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energy Bulletin

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Safety checks of home solar installations

Over 10,000 new domestic solar systems were installed in WA between July and December 2011. Given such an increase, monitoring photovoltaic (PV) installations to ensure they are safe and comply with regulations has become a pressing issue.

Energy*Safety*, with the assistance of network operator inspectors, conducted an audit of 260 grid-connected solar installations in Western Australia. Our findings have revealed the industry still has a long way to go to achieve compliance with relevant Australian standards and legislation.

Half of the installations inspected were defect-free, while the remaining 50 per cent contained at least one defect:

- Category 1 – potential fire risk if DC switch operated at full load. This relates primarily to incorrect wiring of the DC circuit breaker.
- Category 2 – AS/NZS 3000:2007, Wiring Rules defects, examples include:
  - o Incorrectly sized protective devices;
  - o Inadequate mechanical protection of cables; and
  - o IP index of equipment was not suitable for the environment.
- Category 3 – Missing or incorrect warning labels.

Wiring Rules defects and labelling errors comprised 11 per cent and 27 per cent respectively. While none of these installations posed an immediate threat of an electric shock or fire hazard, these defects require rectification. Inspector's Orders were issued for these defects to be corrected.

What is concerning, is 12 per cent of the installations had incorrect wiring which is a potentially serious defect. AS5033:2005, Installation of photo-voltaic (PV) arrays requires a DC isolating device on the DC side of the inverter. Many installers used double-pole DC circuit breakers, which were either polarised or non-polarised.

If the circuit breaker is incorrectly wired, a serious fire hazard can result should the correct shutdown procedure not be followed.

Householders and businesses must have confidence that their solar system meets stringent safety standards. Energy*Safety* and network operator inspectors will continue their surveillance of solar installation work to encourage and, where necessary, enforce compliance.

Only licensed electrical contractors may perform the solar installations. A Preliminary Notice and Notice of Completion are required to be submitted to the relevant network operator for each installation and an Electrical Safety Certificate provided to the customer. If a copy of the Electrical Safety Certificate has been provided to the solar company, please ask the company to pass it on to the owner of the premises.

The Energy*Safety* audit report can be viewed at www.energysafety.wa.gov.au under reports and discussion papers.

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Overview of activities 2010-11

Introduction

Energy*Safety* comprises four Directorates:

1. Gas Directorate, headed by David Allan;
2. Policy and Electrical Engineering Directorate, headed by Don Saunders;
3. Electricity Compliance Directorate, headed by Michael Bunko; and
4. Business Services Directorate, headed by Joe Bonfiglio.

The principal functions of Energy*Safety* can be summarised as:

- administering electricity and gas technical and safety legislation and providing policy and legislative advice to the Minister and Government;
- setting and enforcing minimum safety standards for electricity and gas networks;
- enforcing natural gas and LP Gas quality standards;
- for the purpose of ensuring satisfactory billing of consumers by gas suppliers, administering the regulatory scheme that determines the "higher heating value" of natural gas in distribution systems subject to the commingling (mixing) of gas from different sources;
- providing technical advice and support to the Economic Regulation Authority (ERA) and the Energy Ombudsman;
- at the request of the ERA or Energy Ombudsman, investigating the performance of electricity and gas network operators, particularly in respect of energy supply reliability and quality;
- setting and enforcing minimum safety standards for consumers' electrical and gas installations;
- setting and enforcing safety and energy efficiency standards for consumers' electrical and gas appliances;
- licensing electrical contractors, electrical workers and gas fitters and carrying out accident investigations; and
- promoting electricity and gas safety in industry and the community.

Operational work including compliance enforcement activities

Electricity distribution systems

Following the comprehensive audit of 2008, Energy*Safety* continued its focus on improving the safety of wooden electricity distribution poles in the Western Power and Horizon Power systems. Energy*Safety* is working with both organisations on programs to improve the accuracy and relevance of pole inspection and testing methods aimed at producing data needed for effective and safe management of these critical community assets.

Gas Industry Trade Expo

On 16 March 2011, to coincide with the release of AS/NZS 5601, Gas Installations, Energy*Safety* held the first Gas Industry Trade Expo in Western Australia to showcase the downstream side of the gas industry. The Expo was a great success with 49 industry exhibitors and more than 800 visitors attending.

The Expo provided an opportunity for gas fitters and plumbers to see the latest advances in technology and meet gas suppliers, retailers, training providers and regulators in one location. It proved to be an ideal opportunity for industry and Energy*Safety* to work together and promote safety and training.

Bushfire investigations

Energy*Safety* carried out major investigations into significant wild fires allegedly caused by Western Power's electricity distribution system. At the Government's direction, Energy*Safety*, the Fire and Emergency Services Authority of Western Australia, Western Australia Police and Western Power jointly developed a protocol to guide coordinated investigations of bushfires suspected to have been ignited by electricity.

RCD Campaign

The RCD campaign was officially launched by the Minister for Commerce, Hon Simon O'Brien MLC, on 17 January 2011.
The campaign comprised television, press, online and radio

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Alternative formats of this publication may be available to meet the needs of people with disabilities.

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advertisements. The campaign objective was to encourage home-owners of properties built prior to 2000 to have two RCDs fitted to their premises. Results of the survey to gauge the effectiveness of the campaign were encouraging, with 79 per cent of 560 homeowners interviewed agreeing that the campaign would make them want to install an RCD.

Increased demand for licensing services

The Licensing Office at Energy*Safety* again experienced a high volume of electrical and gas licence applications. The increased workload was managed well by staff of the Licensing Office.

Electrical Licensing

As at 30 June 2011, there were **32,682** electrical workers, **4,151** electrical contractors and **235** in-house licence holders registered.

The Electrical Licensing Board grants licences to eligible electrical operatives and conducts competency assessments of operatives when necessary.

It also recommends disciplinary action when appropriate.

