summary of reported electrical and gas accidents

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Notification — electrical and gas accidents
Freephone 0800 104 477
NOTIFIABLE ELECTRICAL AND GAS ACCIDENTS

1 January 2006 to 31 December 2006
April 2006

The Energy Safety Service (ESS) continually seeks to promote safe practices to both the industry and users of electricity and gas.

ESS is the part of the Ministry of Economic Development (MED) which monitors and encourages compliance with the laws relating to energy safety. In 2006 ESS moved from the Ministry of Consumer Affairs to the Business Services Branch of MED. The location change was designed to lift ESS’s capability and effectiveness in delivery and aligns work groups with similar operational and regulatory responsibilities.

The vision of ESS is to be the power behind energy safety. This is achieved by working with both the general public and industry to create an environment in which:

- People and property are safeguarded from the dangers of gas and electricity.
- Gas and electrical appliances, installations, electricity supply and generating systems are safe.
- The quality and measurement of gas and electricity are maintained.
- We are a smart and effective centre focusing on the right energy safety issues.

ESS is committed to safety, reliability and accuracy in electricity and gas. We work with industry to promote high safety and quality standards in networks, installations and products. ESS also works to ensure the appliances people use are safe and they are used safely. Our work is vital in ensuring consumers enjoy the benefits of energy safely, and in obtaining reliable measurement and quality of gas and electricity supplied to market.

The ESS Summary of Reported Electrical and Gas Accidents was first produced in 2001 and is now an annual publication. It has a number of aims:

- To provide an historic picture of electrical and gas accidents in New Zealand.
• To assist government and industry to identify the criticality of issues arising from energy safety.
• To provide industry workers with information which will help to inform best practice around safety.
• To monitor safety in New Zealand and compare it with internationally aligned standards.

ESS wants this publication to promote and encourage employers and workers to follow safety guidelines stringently, insist on appropriate ongoing worker training and assess work practices regularly.

Energy Safety is a team effort. No single area of the industry or government can achieve this on their own. It requires government, industry and the public to work together to take up their share in the responsibility for safe energy, safe people and safe property.

Sanjai Raj
Group Manager – Energy Safety Service
Business Services Branch
Overview of 2006

During 2006

There were:

- 67 notifiable electrical accidents, which caused four fatalities and injured 65 people.
- 11 notifiable and 30 non-notifiable natural gas accidents were reported to ESS, with three of the notifiable accidents causing injury to four people in total.
- 18 notifiable and 23 non-notifiable LPG accidents were reported to ESS, with five of the notifiable accidents causing injury to nine people.
- One notifiable LPG abuse accident caused one fatality.

The general trend of the last five years (2002-2006) indicates some reduction in electrical accidents to line mechanics, fatal accidents to the general public and LPG injury accidents. However, there has been an increase in deliberate LPG inhalation abuse accidents and non-notifiable natural gas accidents reported to ESS, especially mains, services, regulator station and meter-related accidents.

High-Risk Areas 1993-2006

Electrical and gas accident information from the last 14 years (1993-2006) has been categorised into relevant groups before being analysed for trends, frequency, common causes and the types of worker involved. The information is also analysed for the severity and frequency of total accident occurrences for each of these groups.

Electrical Accidents

Electrical workers

- Line mechanics made up 37% of electrical worker accidents (460), which caused ten fatalities and injured 170 line mechanics.
- Electricians made up 39% of electrical worker accidents, which caused eight fatalities and injured 180 electricians.
Trainee electricians made up 9% and trainee line mechanics made up 3% of electrical worker accidents, which caused five fatalities and injured 57 trainees.

Other occupations (non-electrical workers)

- Farm workers made up 6% of other occupations worker accidents (357), which caused about 40% (nine) of the total 22 fatalities for this group and injured 14 farm workers.
- A significant number of non-electrical worker accidents involved digging or carrying out non-electrical work near high-voltage live lines.

General public

- **Young people** (a combination of children and students aged less than 25 years)
  Young people were involved in 46% of general public accidents (190), causing 12 fatalities and injuring 75 people.
- **Domestic environment**
  Over 50% of accidents involving the general public occurred in the domestic environment, causing 19 fatalities and injuring 81 people.

Natural Gas Accidents

Equipment

- **Mains/Service and regulator stations**
  About 12% of the notifiable accidents (136) and over 50% of the total non-notifiable accidents (488) reported to ESS involved mains/service/regulator stations. Ten of these notifiable accidents caused injury to 13 people.
- **Water heaters/boilers**
  About 34% of the notifiable accidents involved water heaters. 11 of these accidents caused one fatality and injury to 13 people and accounted for about 5% of the total non-notifiable accidents.
- **Space heaters**
  About 27% of the notifiable accidents involved space heaters. Eight of these accidents caused one fatality and injury to eight people. Space heaters accounted for 17% of the total non-notifiable accidents reported to ESS.
• **Cookers/Ovens**
  About 17% of the notifiable accidents involved cookers/ovens. Seven of these accidents caused one fatality and injury to seven people and accounted for 10% of the total non-notifiable accidents.

**Liquefied Petroleum Gas (LPG)**

**Intentional LPG inhalation accidents**

Young people were involved in 16 fatal accidents. These accidents highlight that containers and refillable cylinders are prone to unsafe usage.

**LPG accidents**

**Equipment**

• **Cookers/Ovens**
  About 31% of the notifiable accidents (237) involved cookers/ovens. 51 of these accidents caused 13 fatalities and injury to 62 people. Cookers/Ovens accounted for 12% of the non-notifiable accidents (411) reported to ESS.

• **Portable heaters**
  About 36% of the notifiable accidents involved portable heaters. 36 of these accidents caused four fatalities and injury to 42 people. Portable heaters accounted for 34% (135) of the total non-notifiable accidents.

• **Containers**
  About 8% of the notifiable accidents involved LPG refillable containers. 16 of these accidents caused four fatalities and injury to 18 people. These made up 20% (81) of the non-notifiable accidents.

**Environmental**

• **Caravan**
  About 12% of the notifiable accidents occurred in caravans, which caused eight fatalities and injury to 16 people.
Background

ESS is responsible for the administration of electricity and gas legislation. The aim of ESS is to bring a clear focus to safety, supply quality and measurement across the electricity and gas sectors. From 1 October 2006 ESS became part of the Business Services Branch of MED.

ESS performs operational safety-related functions under ‘energy-related’ legislation. ESS is also responsible for ensuring the safe production, supply, installation and use of electricity and gas.

A key ESS function is to investigate serious electrical and gas accidents, and implement improved safety procedures. The occupier or the person in charge of the accident area is required by law to report to ESS any accidents caused by electricity or gas which result in fatalities, serious injuries or significant damage to property.

Data Collection and Recording

This publication contains brief descriptions of ESS investigations into electrically caused serious injuries (shock or burns) and significant property damage caused by fire. It also lists notifiable gas accidents reported to ESS during the 2006 calendar year. In order to determine trends, notifiable electrical accidents (except fire) and notifiable and non-notifiable gas accident information collected since 1993 has been analysed.

Note that some accident investigations take a long time to be completed. This summary takes the latest information available at the time of preparation of this publication.

Electrical Accidents

A ‘notifiable electrical accident’ has the same meaning as a notifiable accident in the Electricity Act 1992. A ‘notifiable electrical accident’ is defined as an accident that:

- Has been caused by, or has involved, electricity; and/or
• Involves or affects the generation, conversion, transformation, conveyance or use of electricity; and/or
• Causes damage to property, making it unusable for its original purpose; and/or
• Results in death or serious injury (loss of consciousness or resulting in the need for medical treatment from a healthcare professional).

A large number of electrically caused fires are not reported to ESS or are not reported in time to carry out an investigation. Additionally, a large number of electrical fires covered by the Electricity Act occur due to incorrect operation or misuse of electrical equipment. Therefore, ESS is not involved in the majority of electrical fire investigations. Instead, this information is collected and published by the New Zealand Fire Service.

**Gas Accidents**

A ‘notifiable gas accident’ has the same meaning as a notifiable accident in the Gas Act 1992. A ‘notifiable gas accident’ is defined as an accident that:

• Involves the production, supply, distribution or use of gas; and/or
• Causes significant damage to property; and/or
• Results in death or serious injury (whereby the victim is incapacitated for 48 hours or more).

A ‘non-notifiable gas accident’ is defined as an accident that:

• Causes property loss; and/or
• Causes injury below the threshold defined in the Gas Act 1992, and is involved with what is supposed to be a safe supply or use of fuel gas.

Information relating to non-notifiable accidents is received in two ways:

1. It is received or collected by ESS from various sources within a short time of the accident occurring.
2. It is provided or collected infrequently and in bulk quantity from gas suppliers and the New Zealand Fire Service for recording purposes. This infrequently collected information is not collected systematically, which may provide inaccurate analysis and therefore this type of infrequently collected information is not included in the analysis.

The accident summary sections only cover notifiable gas accidents.
Reporting Accidents and Reliability of Data

In practice, ESS has found that the more serious the accident, the more likely it is to be reported and the more accurate the information. This is because serious accidents are thoroughly investigated by the responsible authorities. There is also a higher likelihood of publicity of serious accidents, with subsequent public pressure to determine the cause of the accidents with a view to preventing reoccurrences.

While ESS believes its database contains the majority of serious notifiable accidents, it may not capture all of the less serious notifiable accidents because of the lack of reporting to ESS. The non-notifiable gas accident records held by ESS may represent significantly fewer accidents, as there is no obligation to report them under the current legislation.

ESS receives earlier notification and more accurate information from members of the energy industry than from the general public. Unfortunately, ESS is often not advised of some electrical and gas incidents, unless they result in a fatality or a very serious accident.

Full and early reporting of accidents and incidents, no matter how minor, is important. It enables ESS to monitor practices and behaviours, pinpoint problem areas and take early action on improving safety before death, injury or serious loss occurs. In all areas, ESS asks both industry and the public to report all accidents so that a comprehensive database can be maintained. This can be done by contacting the ESS accident notification service on:

- Freephone: 0800 104 477
- Freefax: 0508 723 336
- Web site: www.ess.govt.nz

Notified accident information from the last 14 years (1993-2006) has been analysed for trends, frequency, common causes and types of worker involved. This analysis includes a comparison of the initial five years (1993-1997) and the last five years (2002-2006) of the introduction of the current Electricity and Gas Acts. These periods were selected to compare the variation in current accident rates (2002-2006) with the immediate period after the introduction of the new legislation (1993-1997).
Even though the definition of ‘accident’ is similar in the Electricity and Gas Acts, there are some differences in electrical and gas data collection and recording that may be of significance:

1. A ‘notifiable electrical accident’ may include an electrical fire. Fires are, however, not included for analysis, because not all notifiable electrical fires are reported to ESS or investigated and recorded in the ESS database. Generally, the New Zealand Fire Service investigates all electrical fires in the same manner as other fires.

2. A ‘notifiable gas accident’ means a gas accident causing fire and/or explosion, and/or gas poisoning. All these are included for analysis because ESS actively investigated these accidents and they are recorded in the ESS database.

3. While electrical accident investigators specify a single most likely causal factor, gas accident investigators may specify up to four most likely causal factors for each gas accident. This approach is based on the philosophy that loss can be avoided or reduced by removing at least one of the causal factors.

It is important to note that the accident analysis does not explain the reasons behind the trends found in this analysis. The changes (increase/decrease) may be due to one or a combination of reasons such as changes in the amount of work undertaken, the use of a trained workforce, the accident reporting level or improvements in safety practices. Establishing the real reason(s) behind the majority of these changes requires a significant amount of work and more information from the energy industry, which may or may not exist.
Electrical Accidents

Electrical injury accident information is collected and recorded in the ESS database under three main target groups: electrical workers, workers in other occupations (non-electrical occupations) and the general public.

