assessment Body
CBD	Central Business District
CBS	Consumer Business Services - The licensing authority in SA
CCASA	Caravan and Camping Association of South Australia
CFS	Country Fire Service
CI	Cast Iron
CO	Carbon Monoxide
COAG	Council of Australian Governments
CoC	Certificate of Compliance
CWMS	Community Wastewater Management Scheme
DC	Direct Current
Deemed-to-Satisfy provisions	The Deemed-to-Satisfy provisions are an optional means of achieving compliance with the mandatory Performance Requirements
DBYD	'Dial Before You Dig' - This telephone (1100) and internet service provides location information on infrastructure, such as gas pipelines, to protect these assets during excavation work
DHW	Department for Health and Wellbeing
DPTI	Departments of Planning, Transport and Infrastructure, formerly DTEI
eCoC	Electronic Certificate of Compliance
ElectraNet	Short form of ElectraNet SA, the trading name of ElectraNet Pty Limited
EMPIA	Electronic Management of Plumbing Inspections and Audits

EPA	Environment Protection Authority
Equipment	Includes - (a) Pipes, fittings and apparatus; and (b) any component of any equipment
ERAC	Electrical Regulatory Authorities Council
ESISC	Energy Supply Industry Safety Committee
ESCOSA	Essential Services Commission of South Australia
ETSA	Short form of Electricity Trust of South Australia Utilities (Now known as SA Power Networks)
EWOSA	Energy and Water Ombudsman South Australia
FIA	Fire Industry Association
Global Mark	A gas appliance certification body (CAB) proclaimed by the Governor
GMMP	Gas Measurement Management Plan
GTRC	Gas Technical Regulators Committee
HDPE	High Density Polyethylene
HIA	Housing Industry Association
HV	High voltage
IAPMO	International Association of Plumbing and Mechanical Officers – a gas appliance certification body (CAB) proclaimed by the Governor
IEEE	The Institute of Electrical and Electronics Engineers
IGA	Inter Government Agreement
Incident	Described in the <i>Gas Regulations 2012</i> as an ‘accident’; an event causing death, injury or property damage; a gas related incident is when natural gas or LP gas or their products of combustion is (or is suspected of being) directly involved
In-house	Testing performed by the operator, using their own facilities, such as meter testing performed at the laboratory of the APA Group depot
In-testing	Removal of a meter from service and test in a laboratory; if the meter is found to be satisfactory, it can be made available for re-use (if not, it will be repaired or scrapped)
kPa	Kilo Pascal (1000 Pascals) – unit of pressure
KPI	Key Performance Indicator
LED	Light Emitting Diode
LGA	Local Government Association
LMP	Leakage Management Plan
LNG	Liquefied Natural Gas
LP gas	Liquefied Petroleum Gas
LSG	Land Services Group
LV	Low voltage (less than 1000 volts; nominally 400/230 volts)
MAP	Moomba-Adelaide Pipeline – Gas pipeline that supplies natural gas to Adelaide from the Moomba processing plant
MBA	Master Builders Association
MCE	Ministerial Council on Energy
MED	Major Event Day
MEPS	Minimum Energy Performance Standards

MFS	Metropolitan Fire Service
ML	Mega Litre
MPA	Master Plumbers Association
MRA	Mutual Recognition Agreement or Act allowing legal recognition in one jurisdiction of product approval or testing procedures in another jurisdiction
NATA	National Association of Testing Authorities
NCC	National Construction Code
NEM	National Electricity Market
NERL	National Energy Retailer Law
NGERAC	National Gas Emergency Response Advisory Committee
OTR	Office of the Technical Regulator
PCA	Plumbing Code of Australia
PCA pipeline	Port Campbell to Adelaide Pipeline
PCC	Plumbing Code Committee
PIR	Property interest reports
Plumbing	<ul style="list-style-type: none"> a. water plumbing work, sanitary plumbing work or draining work on the Customer's side of any connection point. b. any other work brought within the ambit of this definition by the regulations;
POL connection	'POL' is a type of valve for LP gas cylinders and the most common type in Australia. The 'POL' is an acronym for the company that first produced the valves, Prest-O-Lite.
PTAC	Plumbing Technical advisory committee
QSN link	Queensland, South Australia and New South Wales link – pipeline from South West Queensland to the Moomba gas plant in SA
RCM	Regulatory Compliance Mark
RDNS	Royal District Nursing Society
Regulation Roundup	Bi-annual newsletter of the Technical Regulator to the gas, electrical and plumbing industry
RIS	Regulatory Impact Statement
Roadshow	Technical presentation by the Technical Regulator to gas fitters, provided free of charge annually in Adelaide city and regional centres
RVMAA	Recreational Vehicle Manufacturers Association Australia
SA	South Australia
SA Water	South Australian Water Corporation
SafeWork SA	Government department that administers the Dangerous Substances Act
SAIDI	System Average Interruption Duration Index
SAIG	Standards Australia International Global-this is among other things a gas appliance certification body (CAB) proclaimed by the Governor
SAILIS	South Australian Integrated Land Information System
SAP	Safety Awareness Plan
SAPN	SA Power Networks - Operator of the electricity distribution network in South Australia
SAPOL	South Australian Police

SCADA	Supervisory Control and Data Acquisition
SCO	Senior Committee of Officials
SEAGas	South East Australia Gas Pipeline – Gas pipeline that supplies natural gas from Victoria to Adelaide
SEPS	South East Pipeline System: a lateral gas pipeline off the SEA Gas pipeline that supplies natural gas to the Mt Gambier region
SRMTMP	Safety, Reliability, Maintenance and Technical Management Plan
Standards	Standards are either Australian or joint Australian and New Zealand Standards, as issued by Standards Australia (or previously published by Australia Gas Association).
STEDS	Septic Tank Effluent Disposal Scheme
STTM	Short Term Trading Market
SWE	Significant Weather Event
SWER	Single Wire Earth Return (19kV rural distribution feeder)
SWQ	South West Queensland
TAC	Technical Advisory Committee
TAFE	Training and Further Education
TGC	Tamar Gas Certification
the Commission	Essential Services Commission of South Australia
TJ	Terajoule (one million megajoules) – unit of energy
TOR	Terms of Reference
Type A	Mass produced, gas appliances, primarily domestic appliances, which are pre-certified by testing prior to sale and installation
Type B	Gas appliances, primarily industrial appliances, which must be certified on site to AS 3814
UAFG	Unaccounted for gas – difference between the quantity of natural gas measured into the network and the quantity measured out at consumers' meters; the difference may be due to leaking gas, differences in meter reading times, meter inaccuracy, gas theft, line pack differences and gas lost during commissioning of pipelines
UPS	Unprotected Steel pipe
USAIDI	Unplanned System Average Interruption Duration Index
WITAC	Water Industry Technical Advisory Committee
WSAA	Water Services Association of Australia