Members of the Electrical Licensing Board as at 30 June 2011 were:

- Mr K McGill – Chairman.
- Mr J Murie – representing the interests of electrical workers.
- Mr P Beveridge – representing the interests of electrical contractors.
- Mr G Grundy – representing the interests of electrical workers with restricted licences.
- Mr G Bryant – representing the interests of large businesses, who are consumers of electrical services.
- Mr P Mittonette – representing the interests of small businesses, who are consumers of electrical services.
- Ms L McGuigan – a residential consumer of electrical services.
- Mr D Saunders – nominated by the Director of Energy Safety.

The Electrical Licensing Board met **22** times during the year.

Gas licensing

As at 30 June 2011 there were **7,282** persons registered for gas fitting work.

The Gas Licensing Committee, operating under the delegation of the Director of Energy Safety, considered applications for licences to gas operatives. Routine licenses for gas operatives were dealt with by licensing staff under delegated authority.

Members of the Gas Licensing Committee as at the 30 June 2011 were:

- Mr J Bonfiglio – Chairman.
- Mr K Hooper – Chief Gas Inspector.
- Mr D Robertson – Principal Engineer Gas Utilisation.

The Gas Licensing Committee met **21** times during the year.

Prosecutions

The following tables provide summaries of prosecutions finalised during 2010-11. Prosecutions follow investigations by Inspectors, then review and authorisation by senior management of Energy*Safety*. The investigations are often initiated by an Inspector of the electricity and gas network operators, as part of their consumer electrical or gas installation inspection work.

Summary of prosecution actions for breaches of the electricity related legislation

Legislation	*Breach*	*Number of Offences*	*Penalties $*
Electricity Act 1945	*Section 25(1) (a) – Failed to ensure service apparatus was in a safe and fit condition for supplying electricity.*	*2*	*56,299.40*
Electricity (Supply Standards and System Safety) Regulations 2001	*Section 10(1) – Failed, so far as reasonable and practicable, to operate its network (prescribed activity) in such a way as to provide for the safety of persons, including employees of and contractors to the operator.*	*1*	*8,649.70*

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Legislation	Breach	Number of Offences	Penalties $
Electricity (Licensing) Regulations 1991	*Regulation 50(A) – Permitted unsafe wiring or equipment to be connected to an electrical installation.*	*1*	*2,649.70*
	Regulation 62 – Failed to report an unsafe installation to the relevant Network Operator.	*1*	
	Regulation 52(3) – Sending Notice of Completion of notifiable work in relation to uncompleted work.	*8*	*22,248.10*
	Regulation 53(2) – Employing, engaging or instructing an unlicensed person to carry out electrical work for which a licence was required.	*3*	*4,175.00*
	Regulation 63 – Failed to report an electrical accident to the relevant Network Operator.	*1*	*4,649.70*
	Regulation 49(1) – Carried out unsafe and substandard electrical work.	*10*	*34,948.00*
	Regulation 19(1) – Carried out electrical work whilst not authorised by a licence or permit.	*2*	*5,825.70*
	Regulation 33(1) – Carried out business as an electrical contractor without a licence.	*2*	*1,149.70*
	Regulation 50(1) – As an employer, failed to provide effective supervision of an apprentice.	*4*	*14,319.70*
	Regulation 52(1) – Failed to give Notice of Completion within required time.	*2*	*0.00*
	Regulation 51(1) – Failed to deliver Preliminary Notice within required time.	*2*	*4,649.70*
TOTAL		***39***	***159,564.40***

E(L)R Electricity (Licensing) Regulations 1991
EA *Electricity Act 1945*
E(SS&SS)R Electricity (Supply Standards and System Safety) Regulations 2001
* Global Penalty (more than one offence)

Summary of prosecution actions for breaches of the gas related legislation

Legislation	Breach	Number of Offences	Penalties ($)
Gas Standards Act 1972	*Section 13A(2) – Carried out gasfitting work while not holding a certificate of competency, permit or authorisation allowing him to do so.*	*3*	*17,000.00*
Gas Standards (Gasfitting and Consumer Gas Installations) Regulations 1999	*Regulation 18 – Failing to ensure gas installation complies with prescribed requirements.*	*2*	*$5,040.00**
	Regulation 30 – Failing to rectify defects and give notice of rectification within required time.	*2*	*
	Regulation 32 – Failed to ensure installation complied with the codes & standards.	*2*	*
TOTAL		***9***	***$22,040.00***

* Global Penalty (more than one offence)

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Summary of Infringement Notices issued for breaches of electricity related legislation

Legislation	Breach	Number of Offences	Penalties ($)
Electricity Act 1945	*33B(2) – Selling or hiring or exposing or advertising for sale or hire, prescribed appliance without approval.*	*4*	*17,000.00*
Electricity (Licensing) Regulations 1991	*52(3) – Sending Notice of Completion of notifiable work in relation to uncompleted work.*	*26*	*62,500.00*
	45(1) – Failed to display licence number in an advertisement.	*1*	*1,000.00*
	63 – Failed to report an electrical accident to the relevant Network Operator.	*1*	*2,000.00*
	52(1) – Failed to give Notice of Completion within required time.	*1*	*2,000.00*
TOTAL		***33***	***84,500.00***

E(L)R Electricity (Licensing) Regulations 1991
EA *Electricity Act 1945*

Summary of Infringement Notices issued for breaches of gas related legislation

Legislation	Breach	Number of Offences	Penalties ($)
Gas Standards Act 1972	*Section 13A(2).*	*9*	*13,000.00*
Gas Standards (Gasfitting and Consumer Gas Installations) Regulations 1999	*Regulation 18(2)(a) – Failing to ensure gas installation complies with prescribed requirements.*	*33*	*19,800.00*
	Regulation 20(1)(b) – Installing appliance, apparatus or part contrary to instructions or recommendations of manufacturer or designer.	*6*	*3,600.00*
	Regulation 23 – Failing to record service information in required manner.	*1*	*400.00*
	Regulation 26(1)(a) – Failing to ensure gas installation meets requirements as to pressure testing and is gas-tight.	*9*	*5,200.00*
	Regulation 28(2) – Failing to attach approved badge or label to gas installation upon completion of gasfitting work.	*15*	*6,000.00*
	Regulation 28(3) – Failing to give notice of completion of gasfitting work within required time.	*46*	*18,400.00*
	Regulation 34(1) – Failing to keep records of employed gas fitters in required manner.	*1*	*1,250.00*
	Regulation 42A – Failing to report defect rendering gas installation unsafe.	*1*	*600.00*
TOTAL		***121***	***68,250.00***

Major Policy Work

National Regulatory Reform Projects

During 2010/11 Energy*Safety* continued work with electrical and gas safety regulators of other jurisdictions to make significant contributions to various national regulatory reform projects.