Accidents have been analysed for their severity and the frequency of total accident occurrence for each of these groups.

Graph 1 has information on all notifiable electrical accidents and Graphs 2a and 2b have information on electrically caused fires and electrical fire casualties\(^1\).

The nature of each group’s relationship with electricity (training, familiarisation and responsibility) is quite different. All accidents have similar types of causal factors, but the reasons for accidents and the solutions for preventing further accidents may be different. Therefore, accident causality is analysed differently for each of the groups.

Electrical Workers

During 2006

- There was one fatal accident to a line mechanic. The average annual fatality rate for electrical workers is 1.7 over the last 14 years.
- There were 30 notifiable injury-causing accidents harming 32 electrical workers. This is about twice the number of injury-causing accidents than last year. The average injury level for the last 14 years is about 33 per annum.
- Over 50% (15) of electrical worker accidents involved 400 volts, and over 25% of the accidents involved 230 volts (single phase). This represents an increase of over 250% in accidents involving the 400 volt system, compared with last year.
- About 55% of the electrical workers involved in accidents received an electrical shock and the rest of the electrical workers (45%) received a burn injury, which is similar to last year.

\(^1\) The New Zealand Fire Service has supplied the data on electrically caused fires.
Summary of Reported Accidents

Notifiable Electrical Accidents 1993-2006

Graph 1

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Electrically Caused Fires 1993-2006

Graph 2a

- Residential fires initiated by arcing or overloaded equipment
- Non-residential fires initiated by arcing or overloaded equipment
- Residential fires initiated by heat from equipment
- Non-residential fires initiated by heat from equipment

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Graph 2b

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General trends

- There has been a small decline in the number of notifiable accidents occurring to electrical workers over the last 14 years (see Graph 3a).

- During the last five years (2002-2006) there has been some reduction in accidents involving electricians compared with the initial five years (1993-1997), from about 15 to about ten annually (see Graph 4a).

- During the last five years there has been a significant rise (from about two to about five annually) in accidents involving trainee electricians and trainee line mechanics, compared with the initial five years (1993-1997) (see Graph 5d).

- In the last five years, there has been a significant reduction in electrical accidents to line mechanics, from about 16 per year during 1993-1997 to about eight per year during 2001-2005 (see Graph 5a). However, there has been no significant change in the number of fatalities involving line mechanics.
NOTIFIABLE ELECTRICAL AND GAS ACCIDENTS
1 January 2006 to 31 December 2006

Graph 3a  Notifiable Electrical Accidents to Electrical Workers 1993-2006

- Fatalities
- Injuries
- Notifiable accidents
- Trendline – Notifiable accidents

Graph 3b  Notifiable Electrical Accidents to Electrical Workers 1993-2006
by worker category
- Trainee line mechanic: 3%
- Trainee electrician: 9%
- Service technician: 2%
- Other/Unknown: 2%
- Network technician: 1%
- Line mechanic: 37%
- Electrician: 38%
- Electronic technician: 3%
- Fitter: 3%
- Inspector: 1%
- Labourer: 1%

Graph 3c  Notifiable Electrical Accidents to Electrical Workers 1993-2006
by causal factor
- Work practices: 29%
- Unintentional liveening or backfeed: 1%
- Other/Unknown: 6%
- Misuse, deliberate: 1%
- Maintenance: 3%
- Design: 3%
- Equipment failure: 10%
- Failure to cover exposed live parts: 13%
- Failure to isolate: 26%
- Failure to test: 8%

Graph 3d  Notifiable Electrical Accidents to Electrical Workers 1993-2006
by voltage
- 230 V: 27%
- 400 V: 38%
- 11,000 V: 16%
- Other/NA/Unknown: 13%
- 220,000 V: 1%
- 110,000 V: 2%
- 33,000 V: 3%
Graph 4a Notifiable Electrical Accidents to Electricians 1993-2006

- Fatalities
- Injuries
- Trendline – Notifiable accidents

Graph 4b Notifiable Electrical Accidents to Electricians 1993-2006

by causal factor
- Work practices: 14%
- Unintentional livening or backfeed: 3%
- Other/Unknown: 5%
- Maintenance: 3%
- Failure to test: 9%
- Design: 4%
- Equipment failure: 12%
- Failure to cover exposed live parts: 12%
- Failure to isolate: 38%

Graph 4c Notifiable Electrical Accidents to Electricians 1993-2006

by voltage
- 230 V: 35%
- 400 V: 52%
- 8% Other/NA/Unknown
- 1% 110,000 V
- 4% 11,000 V
Notifiable Electrical Accidents to Line Mechanics 1993-2006

Graph 5a

- Fatalities: Notifiable accidents
- Injuries: Trendline – Notifiable accidents

Graph 5b

by causal factor

- Work practices: 39%
- Unintentional livening or backfeed: 1%
- Other/Unknown: 8%
- Misuse, deliberate: 2%
- Design: 1%
- Equipment failure: 8%
- Failure to cover exposed live parts: 19%
- Failure to isolate: 9%
- Failure to test: 9%
- Maintenance: 4%

Graph 5c

by voltage

- 230 V: 9%
- 400 V: 28%
- 11,000 V: 31%
- Other/NA/Unknown: 19%
- 220,000 V: 1%
- 110,000 V: 3%
- 66,000 V: 1%
- 50,000 V: 1%
- 33,000 V: 7%

Graph 5d

Notifiable Electrical Accidents to Trainees (Electricians and Line Mechanics) 1993-2006

- Trainee electricians: Total accidents to trainees
- Trainee line mechanics: Trendline – Total accidents to trainees
Trend analysis: consequence and frequency

During the last 14 years:

- There have been 23 fatal accidents to electrical workers (eight electricians, three electrical apprentices, ten line mechanics, one trainee line mechanic and one other class of electrical worker).
- There have been 440 accidents which caused injury to a total of 463 electrical workers.
- Compared with the other classes of electrical workers, electricians (38%), line mechanics (37%) and trainee electricians (9%) have had the highest accident rates within the electrical worker accident category (see Graph 3b).
- The main causes of accidents to electrical workers have been: a failure to isolate from the power source (26%); not following correct work practices (29%); failure to cover exposed live parts (13%); equipment failures (10%); and failure to test for a live supply (8%) (see Graph 3c).
- About 38% of accidents to electricians have been caused by failing to isolate from the power source. Failure to cover exposed live parts (12%), failure to test (9%), not following safe work practices (14%) and equipment failure (11%) have been significant causes (see Graph 4b).
- The causes of accidents to trainee electricians have been similar to those of accidents involving electricians. The major accident causes have been: failure to isolate (35%); failure to follow safe work practices (28%); and failure to test (9%).
- About 40% of accidents to line mechanics have been caused by not following correct work practices and about 19% have been caused by failing to cover exposed live parts. Failure to isolate and failure to test the power supply have accounted for about 10% each (see Graph 5b). The accidents caused by failing to cover exposed live parts have significantly reduced from 30% in the first five years (1993-1997) to 10% in the last five years (2002-2006). However, accidents caused by not following correct work practices have increased during the same period (from about 32% to 57%).

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2 Where the primary cause work practice such as failure to test, failure to isolate or failure to cover exposed live parts was not so clearly evident and there was a blatant disregard for the safety rules, any written procedure, or where such activity was carried out and would be considered unacceptable industry practice.
• Three widely operated voltages (230, 400 and 11,000 volts) have caused over 82% of accidents to electrical workers. Even though the 230 volt systems are more widely used than the 400 volt systems, more accidents have been caused by 400 volt systems. About 39% of electrical worker accidents have been caused by 400 volt systems, while 27% of accidents have been caused by 230 volt systems and 16% of accidents have been caused by 11,000 volt systems (see Graph 3d).

• Over 50% of the total accidents to electricians have been caused by 400 volt systems, in comparison with one-third of accidents being caused by 230 volt systems (see Graph 4c). The relative accident rate by these two voltages has not changed for both the five-year periods (1993-1997 and 2002-2006).

• About 31% of line mechanic accidents have been caused by 11,000 volt systems and a similar level of accidents has been caused by 400 volt systems (see Graph 5c). During the first five years (1993-1997) about 21% of total accidents were caused by 400 volt systems, while about 31% of the accidents were caused by 11,000 volt systems. The relative accident rate has reversed for these two voltages in the last five years (2002-2006) and now fewer accidents are caused by 11,000 volt systems than 400 volt systems. During the last five years, 38% of total accidents have been caused by 400 volt systems and about 30% of accidents have been caused by 11,000 volt systems.

Other Occupations (Non-electrical Workers)

During 2006

• There were two fatal accidents which killed a roofer and a truck driver in the other occupations group. The average fatal accident and fatality rate is 1.6 per year over the last 14 years.

• There were 24 accidents which caused injury to 24 workers. The average annual rate for injury-causing accidents to workers in other occupations is 24.
General trends

- Over the last 14 years there has been no measurable change in the number of fatal and injury-causing accidents occurring to other occupation workers (see Graph 6a).

- About 40% of the fatal accidents (nine out of 22) in the last 14 years have involved farm workers. Four of the nine fatal accidents to farm workers involved 230 volts and three of the accidents involved 11,000 volts. Over half of the total farm worker accidents (23) involved 11,000 volts.

- There has been a significant reduction in accidents to farm workers over the last five years. There have been only one fatal accident and two injury-causing accidents over the last five years compared with the initial five-year period, where there were three fatal accidents and eight injury-causing accidents. The majority of these accidents by contacting with overhead lines.

- In the other occupations group, about 16% of the accidents have involved labourers and over one-third of these accidents have involved 11,000 volt systems. Farm workers, process workers, fitters, builders, kitchen workers and plumbers/gas fitters/roofers have all been involved in a similar number of accidents, about 6-7% each (see Graph 6b). About 75% of labourers involved in accidents have been injured by a system higher than 230 volts, while mainly working (either cutting or digging) near underground or overhead lines.

- There has been a significant increase (from five to 11) in accidents to plumbers/gas fitters/roofers over the last five years compared with the initial five years.

Trend analysis: consequence and frequency

During the last 14 years:

- There have been 22 fatal accidents to workers in the other occupations group. Over half (12) of the fatal accidents involved systems higher than 230 volts. Ten of the fatal accidents involved 11,000 volts and eight involved 230 volts.

- There have been 357 injury accidents to workers in other occupations, causing injury to 365 workers.
Graph 6a  Notifiable Electrical Accidents to People in Other Occupations* 1993-2006

Graph 6b  Notifiable Electrical Accidents to People in Other Occupations* 1993-2006 by occupation

Graph 6c  Notifiable Electrical Accidents to People in Other Occupations* 1993-2006 by causal factor

Graph 6d  Notifiable Electrical Accidents to People in Other Occupations* 1993-2006 by voltage

* Workers in occupations other than electrical work
The major causes of accidents have been: not following correct work practices (32%); a lack of maintenance (20%); and failure to isolate (13%) (see Graph 6c).

Over 50% of the total other occupation accidents (357) have involved 230 volts, about 12% of the accidents have involved 400 volts and 20% have involved 11,000 volts (see Graph 6d). More accidents have been caused by 230 volt systems during the last five years (2002-2006), with an average of 15 per year compared with the initial five years (1993-1997), which had an average of 11 per year.

**General Public**

**During 2006**

- There was one fatal electrical accident involving the general public. The annual fatality rate is 2.3 over the last 14 years.
- There were nine accidents injuring nine people. The average for the last 14 years is about 12.1 accidents per year.
- All bar one accident involved 230 volts, including a single fatality. In the last 14 years 230 volt accidents have averaged eight per year.