- **Electricity and gas licensing**
  The Interim Advisory Committees continued to provide advice on licensing policy. Draft Regulations and a Consultation Regulation Impact Statement for each occupational area will be released for public comment in the first half of 2012. The public will have six to eight weeks to comment on the proposal. The draft Regulations and the Regulation Impact Statement will be made available on the Energy*Safety* website.
- **Appliance safety**
  Energy*Safety* contributed to the Electricity Regulatory Advisory Council's new Australia wide approval and certification scheme for electrical appliances and equipment.
- **Electricity supply safety**
  Energy*Safety* continued as an active participant in the Energy Supply Industry Safety Committee, developing a new standard for safety cases applicable to the electrical power industry, improving the mobility of the energy supply industry workforce and reviewing operational safety practices across jurisdictions. The result will harmonise electricity supply safety management throughout Australia.

Standards development work

During the year, Energy*Safety* played a significant role in the development of Australian Standards.

Committee participation

Aside from major work on several key technical standards committees, Energy*Safety* continued to be involved in a number of national regulatory coordination and other technical standards bodies.

The following is a summary list:

- National Regulatory Coordination Bodies
  - Electrical Regulatory Authorities Council (ERAC)
  - Gas Technical Regulators Committee (GTRC)
  - National Equipment Energy Efficiency Committee (Committee E3)
- National Standards Councils, Boards and Committees
  - Council of Standards Australia (representing the Government of WA)
  - Electrotechnology Standards Sector Board
  - AG6 Gas Installations
  - AG5 Industrial Gas Appliances
  - AG8 Gas Distribution
  - AG9 Natural Gas Vehicle Technical Standards
  - AG10 Specification for Natural Gas Quality
  - AG11 Gas Component & Industrial Equipment Standards Committee
  - CH-038 Liquefied Petroleum Gas
  - EL1 Wiring Rules and related sub-committees
  - EL2 Electrical Appliance Safety
  - EL4 Electrical Accessory Safety
  - EL11 Electricity Metering
  - EL42 Renewable Energy Power Supply Systems
  - EL43 High Voltage Electrical Installations
  - ME46 Gas Fuel Systems for Vehicle Engines.

Safety statistics: Serious accidents and fatalities

The following were reported to Energy*Safety* during 2010/11:

Electric shocks	1,053
Serious electrical accidents	12
Fatalities	4

The following data is provided for accidents (based on the date of the accident). This data may not include all accidents due to time lags in reporting such accidents.

Serious electricity related accidents notified per million population*

Year	Number	Five Year Average
2000-01	11	15
2001-02	12	15
2002-03	18	16
2003-04	16	15
2004-05	23	16
2005-06	15	17
2006-07	9	16
2007-08	10	15
2008-09	9	13
2009-10	6	10
2010-11	13	9

NB: Electrical shock incidents recorded are for the date of incident and are for current notifications entered and received from 01/07/10 until 30/06/11

*Electrical shock incidents resulting in the person requiring treatment at a medical facility.

The serious electricity related accidents included four fatalities in which electricity was found to be the cause:

- A 22 year old male died after he received a fatal electric shock when he touched a caravan. A damaged power cord on an outlet board energised the wet floor of the caravan and its frame.

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- An 18 year old female was walking home from a party and died after she walked into a live fallen public street lighting switch wire.
- A 78 year old male died after touching a home made electric fence.
- A 46 year old male received a fatal electric shock when he contacted an exposed cable joint in the roof space while repairing a plaster ceiling.

Gas related incidents and fatalities

Serious gas related accidents	3
Fatalities	0

Serious gas related accidents notified per million population*

Year	Number	Five Year Average
2000-01	7	6
2001-02	5	6
2002-03	8	6
2003-04	5	5
2004-05	7	5
2005-06	4	5
2006-07	6	5
2007-08	5	5
2008-09	4	4
2009-10	7	5
2010-11	3	5

NB: Gas related accidents recorded are for the date of incident and are for current notifications entered and received from 01/07/10 until 30/06/11

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electrical focus

A warning on VIR and TRS wiring

Many domestic installations wired before 1960 have potentially deadly VIR (Vulcanised Indian Rubber) and TRS (tough rubber sheathed) cables of some form. This wiring has exceeded its serviceable life and poses a risk of electrocution for electricians, other tradespersons, homeowners and persons entering the roof space.

VIR wiring was installed as an "open wiring" system where single insulated cables were supported with wooden or porcelain cleats on top of the ceiling joists (Note: single insulated accessible open wiring systems are no longer permitted in installations in Western Australia).

These cables were installed without mechanical protection and in locations where they could be easily touched. Connections to the open wiring system were made using unenclosed joints anywhere along the cable. The wiring to switches or socket outlets, for example, were installed inside steel conduits located in the walls. Consumer's mains were also enclosed in steel conduit. These conduits could be made live if the wiring insulation perished.

VIR and TRS wiring systems pose a risk because the standards of the day did not require earthing conductors to be insulated or the cable joints to be enclosed. They were not designed to handle increasing household power demands and do not meet the current electrical safety standards. Very often the high temperatures in roof spaces or excessive circuit loading may cause the wire to overheat and lead to the insulation deteriorating.

Anecdotal evidence suggests that VIR and TRS insulation has a service life of no more than 30 years. This maximum service life takes into account the deterioration due to natural aging of the rubber and to high ambient temperatures in roof spaces. This deterioration of the cable insulation may result in bare live conductors in the roof space and possibly bare live conductors in wall conduits and behind fittings.

Deteriorated rubber insulation exposing live conductors.

Once the integrity of the rubber insulation is breached, the live conductors are exposed as shown in the photograph below. This is a safety hazard for anyone entering the roof space.

Several fatalities have occurred as a result of touching bare exposed conductors of deteriorated VIR wiring. Last year, a young man received a fatal electric shock when he made simultaneous contact between exposed live conductors of VIR wiring and bare earth conductors in the roof space of his parent's house.

Energy*Safety* has attempted to encourage owners of pre-1960 premises, through newspaper advertisements, to engage a licensed electrical contractor to have the electrical wiring checked and rewired if VIR or TRS wiring are present.

Electrical contractors encountering VIR or TRS wiring in an installation should undertake an assessment and be mindful that the wiring could be in a poor state and potentially hazardous. In the majority of cases, the wiring will need to be replaced. It is essential that they isolate the electricity supply before commencing any work on the installation and before entering the roof space.

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Electrical contractors are also required to notify the owner or occupier of the premises and the relevant network operator of unsafe wiring so that appropriate action can be taken to rectify the defect (i.e. inspect the installation and issue an Inspectors' Order).

If the customer has agreed to the replacement/rewiring of the VIR, the electrical contractor should note on the Notice of Completion and Electrical Safety Certificate that the defective wiring has been replaced, as well as reporting the matter to the relevant network operator as required by the Electricity (Licensing) Regulations 1991.

Reporting is required irrespective of whether the customer agrees or refuses to have the defective wiring replaced.

Reporting defects

Whenever electricians are working on jobs in the roof space, please ask them to check for any defective work. All defects should be brought to the attention of the owner and if unsafe, reported to the network operator. Typical unsafe defects that require reporting include (but not limited to):

- unenclosed joints;
- lighting fittings not installed with the minimal clearances to combustible materials;
- wiring which has not been fixed, which is readily accessible and is therefore exposed to mechanical damage; and
- deteriorated VIR and TRS wiring.

Clarification on submission of Notices for notifiable work for transportable buildings and generators

For transportable buildings (i.e. dongas), Notices are to be submitted to the network operator of where the final destination of the building will be located/connected. For example, if they are assembled in Perth but are intended to be delivered to a site serviced by a network operator (i.e. Horizon Power for Karratha), Preliminary Notices and Notices of Completion must be sent to that network operator.

New Australian Standards available

Australian/New Zealand Standards have released two new standards of interest to electrical contractors.

AS/NZS 5761:2011, In-service safety inspection and testing – Second-hand equipment prior to sale, published on 4 August 2011, details the procedures for inspection and testing and safety requirements for second-hand appliances offered for sale.

AS/NZS 5762:2011, In-service safety inspection and testing – Repaired electrical equipment, also published on 4 August 2011, details the safety requirements for repair work on second-hand appliances.

Infringement issued at 2011 Royal Show

During a recent inspection campaign, Energy*Safety*'s Inspectors came across an unconventional hand-held "insect-electrocutor" offered for sale. The seller claimed that the appliance was approved by another State jurisdiction. He was unable to substantiate his claim with a "Certificate of Approval".

The dual-purpose appliance can be used both as an "insect electrocutor" and as a hand-held torch.

It is charged through a standard Australian 3-pin plug which is located in its dismountable handle. This part of the appliance contains an LV to ELV battery charger. After charging is complete, the battery-charger end can either:

- be screwed back in position and be used as a hand-held "insect electrocutor"; or
- be used as a hand-held torch.

The store holder received an Infringement Notice with a penalty of $5,000.00 for selling this unapproved electrical appliance.

Electrical contractor failed to install MEN connection

The MEN is a vital part of any electrical installation. There have been a number of instances where the installation of the MEN has been omitted or has been disconnected for testing purposes and then not reinstated. This is a very serious breach of the Electricity (Licensing) Regulations 1991.

In one instance an electrical contractor installed and connected

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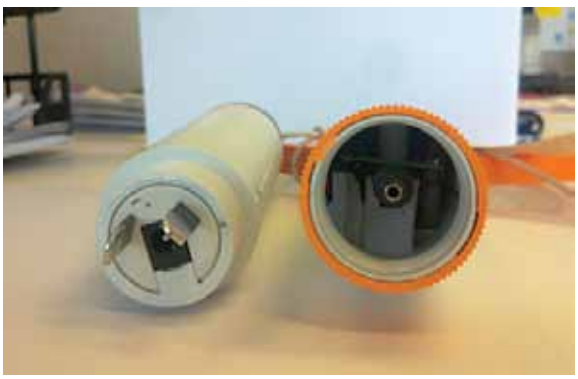

The "insect electrocutor" and charger.

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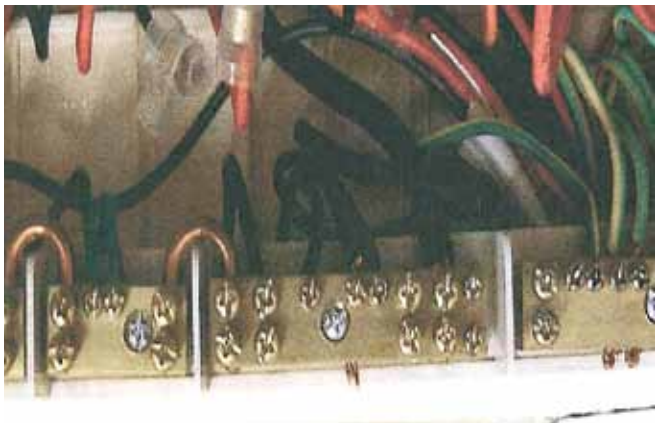

Distribution switchboard showing no MEN connection.

underground sub-mains from the main switchboard to a distribution switchboard. A subsequent inspection revealed that the MEN connection had not been installed at the distribution switchboard as shown in the photograph above. The electrical contractor also failed to check and test the electrical installation, which would have identified the serious omission.

Failure to install a MEN connection can result in the death of a person. Where there is no MEN connection and an active to earth fault occurs in the house, any person in contact with any part of the installation that is earthed could receive an electric shock, possibly fatal.

This matter was brought before the Courts where the electrical contractor pleaded guilty. The Magistrate handed down a penalty of $1,000.00 and court costs of $649.70 for the unsafe and sub-standard work.