**General trends**

- There has been a significant reduction in fatalities (from 15 to 10) to the general public in the last five years (2002-2006) compared with the initial five years (1993-1997). The main contributor to this is a significant reduction in the number of fatal accidents caused by the 230 volt system in the domestic environment. However, there has been no significant change in the number of injury-causing accidents over the last 14 years (see Graph 7a).
- There has been a reduction of about half (from 11 to five) in fatal accidents involving 230 volts in the last five years (2002-2006) compared with the initial five years (1993-1997).
- There has been a significant reduction in fatal accidents (from seven to two) and a small reduction in injuries (from 33 to 16) to young people in the last five years (2002-2006) compared with the initial five-year period (1993-1997).
Trend analysis: consequence and frequency

During the last 14 years:

- There have been 32 fatal accidents to the general public, which caused 32 fatalities (all single-fatality accidents). About two-thirds (20) of the fatal accidents involved 230 volts and about 15% (five) of the accidents involved 11,000 volts.

- Of the 32 fatal accidents, 12 of the victims were young people (children or students aged less than 25 years). Eight of these cases involved 230 volt systems.

- 19 of the fatal accidents happened in the domestic environment and 17 of these involved 230 volts. However, only five out of these 17 domestic fatal accidents happened during the last five years (2002-2006).

- About 18% of the fatal electrical accidents to the general public were caused by the misuse of equipment. Lack of maintenance, failure to test power supply and failure to cover exposed parts each accounted for about 10% of these accidents. The cause(s) of 13 of the fatal accidents was unclear.

- Lack of maintenance (27%) and misuse actions (17%) have caused a significant number of electrical accidents to the general public (see Graph 7b).

- There has been a total of 190 electrical accidents to the general public. Of these, 161 accidents caused injury to 170 people. Young people were involved in about half (45%) of the accidents involving the general public.

- About 61% of the total accidents (190) involved 230 volt systems and 17% of the accidents involved 11,000 volt systems (see Graph 7c). Over half of the total 230 volt accidents (118) involved young people.
Graph 7a: Notifiable Electrical Accidents to the General Public 1993-2006

- Fatalities
- Notifiable accidents
- Injuries

Graph 7b: Notifiable Electrical Accidents to the General Public 1993-2006

by causal factor

- Work practices: 6%
- Unintentional live energizing or feedback: 3%
- Other/Unknown: 25%
- Misuse, deliberate: 17%
- Maintenance: 27%
- Design: 3%
- Equipment failure: 5%
- Failure to cover exposed live parts: 2%
- Failure to isolate: 8%
- Failure to test: 4%

Graph 7c: Notifiable Electrical Accidents to the General Public 1993-2006

by voltage

- 230 V: 61%
- 400 V: 5%
- 9% Other/NA/Unknown
- 1% 110,000 V
- 1% 66,000 V
- 4% 33,000 V
- 2% 25,000 V
- 17% 11,000 V
Electrical Accidents

<table>
<thead>
<tr>
<th>Major contributors to total accidents</th>
<th>Last 14 years (1993-2006)</th>
<th>Last five years (2002-2006)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Last six years</td>
<td>Frequency</td>
</tr>
<tr>
<td></td>
<td>(1993-2006)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatal:</td>
<td>23 (23)</td>
<td>8 (8)</td>
</tr>
<tr>
<td>Injury:</td>
<td>463 (440)</td>
<td>136 (131)</td>
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<td></td>
</tr>
<tr>
<td>Electricians</td>
<td>8 (8)</td>
<td>180 (174)</td>
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<td></td>
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<tr>
<td></td>
<td>1 (1)</td>
<td>54 (52)</td>
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</tr>
<tr>
<td></td>
<td>4 (4)</td>
<td>37 (36)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>1 (1)</td>
<td>27 (27)</td>
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</tbody>
</table>

Summary of Reported Accidents
### Summary of Reported Accidents

#### Notifiable Electrical and Gas Accidents

1 January 2006 to 31 December 2006

<table>
<thead>
<tr>
<th>Major contributors to total accidents</th>
<th>Last 14 years (1993-2006)</th>
<th>Last 5 years (2002-2006)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consequence/ (Frequency)</td>
<td>Main causes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Last 14 years (1993-2006)</td>
<td>Last 5 years (2002-2006)</td>
</tr>
<tr>
<td></td>
<td>Consequence/ (Frequency)</td>
<td>Main causes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Other Occupations

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 (22)</td>
<td>343 (338)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (6)</td>
<td>121 (118)</td>
</tr>
</tbody>
</table>

**Farm workers**
- **Fatal:** 9 (9)
- **Injury:** 14 (14)

**Fitters**
- **Fatal:** 3 (3)
- **Injury:** 19 (19)

**Process workers**
- **Fatal:** 1 (1)
- **Injury:** 23 (23)

**Builders**
- **Fatal:** 1 (1)
- **Injury:** 23 (22)

**Labourers**
- **Fatal:** 1 (1)
- **Injury:** 57 (55)

**Plumbers/Gas fitters/Roofers**
- **Fatal:** 1 (1)
- **Injury:** 21 (20)

**Other workers**
- **Fatal:** 6 (6)
- **Injury:** 185 (186)

#### General Public

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 (32)</td>
<td>170 (161)</td>
</tr>
</tbody>
</table>

(4 fatalities and 19 injuries in works environment)

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (10)</td>
<td>51 (50)</td>
</tr>
</tbody>
</table>

**Children**
- **Fatal:** 5 (5)
- **Injury:** 47 (46)

**Students**
- **Fatal:** 7 (7)
- **Injury:** 28 (26)

**Householders and others**
- **Fatal:** 20 (20)
- **Injury:** 95 (89)

**Conclusion**
- 32% unsafe work practices
- 20% lack of maintenance
- 13% failure to isolate

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (1)</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>

- 31% unsafe work practices
- 15% lack of maintenance
- 12% failure to isolate
- 12% equipment failure

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (1)</td>
<td>3 (3)</td>
</tr>
</tbody>
</table>

- 31% unsafe work practices
- 15% lack of maintenance
- 12% failure to isolate
- 12% equipment failure

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (0)</td>
<td>6 (6)</td>
</tr>
</tbody>
</table>

- 31% unsafe work practices
- 15% lack of maintenance
- 12% failure to isolate
- 12% equipment failure

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (1)</td>
<td>11 (10)</td>
</tr>
</tbody>
</table>

- 31% unsafe work practices
- 15% lack of maintenance
- 12% failure to isolate
- 12% equipment failure

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (1)</td>
<td>10 (9)</td>
</tr>
</tbody>
</table>

- 31% unsafe work practices
- 15% lack of maintenance
- 12% failure to isolate
- 12% equipment failure

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 (2)</td>
<td>75 (75)</td>
</tr>
</tbody>
</table>

- 31% unsafe work practices
- 15% lack of maintenance
- 12% failure to isolate
- 12% equipment failure

**Conclusion**
- 27% lack of maintenance
- 17% misuse, deliberate
- 8% failure to isolate

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (1)</td>
<td>14 (14)</td>
</tr>
</tbody>
</table>

- 13% lack of maintenance
- 13% misuse, deliberate
- 6% failure to isolate
- 13% unsafe work practices
- 11% equipment failure

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (1)</td>
<td>2 (2)</td>
</tr>
</tbody>
</table>

- 13% lack of maintenance
- 13% misuse, deliberate
- 6% failure to isolate
- 13% unsafe work practices
- 11% equipment failure

<table>
<thead>
<tr>
<th>Fatal:</th>
<th>Injury:</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 (8)</td>
<td>35 (34)</td>
</tr>
</tbody>
</table>

- 13% lack of maintenance
- 13% misuse, deliberate
- 6% failure to isolate
- 13% unsafe work practices
- 11% equipment failure
### Summary of Reported Accidents

#### Main causes contributing to total accidents

<table>
<thead>
<tr>
<th>Last 14 years (1993-2006)</th>
<th>Last five years (2002-2006)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical Fire Accidents</strong></td>
<td><strong>Electrical Fire Accidents</strong></td>
</tr>
<tr>
<td><strong>Fatal:</strong></td>
<td><strong>Fatal:</strong></td>
</tr>
<tr>
<td>119</td>
<td>36</td>
</tr>
<tr>
<td><strong>Injury:</strong></td>
<td><strong>Injury:</strong></td>
</tr>
<tr>
<td>1,161</td>
<td>386</td>
</tr>
<tr>
<td><strong>Consequence/ Main causes</strong></td>
<td><strong>Consequence/ Main causes</strong></td>
</tr>
<tr>
<td>(Frequency)</td>
<td>(Frequency)</td>
</tr>
<tr>
<td>Residential fires initiated by arcing or overloaded equipment</td>
<td>Faulty, loose or broken conductors and defective or worn insulation involved in a significant number (about 60%) of incidents</td>
</tr>
<tr>
<td>Fires: 7,754</td>
<td>Fires: 2,735</td>
</tr>
<tr>
<td>Residential fires initiated by heat from electrical equipment</td>
<td>Cooking appliances contributed to a significant number of incidents (about 40%) with the cause of not attending or not keeping an eye on equipment, or falling asleep (60% of them)</td>
</tr>
<tr>
<td>Fires: 16,807</td>
<td>Fires: 6,271</td>
</tr>
<tr>
<td>Non-residential fires initiated by arcing or overloaded equipment</td>
<td>Light fixtures involved in a significant number of incidents</td>
</tr>
<tr>
<td>Fires: 9,395</td>
<td>Fires: 3,667</td>
</tr>
<tr>
<td>Non-residential fires initiated by heat from electrical equipment</td>
<td>Cooking appliances and light fixtures involved in a significant number of incidents (about 60% of them)</td>
</tr>
<tr>
<td>Fires: 5,106</td>
<td>Fires: 1,996</td>
</tr>
</tbody>
</table>
Gas Accidents

Gas accident data predominantly covers the two types of widely used fuel gas: natural gas and liquefied petroleum gas (LPG). These two gases have different characteristics, fuel industries, categories of appliance, methods of fuel distribution and use.

The gas accident database contains information about fatalities, injuries, fires, explosions and minor accidents for natural gas and LPG. Gas accidents have been analysed for severity (fatal, notifiable injury and non-notifiable reported to ESS) and frequency of similar types of accident. ‘Non-notifiable’ means an accident or incident causing loss, or injury, below the threshold defined in the Gas Act 1992.

Natural Gas

During 2006

- There were no fatal natural gas accidents, but there were three accidents which caused injury to four people. The annual average for injury accidents is 3.4 over the last 14 years.
- There were 11 notifiable accidents (including the three accidents causing injury). Six of these accidents involved heaters/furnaces, three accidents involved cookers/ovens, one accident involved water heaters/boilers and another a mains/regulator station. All but one of these accidents resulted in a fire, explosion or both.
- There were 30 non-notifiable accidents reported to ESS. Mains/Services or regulator stations were involved in 43% (13) of these accidents. The non-notifiable accidents are down by one-third on last year.
- Over half of the notifiable and 50% of the non-notifiable accidents (mainly mains/services/regulator accidents) were reported by the wider gas industry (gas suppliers, retailers and gas industry associates). In comparison with the previous year, there was a reduction of around 10% in non-notifiable accidents reported from the gas industry. This may be one of the reasons for a reduction in the number of non-notifiable accidents this year.
General trends

- The only reportable trend for fatal and injury-causing accidents over the last 14 years is that there have been no fatal accidents over the last seven-year period (2000-2006) (see Graph 8a). No other trend has been determined due to the infrequent and low number of accidents (three fatal and 38 injury-causing accidents in 14 years).

- Water heaters/boilers were involved in over one-third (46) of all notifiable accidents. The majority (87%) of the water heater accidents caused a fire/explosion. The main causes of about 80% of these water heater/boiler accidents were inappropriate installation, lack of maintenance and/or storage of combustible material close to the appliance.

- There has been a significant rise (68%) in the number of non-notifiable accidents reported to ESS in the last five years (2002-2006) (see Graph 8b). There have been 203 non-notifiable accidents in the last five years (2002-2006) compared with 121 in the initial five years (1993-1997).