Electrical contractor prosecuted for failing to terminate a cable and enclosing a cable junction in a roof space

An investigation revealed an electrical contractor had failed to inspect and test the electrical installation he was working on, which resulted in several defects. One of these was a light switch cable which had not been terminated and a cable junction in the roof space which was not enclosed as shown in the photographs in the next column.

The contractor was engaged to install the main switchboard, connect the consumers mains and kWh meter and the fitting off of final sub-circuits associated with lighting, oven/hot plate and power circuits.

It was fortunate that this installation was not connected to the electricity supply, as a fatal electric shock could have occurred.

Cable junction in roof space not enclosed.

Light switch cable which has not been terminated.

Failure to enclose a cable junction in a cable junction box in a roof space means that a person working in the roof space could inadvertently receive an electric shock if they came into contact with unprotected conductors. Persons have died from coming into contact with inadequately enclosed joints in a roof space.

The matter was brought before the court and the contractor pleaded guilty. A fine of $3,500.00 was imposed with court costs of $649.70.

Q & A with Stuart Voss – recipient of the 2011 Energy*Safety* Apprentice Award

Energy*Safety* would like to congratulate the recipient of the 2011 Energy*Safety* Apprentice award, Stuart Voss, pictured below with Energy*Safety's* newly appointed Director of Electricity Compliance, Michael Bunko. At NECA WA's annual industry Excellence Awards night held on 19 August 2011, electrical apprentice Stuart Voss was honoured and received both the WA Industrial Apprentice of the Year award and Energy*Safety*'s Apprentice Safety award. NECA's Excellence Awards honour those working in the electrical and communications industry who have demonstrated work practices of an excellent standard throughout the year.

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Stuart Voss and Director Electricity Compliance, Michael Bunko.

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After winning this award, the editor of the Energy Bulletin interviewed Stuart which is reproduced below.

Q: Congratulations Stuart on winning both the WA Industrial Apprentice and EnergySafety Apprentice Award. How did both of these nominations come about?

A: I have been fortunate to have had the support of my EGT field officer, Charlie Vallani for the majority of my apprenticeship. Charlie nominated me for the awards this year as well as in the past. The awards start with a nomination and then a panel of judges look at areas of your apprenticeship such as feedback from host employers, off-the-job training performance and general performance and attitude towards your work. If successful you progress to interview stage and the awards are attributed by a panel of industry peers based on the selection criteria. The Energy*Safety* award is an additional award based on the rules and regulations governing our industry. All applicants are given an exam questionnaire containing questions derived from publications such as the WAER, AS/NZ 3000 and AS/NZ 3008.

Q: What influenced your decision to undertake an electrical apprenticeship?

A: After working in sales and marketing roles for many years and undertaking marketing studies at ECU I decided I wanted a change in direction and to do an electrical trade. Electricity has always interested me as my Father is an Electrician, maybe it's in the blood. I undertook a mature age apprenticeship at 32 and I have enjoyed every bit of it. It is the best decision I have ever made.

Q: Were there any challenges involved in being a mature aged apprentice? Was it a difficult transition to go back to studying after full-time employment?

A: As a mature age apprentice there is some short term financial sacrifices to be made so you have to be sure you want it and you have to be determined to make it work. From a learning point of view I have always thrived on knowledge and I really enjoyed learning the trade. I didn't find it difficult going back to study as I enjoyed the subject matter and I was lucky to have the dedicated lecturers at CET in Balcatta to support me and pass on their knowledge and experience.

Q: Can you tell us what are some of the important electrical safety tips you have taken with you from on and off-the-job training?

A: I think the main safety tips I have learned both on and off-the-job have been never assume anything, always treat every installation as live and test before you touch. Along with always isolating, testing and tagging. I have developed a work practice where I don't take anyone's word for my safety. I believe I am responsible for my own safety and I want to go home to my family at the end of every day. I take my safety and the safety of others very seriously. I double check and test everything.

Q: What are your career plans for 2012?

A: I have started working in the family electrical business under the guidance of my father. I hope to learn from his many years of experience and become a good electrician. Also, to grow the business and see where that path takes me.

Q: What is the most valuable piece of advice you would give to apprentices who have just embarked on their apprentice journey?

A: Firstly I would say this trade is not only about electricity, it is equally about safety. Along with this trade comes a huge responsibility with regards to the safety of others and yourself. I would also say learn as much as you can and the more effort you put into your apprenticeship the more knowledge you gain and the better electrician you will be. Enjoy the process and enjoy the trade. It is an exciting technical field you have entered and it will offer you many diverse paths. I know an apprenticeship is just the beginning of the learning process and many years are to follow but a good apprenticeship is a good foundation on which to launch your career.

Prosecutions for breaches of electricity legislation

1 September 2011 to 29 November 2011

Name (and suburb of residence at time of offence)	Licence No.	Legislation and Breach	Offence	Date of Offence	Fine ($)	Court Costs ($)
Apollo Electrotech (Bibra Lake)	EC000171	E(L)R Regulation 45(1)	Failed to conspicuously display licence number in an advertisement	Between 05/12/08 and 18/12/08	1,000.00	649.70
Slobodan Bajic (Morley)	EW122699	E(L)R Regulation 49(1)	Carried out unsafe and substandard electrical work	Between 01/05/09 and 25/05/09	3,500.00	649.70
Slobodan Bajic T/As Bajic Electrical (Morley)	EC008015	E(L)R 1991 Regulation 52(3)	Sending Notice of Completion of notifiable work in relation to uncompleted work			
Symmetrical Group Pty Ltd T/ As Symmetrical Group (Innaloo)	EC008696	E(L)R Regulation 52(3)	Sending Notice of Completion of notifiable work in relation to uncompleted work	25/11/09	2,500.00	649.70
Westpoint Electrics Pty Ltd (Thornlie)	EC006086	E(L)R Regulation 53(3)	Employing and instructing an unlicensed person to carry out electrical work while not authorised by licence or permit.	Between 01/08/09 and 23/10/09	2,500.00	649.70

Table amended as of the 21 March 2012.

Legend NLH No Licence Held
EA *Electricity Act 1945*
E(L)R *Electricity (Licensing) Regulations 1991*
* Global Fine or Costs issued

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gas focus

Heading off illegal on-line buying and selling of gas appliances

Shopping website eBay has prepared and implemented educational messages for sellers and buyers of mass produced gas appliances in Australia, through their Global Asset Protection Regulatory and Policy Management team.

The educational messages are intended to stop the trade of appliances that do not meet the Australian safety requirements or burn fuel gases not available in Australia.

The educational messages are designed to advise sellers and buyers of gas appliances in Australia, that the appliances must be approved by an Australian State/Territory gas technical regulator who recognises the certification by assessment bodies such as the Australian Gas Association (AGA), SAI Global, IAPMO Oceana or Global-Mark Pty Ltd, before they can be sold, installed or used in the respective Australian State/Territory.

These educational messages were prepared by eBay on advice from Energy*Safety* and Queensland's Department of Employment, Economic Development and Innovation. Figure 1 shows the message for sellers and Figure 2 the message for buyers.

A number of WA consumers have reported to Energy*Safety* that they have been unable to have a gas appliance, purchased on eBay, installed by a gas fitter. Gas fitters in WA are aware that they must install only approved appliances or face attracting an infringement and/or penalty.

Figure 1: Listing for sellers

Figure 2: Listing for buyers

Industrial and commercial gas-fired appliances to now comply with AS 3814 under pipeline licenses

The Petroleum Division of the Department of Mines and Petroleum, in liaison with Energy*Safety* has agreed to impose a condition covering industrial and large commercial gas appliances in future pipeline licenses granted under the *Petroleum Pipelines Act 1969* and its regulations. This condition will require the gas appliances (Type B gas appliances) to be designed, manufactured and operated in compliance with the Australian Standard, AS 3814, Industrial and commercial gas-fired appliances.

This does not mean that the appliance will be certified under the *Gas Standards Act 1972* (Act) and its associated Regulations, Gas Standards (Gasfitting and Consumer Gas Installations) Regulations 1999.

To achieve compliance to AS 3814 the pipeline operator may consider applying the existing process regulated in the *Gas Standards Act,* for example use the services of a designated independent Type B Inspector.

The independent designated Type B gas appliance inspector can not issue a Certificate of Compliance or affix an approval badge since this would be in breach of the Act and Regulations. As an independent contractor the inspector is not indemnified in relation to any liability for injury, property damage

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or consequential damages resulting from the exercise of his or her power. The inspector must adequately insure himself/herself against any potential liability.

Pluto LNG Project

Energy*Safety* recently visited the onshore facilities of the Pluto LNG Project that is located between the existing North-West Shelf Project and Dampier Port on the Burrup Peninsular.

The Pluto LNG Park facility is expected to commence processing gas from the Pluto and Xena gas fields (located approximately 190km north-west of Karratha) into liquefied natural gas (LNG) in early 2012. The offshore gas will be piped to the onshore Pluto LNG Project and then liquefied for transport to overseas customers.

The Pluto LNG Project was initially approved in July 2007 and construction commenced soon thereafter for the onshore facilities, including a single LNG processing train in addition to storage facilities (two LNG tanks of 240,000 m^3) and an LNG and condensate export jetty. The LNG processing train when in operation is expected to produce 4.3 million tonnes per annum. The main customers will be Kansai Electric and Tokyo Gas who each hold a 5% equity stake in the project together with the remaining 90% stake held by Woodside Burrup Pty Ltd as the operator.

Currently there is a transition taking place from the construction to the commissioning and operational phases of the plant. There is an integrated start-up approach to production with the construction team being joined on-site by the pre-commissioning, commissioning and pre-operations teams.

The plant has industrial gas appliances (Type B gas appliances) on-site which include the following:

- two large GE Frame 7 gas turbines (800 GJ/h each natural gas consumption) used for gas compression;
- four medium GE Frame 6 (402 GJ/h each natural gas consumption) gas turbines used for gas compression;
- a Gasco Pty Ltd regenerative thermal oxidiser (6 GJ/h natural gas consumption) used for air pollution control; and
- seven John Zink Company flare packages each with four (Site A series) or three (Site B series) pilot burners (75 MJ/h each natural gas consumption) used to eliminate waste gas and also act as a safety system for non-waste gas.

Plans are already in place for the next two onshore LNG trains at the LNG Park with their construction start up anticipated to be at the end of 2014.

The Pluto LNG Project will initially utilise gas from the North-West shelf delivered through a lateral connected to the Dampier to Bunbury Natural Gas Pipeline.
The Type B gas appliance inspector is David Brown of Australian Gas and Inspection Services and the Pluto LNG Project Commissioning Engineer is Mike Gentry of Woodside Burrup Pty Ltd.

Pluto LNG gas turbine generators.

Pluto LNG Park.

Recognition of Polytechnic West gap automotive training course, service and repair of compressed natural gas fuel systems for Class E Permit restricted to LNG and CNG

Energy*Safety* has now recognised the Polytechnic West gap Automotive Training Course, which includes service and repair of CNG fuel systems, as forming a suitable prerequisite for the training qualification requirements for a Class E permit restricted to servicing and repair of both LNG and CNG mobiles in Western Australia (WA).

The decision reached by Energy*Safety* was based on the apparent need for permits, particularly for those Class E gas fitters working on combined LNG/CNG engine systems, such as Westport Power Inc. that use significantly higher gas pressures than those of fumigated engines. Already on the roads in WA there are seven Kenworth trucks equipped with the Westport HPDI engine.

View of Kenworth truck with Westport HPDI system showing one of two multiple LNG containers.

View of Westport HPDI system on Kenworth truck.

This recognition is conditional upon the trainee having a current LNG Final Certificate for AURT304466A Repair LNG fuel systems and AURT304470A Service LNG fuel systems or be holders of a current Class E Permit restricted to LNG.

As part of the training course, Polytechnic West has developed an online flexible learning facility using the Moodle Library Resource which allows staged access for trainees to the CNG unit within the course and has practical institutional assessment.