- The number of non-notifiable accidents reported by the wider gas industry has more than doubled, from 44 in the initial five years (1993-1997) to 100 in the last five years (2002-2006).

- Over half of the non-notifiable accidents (260) since 1993 relate to mains, services, regulator stations and meters (see Graph 8d). This is an increase of over 120% in the last five years compared with the initial five years (1993-1997).

Trend analysis: consequence and frequency

During the last 14 years:

- There have been three accidents causing three fatalities where fixed space heaters, cookers and water heaters have been involved. The last fatal accident occurred in 1999.

- There have been 38 notifiable injury accidents causing injury to 48 people. There has been no measurable change in the occurrence of this type of accident and no significant change in injury level.

- About 72% (98) of the total 136 notifiable accidents did not involve any casualty to a person, only property damage.
• Over one-third of the total notifiable accidents have involved three categories of appliance: water heaters/boilers (34%), space heaters/furnaces (27%) and cookers/ovens (17%) (see Graph 8c). The outcome in over 90% of these accidents was fire/explosion.

• About 25% of the notifiable accidents were caused by incorrect assembly/connection/installation/alteration. Lack of maintenance accounted for about 17% of the notifiable accidents, and not following appropriate work practices/third party damage accounted for 11% (see Graph 8e).

• Over half of the total (488) non-notifiable accidents reported to ESS have involved mains, services, regulator stations and meters (see Graph 8d) with a gas leak being the outcome in over 80% of them, while fire was the outcome in less than 10%.

• Over a quarter of the total (488) non-notifiable accidents reported to ESS have involved space heaters/furnaces or cookers/ovens. Fire was the outcome in over 70% of these accidents.

• Over one-third (32%) of the non-notifiable accidents reported to ESS were caused by not following correct work practices or by third party damage and about 10% were each caused by incorrect assembly/connection/installation/alteration and not following correct procedures (see Graph 8f).

• There has been a total of 624 accidents (notifiable and non-notifiable).

• Space heaters/furnaces have been associated with about 19% of the total (624) natural gas accidents, while cookers/ovens have been associated with about 11%.

• About 44% of the total (583) accidents and 12% of the total (136) notifiable accidents have been related to mains, services, regulator stations and meters. About two-thirds (10 out of 16) of notifiable accidents resulted in injury.

• About two-thirds of the total mains, services, regulator station and meter accidents have been caused by not following appropriate work practices and procedures.
Summarized Report of Accidents

Graph 8a  Notifiable Natural Gas Accidents 1993-2006
- Fatalities
- Notifiable accidents
- Injuries

Graph 8b  Non-notifiable Natural Gas Accidents 1993-2006
- Non-notifiable accidents

Graph 8c  Notifiable Natural Gas Accidents 1993-2006
by equipment

- Water heater, boiler: 34%
- Other/Unknown: 4%
- Mains, services, regulator station: 12%
- CNG compressor, storage & dispenser: 3%
- Cooker, oven: 17%
- Fixed space heater, furnace: 27%
- Installation, hose, pipework: 1%
- Cabinet heater, table heater: 2%
NOTIFIABLE ELECTRICAL AND GAS ACCIDENTS
1 January 2006 to 31 December 2006

Graph 8d  Non-notifiable Natural Gas Accidents 1993-2006
by equipment

- Water heater, boiler: 5%
- Other/Unknown: 2%
- Mains, services, regulator station: 54%
- CNG compressor, storage & dispenser: 5%
- Cooker, oven: 10%
- Fixed space heater, furnace: 17%
- Installation, hose, pipework: 6%
- Laundry dryer: 1%

Graph 8e  Notifiable Natural Gas Accidents 1993-2006
by causal factor

- Work practices, third parties: 11%
- Ventilation: 2%
- Proximity: 9%
- Procedure: 9%
- Other/Unknown: 3%
- Operation: 5%
- Assembly, connection, installation, alteration: 27%
- Carelessness: 1%
- Design: 9%
- Maintenance: 17%
- Malfunction: 5%
- Misuse, deliberate: 2%

Graph 8f  Non-notifiable Natural Gas Accidents 1993-2006
by causal factor

- Work practices, third parties: 32%
- Proximity: 2%
- Procedure: 10%
- Assembly, connection, installation, alteration: 10%
- Carelessness: 3%
- Design: 6%
- Maintenance: 14%
- Malfunction: 3%
- Misuse, deliberate: 5%
- Operation: 4%
- Other/Unknown: 11%
Liquefied Petroleum Gas (1993-2006)

LPG is normally used as a fuel for heating, cooking or lighting. However, in a minority of cases LPG is deliberately inhaled, with serious outcomes.

Deliberate LPG inhalation accidents are different from other LPG accidents in terms of the manner in which the fuel is knowingly used/handled without the fault of the equipment or fuel. A combined analysis might give the wrong impression that LPG is a more dangerous fuel than it is in reality. Therefore, LPG accidents are analysed and presented in two separate categories: intentional LPG inhalation accidents and LPG accidents.

Intentional LPG Inhalation Accidents

Deliberate LPG inhalation abuse accidents are not always reported to ESS unless they have involved fire or explosion, which usually has fatal outcomes.

During 2006

A single fatal accident was reported during this year.

General trends

- There is a trend to indicate that deliberate LPG inhalation abuse accidents are increasing.
- Victims are generally young people.
- Victims generally inhale LPG from a canister, but in some cases they use large refillable cylinders.

Trend: consequence and frequency

During the last 14 years:

- There have been 16 known fatal accidents confirmed, which resulted in 16 fatalities. Teenagers or young men were involved in all of these accidents.

---

ESS is also aware of a number of cases where teenagers died by inhaling LPG propellant, but these cases are not included in this analysis because LPG propellant is not covered by the Gas Act 1992.
**LPG Accidents**

**During 2006**

- No fatal LPG accidents occurred during this year, which has occurred only twice in the last 14 years. Over the last 14 years, the average number of fatalities has been 1.8 per year.
- There were five accidents that injured nine people. LPG fixed heaters were involved in three of these injury-causing accidents. These levels of injury and accident in a year are common. The average number of accidents over the last 14 years has been about eight, causing an average of 11.6 injuries.
- There was a total of 18 notifiable (including injury-causing) accidents, which is four fewer than last year. This is about the average annual rate of 16.9 in the past 14 years. LPG heaters and cookers/ovens were involved in over 75% of the total accidents. All cooker and heater accidents resulted in fire and/or explosion.
- There were 23 non-notifiable accidents reported to ESS, which is the third lowest in the last 14 years. 25% (six) of the total non-notifiable accidents involved permanently installed LPG equipment and about 20% of accidents each involved cookers and containers. About one-third of the non-notifiable accidents were caused by problems in assembly, connection, installation or alteration.
- About 20% of the non-notifiable accidents were reported by the wider gas industry group and a similar level by the New Zealand Fire Service and Occupational Safety and Health (OSH). Around 20% of accident information was accumulated from the media.

**General trend**

There is no clear trend to indicate any change in the number of fatal accidents over the last 14 years. However, there was one single fatal accident.

**Trend: consequence and frequency**

During the last 14 years:

- There have been 19 fatal accidents, which resulted in 25 fatalities. Cooking equipment (cooker/oven) was involved in about 50% of these accidents, causing 50% of the total fatalities.
- Over 32% of the total 237 notifiable accidents and over 41% of the total 411 non-notifiable accidents have been caused by poor assembly,
NOTIFIABLE ELECTRICAL AND GAS ACCIDENTS
1 January 2006 to 31 December 2006

Summary of Reported Accidents

Graph 9a  Notifiable LPG Accidents 1993-2006
- Fatalities
- Notifiable accidents (fatal & injury)
- Injuries

Graph 9b  Non-notifiable LPG Accidents 1993-2006
- Non-notifiable accidents

Graph 9c  Notifiable LPG Accidents by causal factor 1993-2006
- Work practices, third parties: 6%
- Ventilation: 4%
- Proximity: 6%
- Procedure: 1%
- Other/Unknown: 3%
- Operation: 15%
- Misuse, deliberate: 6%
- Malfunction: 4%
- Assembly, connection, installation, alteration: 32%
- Carelessness: 4%
- Design: 4%
- Filling: 3%
- Maintenance: 12%
connection, installation of/or alteration to an appliance. Many of these accidents may have had more than one cause.

- 116 notifiable injury accidents have injured 162 people. There has been about an 8% reduction in the number of injury-causing accidents over the last five years (2002-2006) compared with the initial five-year period (1993-1997). However, the same number of people were injured during these periods.

- Of the total injury accidents, cookers/ovens were involved in over one-third and cabinet heaters were involved in over 25%. Close to two-thirds of the total injuries were caused by these two types of equipment.

- Of the total 237 notifiable accidents, over 40% were non-casualty fire/explosion accidents.

- There have been 411 non-notifiable accidents reported to ESS and no accident trend has been demonstrated over this period (see Graph 9b). About one-third of these accidents involved portable heaters, 20% involved containers, 16% involved barbecues and 12% involved cooking/oven equipment.

- Fire/Explosion was the outcome in over 64% of the total non-notifiable accidents and gas escape was the outcome in over 32%.

- About 30% of the total 648 accidents (notifiable and non-notifiable) were notified by OSH.

- The main causal factors of the notifiable accidents have been incorrect assembly/connection/installation/alteration (32%), incorrect operation (15%), lack of maintenance (12%) and operating close to flammable material (6%) (see Graph 9c). These causal factors were also the major contributors to the non-notifiable accidents reported to ESS (see Graph 9d).

- Cabinet heaters (36%), containers (8%) and cookers/ovens (31%) have been the major contributors to the notifiable accidents. This equipment has contributed to a similar level of non-notifiable accidents (see Graph 9e). Together, these three types of equipment have contributed to about two-thirds of the total number of non-notifiable accidents. Barbecues have contributed to about 16% of the total non-notifiable LPG accidents, but only accounted for about 3% of the notifiable accidents (see Graph 9f).
Graph 9d  Non-notifiable LPG Accidents 1993-2006
by causal factor

- Work practices, third parties: 9%
- Proximity: 1%
- Procedure: 3%
- Other/Unknown: 9%
- Operation: 8%
- Misuse, deliberate: 1%
- Malfunction: 3%
- Maintenance: 9%
- Assembly, connection, installation, alteration: 41%
- Carelessness: 2%
- Design: 6%
- Filling: 8%

Graph 9e  Notifiable LPG Accidents 1993-2006
by equipment

- Water heater, boiler: 3%
- Refrigerator: 6%
- Other/Unknown: 3%
- Light, torch: 4%
- Laundry dryer: 2%
- Fixed space heater, furnace: 4%
- Barbecue: 34%
- Cabinet heater, portable heater: 35%
- Container: 8%
- Cooker, oven: 31%

Graph 9f  Non-notifiable LPG Accidents 1993-2006
by equipment

- Water heater, boiler: 1%
- Vaporiser: 2%
- Refrigerator: 1%
- Other/Unknown: 3%
- Mains, services, regulator station: 6%
- LPG dispenser: 1%
- Light, torch: 1%
- Installation, hose, pipework: 1%
- Fixed space heater, furnace: 2%
- Cooker, oven: 12%
- Barbecue: 16%
- Cabinet heater, portable heater: 34%
- Container: 20%
# Notifiable Electrical and Gas Accidents

**1 January 2006 to 31 December 2006**

## Gas Accidents

<table>
<thead>
<tr>
<th>Natural Gas</th>
<th>Last 14 years (1993-2006)</th>
<th>Last 5 years (2002-2006)</th>
<th>Major contributors to total accidents</th>
<th>Consequence/ (Frequency)</th>
<th>Main causes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fatal:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 (3)</td>
<td></td>
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<tr>
<td><strong>Injury:</strong></td>
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</tr>
<tr>
<td>0 (0)</td>
<td></td>
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<td></td>
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<tr>
<td><strong>Notifiable:</strong></td>
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<td></td>
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<tr>
<td>18 (14)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Non-notifiable:</strong></td>
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</tr>
<tr>
<td>50</td>
<td></td>
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</tr>
</tbody>
</table>

**Mains/Services & regulator stations**

- **Fatal:** 0 (0)
- **Injury:** 13 (10)
- **Notifiable:** (16)
- **Non-notifiable:** 260

**Fixed heaters**

- **Fatal:** 1 (1)
- **Injury:** 7 (7)
- **Notifiable:** (37)

**Cookers/Ovens**

- **Fatal:** 1 (1)
- **Injury:** 7 (6)
- **Notifiable:** (23)

**Water heaters**

- **Fatal:** 1 (1)
- **Injury:** 13 (10)
- **Notifiable:** (46)

- **Main causes**
  - 27% assembly, connection, installation, alteration
  - 11% work practice, interference by third parties, operation error
  - 17% lack of maintenance
  - 9% operating procedure
  - 9% proximity
  - 9% design factor

<table>
<thead>
<tr>
<th>LPG (Normal use)</th>
<th>Last 14 years (1993-2006)</th>
<th>Last 5 years (2002-2006)</th>
<th>Major contributors to total accidents</th>
<th>Consequence/ (Frequency)</th>
<th>Main causes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fatal:</strong></td>
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<td>25 (19)</td>
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<tr>
<td><strong>Injury:</strong></td>
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<tr>
<td>8 (6)</td>
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<td><strong>Notifiable:</strong></td>
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<tr>
<td>162 (116)</td>
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<tr>
<td><strong>Non-notifiable:</strong></td>
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<tr>
<td>237</td>
<td></td>
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</tr>
</tbody>
</table>

**Cabinet heaters (no canister connectable equipment found)**

- **Fatal:** 5 (4)
- **Injury:** 42 (33)
- **Notifiable:** (84)

**Cookers/Ovens (excluding canister equipment)**

- **Fatal:** 8 (7)
- **Injury:** 48 (36)
- **Notifiable:** (62)

**Containers (excluding canister equipment)**

- **Fatal:** 4 (4)
- **Injury:** 15 (19)
- **Notifiable:** (16)

**Refrigerator (no canister connectable equipment found)**

- **Fatal:** 3 (2)
- **Injury:** 5 (5)
- **Notifiable:** (14)

**Canister & canister equipment (mainly cookers)**

- **Fatal:** 5 (2)
- **Injury:** 27 (18)
- **Notifiable:** (15)

**Environment**

- **Fatal:** 13 (10)
- **Injury:** 34 (24)
- **Notifiable:** (42)

**Mainly from containers**

- **Fatal:** 16 (16)

- **Main causes**
  - 100% misuse, deliberate

<table>
<thead>
<tr>
<th>LPG abuse</th>
<th>Last 14 years (1993-2006)</th>
<th>Last 5 years (2002-2006)</th>
<th>Major contributors to total accidents</th>
<th>Consequence/ (Frequency)</th>
<th>Main causes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fatal:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 (16)</td>
<td></td>
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</tr>
</tbody>
</table>

- **Main causes**
  - 100% misuse, deliberate
summarizes

N O T I F I A B L E  E L E C T R I C A L  A N D G A S A C C I D E N T S

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Incidents</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2006 to December 2006</td>
<td>100</td>
<td>5</td>
</tr>
</tbody>
</table>

Last 14 years (1993-2006)

- Containers equipment
- Fixation & regulator
- Mains/Service
- Water heaters
- Kitchen appliances
- Environment equipment
- Canister & connectable (no canister equipment found)
- Cabinet heaters
- Cooking gas/oven equipment
- Vehicle refrigerator
- Mains refrigerator
- LPG abuse
- LPG use
- LP storage
- LP storage container

Main causes

- Containers equipment
- Fixation & regulator
- Mains/Service
- Water heaters
- Kitchen appliances
- Environment equipment
- Canister & connectable (no canister equipment found)
- Cabinet heaters
- Cooking gas/oven equipment
- Vehicle refrigerator
- Mains refrigerator
- LPG abuse
- LPG use
- LP storage
- LP storage container

Frequency

- Containers equipment: 16 (16)
- Fixation & regulator: 12 (12)
- Mains/Service: 8 (8)
- Water heaters: 6 (6)
- Kitchen appliances: 5 (5)
- Environment equipment: 4 (4)
- Canister & connectable (no canister equipment found): 3 (3)
- Cabinet heaters: 2 (2)
- Cooking gas/oven equipment: 1 (1)
- Vehicle refrigerator: 1 (1)
- Mains refrigerator: 1 (1)
- LPG abuse: 1 (1)
- LPG use: 1 (1)
- LP storage: 1 (1)
- LP storage container: 1 (1)
## Accident Number: 2006/001

<table>
<thead>
<tr>
<th>Voltage:</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result:</td>
<td>Burns</td>
</tr>
<tr>
<td>Location:</td>
<td>Works</td>
</tr>
</tbody>
</table>

A line mechanic received an electric shock and burns from a service main cable. The line mechanic was unbinding conductors on insulator posts when the phase and neutral conductors clashed. Although the conductors were PVC covered, this was not intended to be voltage insulation. The line mechanic was not wearing insulated gloves at the time of the accident and the company has issued a warning to workers regarding the failure to use appropriate safety equipment.

## Accident Number: 2006/002

<table>
<thead>
<tr>
<th>Voltage:</th>
<th>11,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result:</td>
<td>Burns</td>
</tr>
<tr>
<td>Location:</td>
<td>Works</td>
</tr>
</tbody>
</table>

A line mechanic suffered severe burns while carrying out live line work in an elevated work platform. The line crew was using live line procedures to replace the air break switch with a new gas insulated switch. As the line mechanic attempted to attach the operating handle, his body came into contact with a live conductor while he was touching earthed metal on the switch. A flashover resulted, causing severe burns to one of his hands.
Apparently the hard cover on the conductor had been displaced, allowing contact with the live conductor as the workers moved about in the elevated work platform attempting to fit the switch operating arm.

Accident Number: 2006/005

| Voltage:   | 230 |
| Result:    | Electric shock |
| Location:  | Industrial |

An electrician received an electric shock when he inadvertently touched the live terminals of a ceiling rose that had a missing cover. As he reached up to a steel joist to move a cable above the cable tray, he contacted the live terminals of the ceiling rose. It was not possible to determine how long ago the cover had been removed or who may have removed the cover from the ceiling rose.

Accident Number: 2006/008

| Voltage:   | 400 |
| Result:    | Burns |
| Location:  | Works |

A line mechanic received burns to one of his hands when a service pillar he was working on faulted, causing an internal arc and resultant flash. Repairs had been carried out to straighten the pillar box which had been vandalised. When power was restored a fault occurred, causing an arc flash.

Accident Number: 2006/009

| Voltage:   | 400 |
| Result:    | Burns |
| Location:  | Works |

A trainee line mechanic received burns to his hands while he was attempting to crimp a sleeve on a live conductor. The crimping tool he used did not have insulated handles and one of the handles made contact with a second phase, causing a 400 volt short circuit which burnt through the handle of the crimping tool. No cover-up gear was used on the other exposed conductors during the work.

Electrical accidents must be notified immediately (section 16 of the Electricity Act 1992). This can be done by freephone on: 0800 104 477.

An electrical accident notification report must also be completed. This should be filed with ESS within two weeks of the incident.

A report form can be found at the back of this book and online by visiting the ESS web site at: www.ess.govt.nz.
Accident Number: 2006/015
Voltage: 230
Result: Electric shock
Location: Commercial

An electrician received an electric shock while working in a ceiling space at a shopping centre after he came into contact with the live exposed end of an unterminated cable. Over the years there had been a number of changes to the wiring at the shopping centre and it was difficult to identify who had left the cable in this condition.

Accident Number: 2006/017
Voltage: 400
Result: Burns
Location: Commercial

A trainee electrician received burns to his hands and face while he was carrying out tests using a voltmeter on an electrical control panel when he caused a short circuit with his test probe. The equipment in the control panel appeared to have been supplied from a main switch with no fuse discrimination other than the point of supply.

The installation had been in service for a number of years and the original contractor who installed the equipment could not be identified. The installation was modified to give protection to the control circuit.

Accident Number: 2006/018
Voltage: 400
Result: Electric shock
Location: Industrial

An electrician using an oscilloscope to test a motor drive received a shock and slight burn to one of his hands. The accident was attributed to a live test cable, from which the male pin connector was dislodged from the female connector on the oscilloscope, which came into contact with the electrician’s hand. The test lead was modified so that there were no live pins on the leads.

Accident Number: 2006/019
Voltage: 110,000
Result: Burns
Location: Works

While carrying out work on a 110,000 volt transmission tower, a trainee line mechanic was involved in a flashover as he was lowering a piece of steel that came too close to a live conductor. As a result, the trainee received burns to one of his arms. The task was to replace rusted steel sections on a tower and the work was to be carried out outside the close approach zone and clear of conductors. This particular tower had jumpers running from the conductors that reduced the clearance that the crew were used to working with. As the trainee lifted the piece of steel to his shoulder in order to position it inside
the tower (so he could lower it to the ground), the flashover occurred. The company has reviewed its procedures and changed the training and approval for this work.

**Accident Number: 2006/020**

Voltage: 11,000
Result: Electric shock
Location: Works

A line mechanic working on a temporary transformer received an electric shock when a cable he was working on was inadvertently livened. The other members of the crew had completed their work and were preparing to carry out tests prior to livening. A technician working in the substation nearby inadvertently closed a circuit breaker and the person working in the transformer received an electric shock and burns as a result.

**Accident Number: 2006/023**

Voltage: 400
Result: Burns
Location: Works

An electrician received flash burns to his wrist and hands while changing a contactor in a berm-mounted substation. The neutral lead from the contactor had protruding bare conductors which made contact with an exposed live low-voltage terminal in the transformer, causing a short circuit flashover. The company has reviewed its procedures for this type of work.

**Accident Number: 2006/024m**

Voltage: N/A
Result: Fractures
Location: Works

A trainee line mechanic received fractured bones in one of his feet when a pole that was being unloaded rolled onto his foot. The trainee, who was from another work team, had entered the work zone between the pole and the truck to borrow a shovel. The pole was fully fitted up with the cross arm and braces and was resting on the cross arm while a sling was being repositioned when it started to roll over.

The trainee was unable to get out of the way in time. The trainee had his back to the pole with the truck parked about a metre from the bank. There was no space to get clear of the pole as it rolled over.

The company has reviewed its practice of pole handling and has discontinued the practice of transporting poles with the cross arms fitted. Persons from another work party must not enter a work site without approval from the person having control of the worksite.
Summary of Reported Accidents

NOTIFIABLE ELECTRICAL ACCIDENTS
1 January 2006 to 31 December 2006

Accident Number: 2006/032

Voltage: 11,000
Result: Electric shock
Location: Works

A line mechanic received an electric shock when he contacted two live overhead conductors while descending downwards in an elevated work platform through low-voltage conductors. The line mechanic somehow contacted two different phase conductors with his bare hands. The company is reviewing procedures for working on live low-voltage conductors.

Accident Number: 2006/028

Voltage: 400
Result: Fatal electric shock
Location: Works

A line mechanic received a fatal electric shock when he contacted two live overhead conductors while descending downwards in an elevated work platform as it was the weekend and minimal disruption would be caused to the company. A report was sent to the EWRB, as the person was working outside the scope of his registration.

Accident Number: 2006/029

Voltage: 400
Result: Burns
Location: Commercial

An electrical worker received burns to his hands and face as he was attempting to install a circuit breaker in a live switchboard. The connections for the circuit breaker were to be made using copper links, but the worker did not have the correct links so he decided to use as links short lengths of cable that he found on site.