A person successfully completing the training and assessment, issued with a Completion Certificate will be deemed to have adequate theoretical and practical knowledge of the *Gas Standards Act 1972* and the Regulations required for licensing purposes. An application including a Completion Certificate may be made to the Energy*Safety* Licensing Centre for a Class E Permit restricted to service and repair of LNG and CNG mobiles.

Polytechnic West is proposing to conduct the one day courses on an as needed basis at their Carlisle Campus. Contact person at Polytechnic West for starting dates and details of courses is Amanda Dowling, phone 9374 6111 on Monday to Wednesday, 9267 7425 on Thursday or email amanda.dowling@polytechnic.wa.edu.au.

Gas installations in caravans and boats where the existing installation complied with requirements applicable at the time

Energy*Safety* has issued a global/generic variation/exemption, GVE 11/44 under Regulation 32(1)(b) of the Gas Standards (Gasfitting and Consumer Gas Installations) Regulations 1999 (Regulations) for existing gas installations in caravans, boats or similar vehicles or marine craft used for non-propulsive purposes that were completed prior to 19 July 2011.

After this date, AS/NZS 5601, Gas installations was fully adopted in WA after a transition period of six months from gazettal. The adoption of the current standard for already existing installations in caravans, boats or similar vehicles or marine craft used for non-propulsive purposes was considered onerous, needlessly expensive and unfair by both consumers and gas Inspectors where Notices of Completion or badges have previously been omitted, removed, lost, damaged or destroyed from the original caravans, boats or similar vehicles or marine craft.

As the application for variation/exemption is normally to a code or standard, it was considered inappropriate in this case and was considered in terms of complying with a specified requirement under regulation 32(3)(c) of the Regulations.

The main differences between the current and previous Australian Gas Code (AG 601–1998) and joint Australian Standard/Australian Gas codes (AS 5601/AG 601-2000, AS 5601/AG 601-2002, AS 5601–2004 respectively) referred to in Schedule 7 of previous versions of the regulations, was in relation to the requirements for flame safeguard systems to all burners of gas appliances and upgrading of the ventilation openings to caravans, boats or similar vehicles or marine craft.

These differences between the current standard and previous codes/standards are addressed through conditions of the variation/exemption including the following:

1. There is evidence possessed by the consumer (owner/operator) of the date of manufacture of the caravan, boat or similar vehicle or marine craft occurring prior to 19 July 2011 (Vehicle/hull identification or equipment number, installation and registration date etc).
2. There is reasonable evidence from an investigation conducted by the registered gas fitter to confirm that the installation complied with the previously applicable regulations and referenced Australian Gas Association Code or Australian Standards (AG 601– 1998, AS 5601/AG 601-2000, AS 5601/AG 601-2002, AS 5601–2004 respectively), or was given a dispensation or special approval for that part of the installation by the Director of Energy Safety at the time of manufacture.
3. There is no practical alternative available for the existing gas appliances in the caravan, boat or similar vehicle or marine craft to be fitted with flame safeguard systems to all burners.
4. There is no practical alternative available for the caravan, boat or similar vehicle or marine craft ventilation openings to be upgraded.
5. Written confirmation is obtained from the consumer who is to acknowledge an understanding of the consequences of the following:
   a) Existing LP Gas appliances in the caravan, boat or similar vehicle or marine craft are not fitted with flame safeguard systems to all burners.
   b) Caravan, boat or similar vehicle or marine craft has existing ventilation openings that have not been upgraded.

   Although there is considered to be an increased level of safety with the provision of flame safeguard systems to all burners of gas appliances and upgrading of the ventilation openings, the consumer, if not willing to have these enhancements imposed upon them by the current Standard, must as a condition of the policy statement, state in writing that they have understood the consequences.
6. The gas fitter is to note the Notice of Variation/Exemption details on each caravan, boat or similar vehicle or marine craft installation's Compliance Badge and Notice of Completion (under Section 8, Comments and Additional Details).

At this time the Victorian gas technical regulator, Energy Safe Victoria, has not yet gazetted AS/NZS 5601 and intends doing so in March 2012. As a consequence, caravans, boats or similar vehicles or marine craft manufactured in Victoria, continue to be imported into WA by consumers and are currently being registered by the Department of Transport (DOT) with the previous AS 5601 compliance. The DOT have recently advised that under mutual recognition arrangements, they will accept gas installation work done interstate where that work has been carried out to a standard acceptable in that state or territory (not necessarily the current Standard) and has been compliance plated in that state or territory.

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Note: The Codes or standards for gas installations in WA were adopted in the regulations on the following dates:

Gas installations code/ standard	Gazettal adoption date
AG 601: 1998	30 July 1999
AS 5601/AG 601: 2000	19 December 2000
AS 5601/AG 601: 2002	1 January 2003
AS 5601: 2004	21 April 2006
AS/NZS 5601: 2010	19 January 2011

Out doors gas appliances

A gas fitter received a complaint from a consumer that their barbecue did not seem to work as well as it did three years ago. The Natural Gas barbeque was installed partially covered under a patio.

Testing by the gas fitter later revealed the gas pressure had deteriorated at the barbecue, and then the gas fitter noticed the isolating valve and the appliance regulator nearby. The surface of the regulator was partially corroded, caused probably by a nearby border spray.

The regulator was replaced and the barbecue again operated as new.

The gas fitter later disassembled the regulator and found water had settled on the lower portion of the diaphragm preventing the regulator from functioning correctly. The water possibly entered the regulator through the tiny open vent weep hole.

When installing gas appliances externally or out doors, be aware that some locations may be affected by border sprays or garden sprinklers. Over time the ingress of water may affect the operation of the gas appliance.

Water damaged regulator

Border spray

Approval of gas appliances designed for out doors use are subjected to a number of tests including a rain shower test. This testing does not include upward directed water sprays or sprinklers. Avoid these locations if possible.

Gas fitter fails to purge causing injuries to the consumer

Energy*Safety* gas Inspectors recently investigated an incident where a consumer had received burns whilst attempting to light an oven. The incident is believed to have happened as a direct result of a gas fitter failing to purge a domestic gas installation of air after reconnecting a gas cooker.

The gas fitter was completing the work associated with repositioning LP Gas cylinders, a regulator and installing new consumer piping. The house had a raised floor and the new piping was run to where the existing piping had been cut.