He had attached one cable to the circuit breaker and was attempting to screw the circuit breaker to the back panel of the switchboard. As he did this, the bare end of the cable attached to the circuit breaker made contact with two phase terminals of the busbars in the switchboard, causing an arc flash. This resulted in the worker receiving burns to his hands and face.

The worker had been instructed to carry out a shutdown prior to any work being carried out on the switchboard as it was the weekend and minimal disruption would be caused to the company. A report was sent to the EWRB, as the person was working outside the scope of his registration.

Accident Number: 2006/032

Voltage: 11,000
Result: Electric shock
Location: Works

A line mechanic received an electric shock when he was carrying out live line work. He was covering live 11,000 volt conductors at the time. It is believed that the charging potential between the live conductor and the metal buckle on his safety harness that caused the shock. He quickly recovered from this and carried on working, but a few days later he reported feeling unwell and was sent to a doctor who sent him to hospital for monitoring.

The accident could have been attributed to thick fog present when the job commenced. This made everything damp and would have allowed for higher levels of tracking than usual, including through the air.
NOTIFIABLE ELECTRICAL ACCIDENTS
1 January 2006 to 31 December 2006

Accident Number: 2006/034

Voltage: 11,000
Result: Electric shock
Location: Works

Line mechanics working on an isolated section of line, fitting jumpers to insulators, believed they felt a charging current on the line. As a precaution they immediately stopped work and contacted other workers some distance away, who were working near the isolation point, to find out if they too had a problem. It appears that the workers at the isolation point had livened the line assuming that all work had been completed.

The section of line where the workers received a shock was earthed on the downstream side of the pole, but the upstream side of the pole was not earthed as they thought that the earths were applied at the isolation point. The workers could not see the earths at the isolation point. The earths at the work site caused the protection to operate although it auto re-closed before finally locking out.

A communication problem at the site led to a message being left on a mobile phone stating that an earlier job had been completed and it was clear to liven. This may have caused confusion, with workers believing it was safe to liven the line at the point where the other workers were still working.

Accident Number: 2006/035

Voltage: 400
Result: Burns
Location: Industrial

Two electricians were carrying out current checks on a switchboard using a clip-on ammeter when a fault developed in the switchboard causing an arc flash and a fire. Both men suffered burns as a result. An examination of the switchboard did not reveal any faults but the most likely cause of the fire was a build-up of dust over time, which was disturbed during the testing, and movement of the cables.

Accident Number: 2006/038

Voltage: 400
Result: Burns
Location: Commercial

An electrician received burns to his hands and face when an electrical arc developed in a commercial switchboard he was working on. The electrician was installing flexible cables into a live busbar chamber when the explosion occurred. It appears that the cable shorted across two phase busbars. The company has revised its procedures for working live.
### Accident Number: 2006/039

<table>
<thead>
<tr>
<th>Voltage:</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result:</td>
<td>Burns</td>
</tr>
<tr>
<td>Location:</td>
<td>Commercial</td>
</tr>
</tbody>
</table>

An electrical fitter received burns to one of his hands when he touched a live terminal. The electrical fitter was tasked to check all bolted connections with a torque wrench. The worker was unaware that the switchboard was still live on the incoming side of the main switch. The flashover occurred when the electrical fitter was attempting to tighten a neutral connection and the torque wrench came into contact with the live blue phase connection. The company has reviewed its procedures and carried out staff training.

### Accident Number: 2006/045

<table>
<thead>
<tr>
<th>Voltage:</th>
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</thead>
<tbody>
<tr>
<td>Result:</td>
<td>Electric shock</td>
</tr>
<tr>
<td>Location:</td>
<td>Works</td>
</tr>
</tbody>
</table>

A network technician was removing couch grass that had grown into the high-voltage end of a ground-mounted transformer. The technician was wearing high-voltage gloves but could not get a grip of the grass, so took off one glove and pulled the grass out. In the process the technician received an electric shock. The network owner reinforced its procedures concerning the use of personal protective equipment and was considering modifying the concrete pad design to enable better control of vegetation growth.

### Accident Number: 2006/044

<table>
<thead>
<tr>
<th>Voltage:</th>
<th>230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result:</td>
<td>Electric shock</td>
</tr>
<tr>
<td>Location:</td>
<td>Commercial</td>
</tr>
</tbody>
</table>

An electrician received an electric shock when he was working on the control gear of a recessed fluorescent light fitting. The light fitting was part of a group located in a lecture hall. The electrician isolated the supply to the light fitting by switching off the circuit breaker. There was faulty wiring in an adjacent control box which provided a back feed to the light fitting on which the electrician was working. The electrician had not tested, and received an electric shock when he made contact with live parts within the fitting.

### Accident Number: 2006/046

<table>
<thead>
<tr>
<th>Voltage:</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result:</td>
<td>Electric shock</td>
</tr>
<tr>
<td>Location:</td>
<td>Commercial</td>
</tr>
</tbody>
</table>

A trainee electrician received an electric shock when he touched the load side of a soft starter while it was energised. The trainee failed to test to verify that the soft starter was isolated prior to working on it. The company has reviewed its procedures.
Accident Number: 2006/052
Voltage: 400
Result: Electric shock
Location: Industrial

An electrical worker was in the process of replacing a faulty contactor in a control panel when he made contact with live adjacent components and received an electric shock. The worker had failed to isolate or cover adequately the live adjacent components.

Accident Number: 2006/054
Voltage: 400
Result: Burns
Location: Works

A line mechanic received flash burns to his face as he attempted to connect generator leads to the LV side of a transformer. To reduce the time that customers would be without power, a network company arranged for a contractor to connect generators to four transformers.

Two transformers were connected to generators but due to the lengthy time it had taken to make the connections and a delay in starting the job, a decision was taken to proceed with the connection of the third generator in a different way.

Instead of connecting the leads to the LV bushings, the cables would be connected to a plug-in rack, and the generator leads clamped directly to the stand-off brackets on the LV rack. To achieve this, the rack was unplugged from the LV busbar, and while holding the rack with one hand, the line mechanic attempted to connect the generator leads with the other hand. The first lead had been connected and he was attempting to connect the second lead when there was a short across the connections, causing an arc. Unfortunately, he was unaware of the lack of clearance between the red phase bar on the rack and the clamp now connected to the white phase stand-off bracket. While tightening the clamp the clearance was reduced and a contact was made between red and white phases, resulting in an arc flash.

The line mechanic received burns to his body. Other workers doused him in cold water before he was taken to a medical centre. It was determined that the transformer and LV cables were still live and the network control centre was informed of the incident. It was decided to cordon off the area around the transformer until someone could attend the site to isolate and earth the transformer and make the site safe.
Accident Number: 2006/057
Voltage: 230
Result: Fall injuries
Location: Works

A faultman fell while carrying out maintenance work on a two-pole transformer structure. He was working on a pole platform and standing on the handrail that supported the LV conductors replacing a fuse carrier when he fell to the ground. The fall resulted in him sustaining broken ribs, a fractured pelvis and concussion. At the time of the accident he was wearing the appropriate personal safety equipment for the work, including LV insulating gloves with leather over-gloves, but he was not wearing a fall-arrest device or a safety belt. There was no evidence of an electric shock.

Accident Number: 2006/060
Voltage: 230
Result: Electric shock
Location: Domestic

An electrician was called in to repair a damaged mains cable in a domestic installation. A test was carried out on the cable sheath using a non-contact voltage detector to see if the cable was live. However, as the cable was a neutral screen cable it meant that a voltage detector of this type would not work. The electrician then proceeded to cut through the cable with a hacksaw and he received an electric shock.

Accident Number: 2006/063
Voltage: 230
Result: Electric shock
Location: Domestic

An electrician went to check a cable lying on the ground during building alterations. Having been informed by the homeowner that it was not live, the electrician took hold of the cable and received an electric shock from the exposed live end.

Accident Number: 2006/064
Voltage: 400
Result: Burns
Location: Commercial

A non-registered person working as an electrical assistant had attempted to remove insulation from the busbar lugs on a live switchboard when his screwdriver slipped and caused a phase-to-phase short circuit. As a result of the fault he received burn injuries to his left hand and forearm as well as arc flashes to his eyes. He had not been instructed by his supervisor to carry out this work, which should have been carried out with the power off.
Summary of Reported Accidents

Accident Number: 2006/065

Voltage: 230
Result: Electric shock
Location: Industrial

An electrician was carrying out maintenance work on evaporator fans working from a scaffold. When he touched one of the fan blades he received an electric shock. Tests of the installation revealed that an earth pin on a connector plug had not made contact and because the motor had developed an earth fault the body of the motor was live. As the fan was mounted on rubber feet, it was isolated from earth and the protection had not tripped as no earth fault was detected.

Accident Number: 2006/067

Voltage: Other
Result: Electric shock
Location: Works

A line mechanic was removing tails from a 33,000 volt disconnector when he received an electric shock. The unearthed conductor became energised due to induced voltage from a parallel energised 11,000 volt circuit, causing the line mechanic to receive an electric shock. The workers did not apply temporary earths to the line as per the Safety Manual Electricity Industry requirements of earthing to prevent induction from adjacent circuits. The company has reviewed its procedures and the workers have undergone refresher training.

Electrical accidents must be notified immediately (section 16 of the Electricity Act 1992). This can be done by freephone on: 0800 104 477.

An electrical accident notification report must also be completed. This should be filed with ESS within two weeks of the incident.

A report form can be found at the back of this book and online by visiting the ESS web site at: www.ess.govt.nz.
## Part 2
### Other Occupations

### Accident Number: 2006/004
- **Voltage:** 11,000
- **Result:** Electric shock
- **Location:** Domestic

A building contractor received an electric shock when he inadvertently contacted an 11,000 volt overhead line with a piece of aluminium section being used to carry out repairs on a glasshouse structure. The company has reviewed its procedures when working around overhead lines.

### Accident Number: 2006/006
- **Voltage:** 230
- **Result:** Electric shock
- **Location:** Commercial

A painter using a hand-held electric angle grinder to clean a steel column received an electric shock. He was using the grinder with the power lead draped over his shoulder in order to keep the lead away from the grinding wheel. Before it had stopped rotating he moved position and the wheel cut into the power lead, exposing the live phase conductor.

One of his hands touched the phase and neutral conductors now exposed in the damaged lead and he received an electric shock. Power was supplied through an RCD socket.
outlet, but current flow to earth was detected by the RCD, which was tested and found to be working correctly. The company subsequently put notices on RCD-protected equipment warning of the need to take care and that an RCD is not a substitute for basic electrical safety when using power tools.

Accident Number: 2006/007

Voltage: 11,000
Result: Electric shock
Location: Works

A truck driver received an electric shock from his truck when the tip tray made inadvertent contact with an 11,000 volt power line. The truck had been tipping material close to the power lines, and the driver was lowering the tray when his foot slipped off the brake pedal and the truck rolled forward, making contact with the line. The company has made the workers aware of the dangers of working close to power lines.

Accident Number: 2006/010

Voltage: 11,000
Result: Fatal electric shock
Location: Commercial

A roofing contractor was installing roofing iron on a farm shed and above the shed there were live 11,000 volt overhead power lines. The power lines were approximately 1.5 metres above the roof where the contractor was working. His head made contact with the line and he received a fatal electric shock. It appears that the shed was built by the farmer who also must have been working too close to the power line.

Accident Number: 2006/011

Voltage: 230
Result: Electric shock
Location: Industrial

A carpenter received an electric shock when he touched an electric drill lead that was damaged and had an exposed live conductor. The power source was protected by an RCD which operated correctly, limiting the effect of the electric shock current on the victim.

Electrical accidents must be notified immediately (section 16 of the Electricity Act 1992). This can be done by freephone on: 0800 104 477.

An electrical accident notification report must also be completed. This should be filed with ESS within two weeks of the incident.

A report form can be found at the back of this book and online by visiting the ESS web site at: www.ess.govt.nz.
Accident Number: 2006/012

Voltage: 33,000
Result: Burns
Location: Works

A digging contractor was contracted to dig trenches for new power cables along an existing cable route. During the excavation a worker was watching the digger bucket to ensure that none of the existing cables was in danger of being struck. However, the digger bucket struck a 33,000 volt cable and the resulting explosion caused burns to the face and hands of the worker. The Department of Labour carried out an investigation into this matter and made recommendations to the company.

Accident Number: 2006/016

Voltage: 230
Result: Electric shock
Location: Industrial

A factory worker brought a radio from home for use at his place of work. When he went to unplug it he received an electric shock. The power lead had been damaged some time before and there was a live exposed phase conductor in the power lead. The radio was removed from service and the company made a rule that no appliances from home were to be brought into the factory.

Accident Number: 2006/013

Voltage: 230
Result: Burns
Location: Commercial

A nurse received burns to one of her hands when she was unplugging a pump. Apparently the pump drew quite a load and was normally unplugged without first turning off the power. Over time the plug and socket outlet had become coated in carbon and on this occasion a phase-to-neutral short circuit occurred, causing the plug to emit a flame. The company has since made a rule that appliances must be switched off before removing plugs and RCDs have been fitted to all circuits in the area where these appliances are used.

Accident Number: 2006/021

Voltage: 11,000
Result: Fatal electric shock
Location: Domestic

A concrete pump operator received a fatal electric shock when the pumping boom he was operating came in contact with a live 11,000 volt overhead line. It appears that the boom remote control may have been faulty. This may have caused the boom to continue to move into the power line. When the operator tried to use the controls on the truck, they had become live when the boom had made contact with the overhead power lines.
## Summary of Reported Accidents

<table>
<thead>
<tr>
<th>Accident Number: 2006/022</th>
<th>Accident Number: 2006/026</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage:</strong> 11,000</td>
<td><strong>Voltage:</strong> 230</td>
</tr>
<tr>
<td><strong>Result:</strong> Electric shock</td>
<td><strong>Result:</strong> Electric shock</td>
</tr>
<tr>
<td><strong>Location:</strong> Commercial</td>
<td><strong>Location:</strong> Commercial</td>
</tr>
</tbody>
</table>

An arborist attempting to remove a branch from a live 11,000 volt overhead line received an electric shock from the rope attachment on the branch.

<table>
<thead>
<tr>
<th>Accident Number: 2006/025</th>
<th>Accident Number: 2006/027</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage:</strong> 230</td>
<td><strong>Voltage:</strong> 230</td>
</tr>
<tr>
<td><strong>Result:</strong> Electric shock</td>
<td><strong>Result:</strong> Electric shock</td>
</tr>
<tr>
<td><strong>Location:</strong> Commercial</td>
<td><strong>Location:</strong> Works</td>
</tr>
</tbody>
</table>

A shop assistant received an electric shock after touching a water tap. An investigation found that the main neutral at the entry to the building had broken off. The main earth of the building was found to be ineffective, causing the tap to become live. An electrician completed repairs to the installation neutral.

A supermarket worker received an electric shock while placing meat in a refrigerated cabinet. She attempted to put the lamp back into the lampholder, which had fallen out, her finger touched a broken part of the lampholder which had exposed live parts and she received a shock. The company has reviewed its maintenance and reporting policy.

A labourer received an electric shock as he was moving a service main cable in a trench. The company was contracted to dig trenches for service cables and the procedure was to get the network company to locate live service cables prior to digging. However, on this occasion the workers did not follow the correct procedure. It appears that the cable had been damaged some time prior to the workers moving the cable in the trench and had a live exposed conductor, possibly due to earlier earth works at the site.
Accident Number: 2006/030

Voltage: 230
Result: Electric shock
Location: Commercial

A supermarket checkout operator was removing a plug on the power lead on a power supply box for a set of scales. The power box cover separated into two halves, exposing the internal live components of the power supply. The operator received a shock when two of her fingers made contact with the exposed live components in the power supply box.

When checked, the power supply box was found to have been previously damaged and when the mains lead was pulled out, the cover came off exposing the live components. The cupboard where the power supply was installed had been used for storage and this was the most likely cause of the damage to the unit. The cupboard was cleaned out and is no longer used for storage.

Accident Number: 2006/031

Voltage: 230
Result: Electric shock
Location: Rural

A landscape gardener was trying to remove a disused power pole which was anchored by a steel bar with an attachment eye protruding above ground level. The steel bar snagged during the process of trying to remove it and when extra force was applied the steel bar cut into the sheath of a live buried cable. This made contact with the phase conductor and caused the gardener to receive an electric shock.

Accident Number: 2006/033

Voltage: 230
Result: Electric shock
Location: Industrial

A meat worker received an electric shock when he touched a bag-loading machine. An investigation revealed that the power lead supplying the machine had been pulled out of the cord grip. The neutral and earth wires had pulled out of the terminals and the earth wire had made contact with the phase terminal.

A test of the machine found that there were no bonding wires between the body of the control panel and motor, causing a high impedance to earth, effectively livening the machine under these conditions. The machine was protected by an RCD 30 milli amp but this failed to trip due to limited fault current (however, it tripped on a subsequent test). Other bag-loading machines were checked at the site and found to have similar wiring. As a result the bag-loading machine manufacturer is carrying out modifications on machines at other sites.
### Accident Number: 2006/037

**Voltage:** 230  
**Result:** Electric shock  
**Location:** Commercial

A worker in a supermarket was using a meat slicer when she turned on the switch and received an electric shock. The switch on the appliance was contaminated with grease and was tracking, causing the switch toggle to become live. A new switch was fitted with a rubber boot covering the operating lever and an RCD installed for the power circuit. The company will also be carrying out an audit of electrical safety in the supermarket.

### Accident Number: 2006/041

**Voltage:** 230  
**Result:** Electric shock  
**Location:** Industrial

A worker received an electric shock while attempting to unplug a lead from a metal clad socket outlet. An inspection revealed that the socket outlet had a high resistance earth connection to the outer metal case. The switch mechanism had also dislodged from its mounting and when in the ‘off’ position the phase terminal touched the metal case, livening the body of the socket outlet.

### Accident Number: 2006/042

**Voltage:** Other  
**Result:** Electric shock  
**Location:** Industrial

A labourer installing aluminium busbar sections in a switchyard received an electric shock as a result of a potential difference between the earthed busbars and the metal cladding of an adjacent building.

### Accident Number: 2006/043

**Voltage:** 230  
**Result:** Electric shock  
**Location:** Commercial

A shop assistant received an electric shock while turning on a waste disposal unit. The switch for the waste disposal unit was not waterproof and allowed the ingress of water over time-causing the switch to track. The owner of the shop had the switch replaced with a waterproof type and installed an RCD on the circuit.
Accident Number: 2006/047
Voltage: 400
Result: Electric shock
Location: Domestic

A line mechanic was sent to disconnect a house service, as the house was being moved. The next day a house mover received an electric shock from metalwork in the house. An investigation revealed that the wrong neutral wire had been disconnected and because the earthing system at the house had a high resistance, there was a voltage potential between the ground and metalwork in the house. The company has since reviewed its procedure for disconnection.

Accident Number: 2006/048
Voltage: 0
Result: Electric shock
Location: Commercial

A demolition contractor was in the process of carrying out demolition work when a worker cut through a live low-voltage cable and received an electric shock. The contractor was informed that the site was isolated from the supply of electricity. One of the workers came across a low-voltage cable in an internal wall and decided to cut and remove the cable and received an electric shock as the cable was live.

On investigation it was found that the cable in the internal wall was not isolated from the supply. The demolition worker had access to a voltage detector but failed to test before cutting the cable.

Accident Number: 2006/051
Voltage: 230
Result: Electric shock
Location: Commercial

A worker was probing soil in a hand-dug hole trying to locate a water main for the connection of water supply for a new dwelling. He pushed the probe down amongst low-voltage supply cables and pierced a phase conductor on one of the cables. This resulted in the worker receiving an electric shock. On investigation, it was found that the insulation on the probe was damaged and it should not have been used close to power cables. The company has reviewed its procedures for maintaining equipment.

Accident Number: 2006/053
Voltage: 230
Result: Electric shock
Location: Commercial

A builder received an electric shock when he attempted to push a cable through a hole in a stud in a house. The building was undergoing repairs and an electrician had removed the cable to allow building work to commence. The electrician taped the end of the cable but left the cable live. As the builder
was pushing and pulling the cable through the hole, a strand of the copper conductor pierced the tape, resulting in the builder receiving an electric shock.

Accident Number: 2006/055
Voltage: 230
Result: Electric shock
Location: Works

A truck driver received an electric shock when the truck he was driving inadvertently made contact with a service main. As the driver exited the truck and closed the door he received an electric shock.

At the time of the accident the truck driver was unaware that the raised tray of his truck had brought down a live 230 volt conductor that was now tangled around the tray of the truck. The line supplied power to commercial properties up a common driveway and was due to be under grounded as part of a development scheme. The trucking contract’s manager will be discussing the accident at safety meetings to make drivers more aware of the dangers around power lines.

Accident Number: 2006/059
Voltage: 230
Result: Electric shock
Location: Commercial

A shop assistant in a supermarket received an electric shock after cleaning down a display unit and plugging the unit back into a socket outlet. Moisture on the plug top and probable wet hands caused the person to receive an electric shock as the unit was plugged in.

It was recommended that RCD protection be installed.

Accident Number: 2006/058
Voltage: 11000
Result: Electric shock
Location: Works

A landscape gardener was digging post holes for a retaining wall using an electric hammer when he struck a live 11,000 volt cable in the road reserve outside the property boundary. No checks had been made for the possible presence of any underground services before he had commenced digging.

The gardener received an electric shock and singed one of his arms from the resulting flash. He was taken to hospital for observation and later discharged.
Accident Number: 2006/003

Voltage: 230
Result: Electric shock
Location: Commercial

A tourist received an electric shock while exiting a camper van. The camper van was found to have a defective supply lead with the neutral and earth connections pulled out of the plug supplying power to the van. Information from the rental company’s electrical inspector indicated that the damage resulted from the van being driven off with the lead still connected to the power supply. The company has modified its new fleet of vans so that the plug must be removed before the camper van can be started and driven away.

Accident Number: 2006/014

Voltage: 230
Result: Electric shock
Location: Domestic

A homeowner working on some spouting at the rear of his house noticed a cable sticking out of the wall. When he tried to push the cable back into the wall he received an electric shock. The cable had apparently been used to supply power to a shed which had been removed some years ago. The homeowner had the cable disconnected by an electrician.
Accident Number: 2006/036
Voltage: 230
Result: Fatal electric shock
Location: Domestic

A homeowner received a fatal shock while working in the kitchen of his home. The homeowner was standing on the stainless steel sink bench while painting a section of wall above a window when he touched the metal light fitting above the bench and received the fatal electric shock.

An electrician found that the light fitting had been wired with the phase loop wire connected to the earth connection in the light fitting. The switched phase and neutral connections were wired correctly. This meant that the body of the light fitting was live.

The wiring installation was of the older type with two core TPS with three plate ceiling roses and a switched pair run down the wall.

The phase loop had been placed in the earth terminal, thus liveening the earth metal body of the fitting.

Accident Number: 2006/040
Voltage: 230
Result: Electric shock
Location: Domestic

The tenant of a house received an electric shock from a water heater switch while looking for items in the rear of the water heater cupboard. The water heater switch cover had fallen off and she did not notice the cover was missing and touched the live terminals of the switch. The owner of the property has had the switch replaced.