The gas fitter did not have access to the inside of the house as the consumer was at work.

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Unable to get inside the house the gas fitter purged to a point where the new piping connected to the existing. He purged to this point, made the connection then carried out a soundness test, then left the job. **Had he fulfilled his responsibilities as a gas fitter? NO.**

Arriving home the consumer was unaware any gasfitting work had been undertaken earlier in the day, lit the oven in the usual way and went to get the prepared roast from the refrigerator. Returning to the oven they noticed that the oven burner had gone out. Whilst attempting to light the oven for a second time an explosion occurred resulting in burns to the consumer's arms and hair.

The consumer piping had a pocket of air trapped between the new piping and the existing. Initially, the oven burner lit off the gas trapped in the existing piping and then extinguished when the air came through. The pocket of air passed and the flame failure valve did not operate (it can take up to 90 seconds for a flame failure device to operate). Unburnt gas was filling the oven in this time. The ignition source was the consumer attempting to re-light the oven.

What is required of the gas fitter? A gas fitter is required to commission any appliance he/she installs or in this case re-installs.

Not having access to the inside of premises does not resolve the gas fitter of the associated responsibilities. If you can't leave the gas installation in a safe operating condition then do not leave it operational. Section 6.11 of Australian Standard AS/NZS 5601:2010, Gas Installations sets out the requirements for commissioning Type A gas appliances, this includes appropriate purging.

Energy*Safety* will not tolerate non-compliances that compromise safety. Fortunately in this case the injuries were not serious, however it may not be the case should this situation arise again. The consumer relies on you as the gas fitter to ensure your work and the gas installation is left safe and compliant.

Review of gas water heater exemption 2003/251

Energy*Safety* is reviewing the exemption previously issued under Regulation 32(1)(b) of the Gas Standards (Gasfitting and Consumer Gas Installations) Regulations 1999 on the Replacement of Gas Water Heaters.

This exemption was originally issued on 28 February 2003 by the Director of Energy Safety. This enabled new gas water heaters to be installed in the same location as the original open-flued instantaneous heaters in bathrooms and toilets of mainly multi-storey residential units, although the location may not have complied at the time.

Unfortunately, there are a number of installations where this exemption has been misused and is continuing to be misused by some gas fitters. Examples of some of these installations where conformance with requirements could have easily been achieved, rather than replacement in a non-conforming location are shown in the photographs below and over page.

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Gas water heaters installed with insufficient clearance from an external corner

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The review will involve consultation with the gas industry and Energy*Safety* will consider thereafter whether the Exemption 2003/251 will be entirely withdrawn or a substitute generic/global variation/exemption with more stringent conditions issued.

Energy*Safety* may review the validity of an application for a variation/exemption to ensure adherence to Australian Standards and in particular, the requirements of AS/NZS 5601, Gas installations wherever possible prior to processing the application.

This is of particular relevance for installations that need to comply with prescribed requirements.

In conclusion, the exemption that was originally issued is being reviewed by Energy*Safety* with the possibility of it being entirely withdrawn or substituted with a more rigorous version.

Until the review is completed, Energy*Safety* expects gas water heater installations in single and multistorey building residential units to be in accordance with prescribed requirements. Where this is not possible, the appropriate use of Exemption 2003/251 for the installation work is considered to be very much the exception.

Gas water heater flue installed without adequate clearance from naturally ventilated exhaust cowl (opening)

Andrew Black (left) with EnergySafety's Chief Gas Inspector, Kevin Hooper.

And the winner is…

An article and accompanying photographs of a non-compliant gas installation was published in Energy Bulletin 56 giving readers the opportunity 'to be an inspector for a day'. Respondents were asked to list the non-compliances they could identify and provide their answers to the Chief Gas Inspector.

As an incentive the winning entry judged by a panel of senior gas inspectors and a gas engineer, would be offered a copy of the latest Australian Standards AS/NZS 5601: 2010, parts 1 & 2 Gas Installations.

The winner selected from a number of entries was a gas fitter residing in the Town of York. The winner, Andrew Black said this type of competition appeared to create quite an amount of interest in the gasfitting community and was a common practice in the UK. The photograph is of Andrew accepting the standards from Energy*Safety's* Chief Gas Inspector.

In Andrew's response he managed to identify non-compliances related to the appropriate Regulations, the Gas Standards (Gasfitting and Consumer Gas Installations) Regulations 1999 and sections from Australian Standards AS/NZS 5601:2010 part 1 General Installations.

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The relevant sections from the Gas Standards (Gasfitting and Consumer Gas Installations) Regulations 1999 are outlined below:

Regulation 18 Performance of gasfitting work

(1) A gas fitter who does gasfitting work on a gas installation must ensure that the work is done in a safe manner.

(2) Every part of the gas installation on which the work is done, is compliant, is safe to use and the work is done to a trade finish.

Regulation 20 Installation of an appliance

(1a) When a gas appliance is installed it must be in a suitable place.

(1b) be installed in accordance with any instructions or recommendations of the manufacturer (read the installation instructions before attempting to install gas appliance).

Regulation 21 Commissioning of appliances generally

(a) When a gas fitter commissions an appliance the gas fitter must adjust it for safe and correct operation.

(b) If the consumer is present, demonstrate to the consumer the correct method of operating the appliance (how many of you actually do this?).

(c) Attach to the appliance in a conspicuous position, all the instructions issued by the manufacturer as to the correct method of operating the appliance.

Regulation 26 Pressure testing

It was identified that bubbles were forming from leak detection fluid on the inlet connection of the isolating valve (a poorly formed flare).

(1a) A gas fitter installing a gas appliance must ensure before the installation is commissioned that the system is pressure tested and is gas tight (leak free).

(1b) If gas is available for connection the system is purged of all air.

Regulation 28 Obligations on completion of gasfitting work.

This installation was reported as the consumer requested a warranty call from the manufacturer. In this instance the gas fitter had not submitted a notice of completion to the gas supplier or the consumer and had not fitted a completion badge in the gas meter box.

Andrew also made references to sections within the Australian Standards AS/NZS 5601:2010 Part 1 General installations.