Accident Number: 2006/049
Voltage: 230
Result: Electric shock
Location: Domestic

A homeowner received an electric shock when she moved a toaster that was on a stainless steel bench. The toaster was switched off but still plugged in at the wall when she received the shock.

An investigation revealed that the circuit supplying power to the socket outlet had been blowing fuses and had been repaired several times. The earth wire behind the socket outlet had been trapped by a phase terminal, causing it to eventually blow apart while the tail connected to the earth pin remained in contact with the phase terminal. This resulted in the earth terminal of the socket outlet being live, and when any
metal-bodied appliance was plugged into the socket the body of the appliance would become live. The faulty circuit was left isolated as the homeowner was having work done in the kitchen.

**Accident Number: 2006/050**

Voltage: 230  
Result: Electric shock  
Location: Works

A homeowner received electric shocks off a water tap. The cause was found to be a broken neutral connection on the network end of the overhead service lines providing power to the house. It appears that as a result of high winds, the neutral connection was under stress and eventually failed at the pole connection. This, combined with a high-impedance earth connection at the house, caused a potential rise at the water tap. The neutral connection was re-established.

**Accident Number: 2006/056**

Voltage: 230  
Result: Electric shock  
Location: Domestic

A homeowner received an electric shock when he was opening a set of electrically controlled gates at his home. An electrician carried out tests on the gate, which was found to be live at 230 volts; further investigation identified that the neutral connection at the mains entry box on the house had deteriorated to the point where the neutral connection was not effective. An electrician repaired the neutral connection and tests were carried out to ensure the installation, including the gate, was electrically safe.

**Accident Number: 2006/061**

Voltage: 230  
Result: Burns  
Location: Domestic

A homeowner received an electric shock when he went to turn on a bedside light. The light bulb had broken at some stage and he contacted the exposed live filament support with the palm of one of his hands.
Accident Number: 2006/062

Voltage: 230
Result: Burns
Location: Domestic

A nine-year-old child received burns to one of his hands when he operated the trigger switch on a hot glue gun. The product was defective and did not meet the required electrical safety standards for use in New Zealand. The supplier recalled the product once it was made aware of the problem.

Accident Number: 2006/066

Voltage: 33,000
Result: Electric shock and fractures
Location: Works

A person received electric shock and multiple fractures when he fell from a 33,000 volt structure after attempting to steal conductors. He contacted the live conductors, which caused the lines to trip before he fell some 15 metres to the ground. The network company was informed of the accident by the police.

Electrical accidents must be notified immediately (section 16 of the Electricity Act 1992). This can be done by freephone on: 0800 104 477.

An electrical accident notification report must also be completed. This should be filed with ESS within two weeks of the incident.

A report form can be found at the back of this book and online by visiting the ESS web site at: www.ess.govt.nz.
Part 4

Electrical Fires

<table>
<thead>
<tr>
<th>Number:</th>
<th>2006/001f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result:</td>
<td>Large garage and adjacent residence damaged</td>
</tr>
<tr>
<td>Location:</td>
<td>Domestic</td>
</tr>
</tbody>
</table>

A fire started in a main switchboard and spread to a distribution board and into the garage where it ignited flammable materials. The fire then spread through an open-beamed roof into the adjacent house, causing substantial damage.

The metal meter box was located in a passageway, with the distribution board mounted on the same wall immediately behind it in the garage. The metal meter box and components were almost completely destroyed, with the damage consistent with that of an electrical high-voltage discharge rather than of a component failure.

All three 100 amp pole fuses at the transformer had blown, but not the 11,000 volt transformer fuses. Molten copper fell onto goods stored below the meter box and started the fire, which passed through the wall and into the garage.

The investigator concluded that a lightning strike on the metal garage roof had travelled into the switchboard through the main earth conductor.
<table>
<thead>
<tr>
<th>Number:</th>
<th>2006/003f</th>
<th>Result:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Damage to wall, ceiling and socket outlet</td>
<td>Commercial</td>
</tr>
<tr>
<td>A portable dishwasher used for cleaning cups in a tea room overheated, causing a fire. The cup washer melted and caught fire, which damaged a wall-mounted socket outlet and caused some damage to the ceiling until the sprinkler system activated – which extinguished the fire. The make and model of the dishwasher have been inspected for compliance and safety.</td>
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<table>
<thead>
<tr>
<th>Number:</th>
<th>2006/004f</th>
<th>Result:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Damage to mattress and wall heater</td>
<td>Commercial</td>
</tr>
<tr>
<td>A wall-mounted panel heater in a hotel bedroom was situated close to a bed and was accidentally switched on. This set fire to the mattress. The hotel has since moved the heaters in the rooms away from the beds.</td>
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<table>
<thead>
<tr>
<th>Number:</th>
<th>2006/006f</th>
<th>Result:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Damage to meter enclosure and interior wall</td>
<td>Domestic</td>
</tr>
<tr>
<td>A fire started within the meter enclosure mounted on the outside wall of a domestic garage. Burning plastic fell inside the wall cavity and ignited the interior wall lining. It was determined that the most likely cause was a loose connection in one of the meters, which caused the components to catch fire.</td>
<td></td>
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<table>
<thead>
<tr>
<th>Number:</th>
<th>2006/007f</th>
<th>Result:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Fire damage to switchboard</td>
<td>Domestic</td>
</tr>
<tr>
<td>The main switchboard in a house had been replaced after it had caught fire. When the switchboard caught fire again an inspector was asked to investigate. Insulation on the mains cable outer sheath at the pole was found to be cracked, allowing water to enter the cable. The fires were attributed to arcing that was caused by water travelling down the mains cable to the exposed live conductors and connections.</td>
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</tbody>
</table>
Due to the low and inconsistent level of reporting to ESS on electrically initiated fires, it is difficult to print conclusive and meaningful information in this section. ESS recommends the New Zealand Fire Service web site www.fire.org.nz, where more detailed information on electrically initiated fires is published.

A fire occurred in the ceiling space of a house, with the cause appearing to be that a cable supplying a two-way lighting circuit had been damaged by rodents chewing through the insulation. The protection did not operate and the cable insulation melted as a result of the conductors short circuiting, eventually causing ignition and a fire.

A fire in a commercial switchboard occurred when the main circuit breaker failed to operate and the only protection upstream of the circuit breaker was the high-voltage protection for the supply transformer. This situation allowed cables to short circuit and the high fault current caused the mains cable to burn until the transformer was isolated.

During a storm, water entered the mains entry box that supplied power to a workshop. The resulting electrical short circuit caused a fire that destroyed the workshop and shed.

The ballast in a fluorescent light failed, causing a small fire which was contained within the body of the light fitting.
Number: 2006/022f
Result: Fire damage to dryer and towels
Location: Domestic

A large number of towels were being dried in a tumble dryer. They had been cold washed and had been in the dryer for 90 minutes. The dryer was at the end of its cycle but was most likely not in the cooling part of the cycle. No structural damage to the laundry room occurred, with the fire essentially contained within the dryer and drum.

The lint filter was cleaned before the dryer was loaded and the most likely cause would have been combustion of the load in the dryer due to the presence of a fabric softener or other treatments used in the wash.

A cold wash may not have removed the oils and other fabric treatment compounds. There have been other incidents in the past where such a dryer load self combusted due to a high temperature build-up with a load such as towels. The protection on the switchboard, in this case a rewireable fuse, had not operated.

Number: 2006/012f
Result: Minor damage to floor and carpet
Location: Domestic

A small fire resulted from a carpet having been placed directly on under-floor heating elements without any protective barrier.

Number: 2006/014f
Result: Charring to floor joists
Location: Domestic

Flames were emitted at several points along a mains cable that was installed under a house. The cable ran underground from a plinth on the boundary of the house down a steep hill to the property. The cable entered the property in the basement, where it was clipped to a floor joist under the house.

It appears that, over time, water in the plinth had entered the cable between the outer sheath and the conductors, which then migrated into the insulation causing oxidation of the copper strands to the point of corrosion. A series of high-resistant faults along the cable did not draw sufficient current to allow the fuse protection to operate, allowing small fires to break out along the cable.
Number: 2006/023f

Result: Fire damage to substation

Location: Works

A fire occurred in a kiosk-type substation. An investigation revealed that the most likely cause of the fire was a high-impedance joint in close proximity to a low-voltage supply panel. The protection operated, limiting the damage to the substation.

Number: 2006/029f

Result: Minor fire damage, smoke damage and a melted socket outlet

Location: Domestic

A house suffered moderate damage when the fixed wiring behind a socket outlet caught fire. An investigation determined that there was a loose connection that had been arcing where it was terminated in the socket outlet and at the time of the fire had a heating load connected. The wire fuse protecting the circuit did not operate during the fault.
Electrical accidents must be notified immediately (section 16 of the Electricity Act 1992). This can be done by freephone on: 0800 104 477.

An electrical accident notification report must also be completed. This should be filed with ESS within two weeks of the incident.

A report form can be found at the back of this book and online by visiting the ESS web site at: www.ess.govt.nz.
Date: 09/01/2006
Location: Auckland City
Equipment: Cooker
Accident type: Fire

Losses: Appliance destroyed, property damaged.

Summary of events: A portable hob in the kitchen of a residence had been turned off after use, leaving the LPG supply on. Some time later, a fire developed in the vicinity that destroyed the appliance and caused further significant damage to the kitchen.

Suspected causes and significant factors: Probably a leakage from the soldered joint of the burner control, which ignited during use, resulting in a flame inside the appliance that persisted after the appliance was turned off. The investigator considered that the soldered joint was more vulnerable to damage than the screws and gasket preferred by most manufacturers, with any leakage most likely to be slight and difficult to detect.
**Date:** 29/03/2006  
**Location:** North Shore City  
**Equipment:** Cooker, container  
**Accident type:** Gas leak or escape, explosion  

**Losses:** Second and third degree burns to the feet and lower legs of a chef and superficial burns to a restaurant owner. Damage to the kitchen wall.

**Summary of events:** Neighbours to a restaurant had reported the smell of gas. Later, when unlocking the premises for the day, the owner smelled gas and turned on the kitchen extractor fan. Shortly after, the chef attempted to light a hotplate on the LPG cooker. An explosion engulfed him in a fireball, severely burning his bare feet, and the owner standing behind was also slightly burned. As the chef was being assisted to lie down in the dining area there was a second explosion and a fireball in the kitchen. The fire service and an ambulance were called.

**Suspected causes and significant factors:** Probably due to an LPG escape from a split hose end overnight that was ignited by the chef attempting to light the cooker. The flexible appliance hose was fitted incorrectly, overstressing the bayonet connection end. According to the owner, appliances had recently been pulled away from the wall for cleaning. If fitted in accordance with installation standard NZS 5261, the hoses would naturally have fallen into a ‘U’ configuration when an appliance was pushed against a wall and extended free of stress when an appliance was pulled out for maintenance or cleaning. The entire installation required upgrading and maintenance after the accident.

**Date:** 12/05/2006  
**Location:** Rodney District  
**Equipment:** Cabinet heater  
**Accident type:** Fire  

**Losses:** Tenant hospitalised for at least five days with third degree burns. Death of pet. House destroyed.

**Summary of events:** A towel drying on top of a cabinet heater caught fire while the tenants were distracted. When one of them noticed the fire, she tried to remove the burning towel but was forced to drop it. Newspapers that had been spread on the floor caught fire, which aided the rapid spread of the fire. The injured tenant went out the back door, and two others fled through the front, leaving both entrances open.

The fire service was called two minutes after the start of the fire. Accelerated by gale-force winds and LPG from the cabinet heater cylinder, the fire spread rapidly through the wooden building. The owner of the property was alerted by an explosion, also heard by a passer-by. The fire service arrived in about nine minutes, but the house was destroyed and a pet was killed.
**Suspected causes and significant factors:** The towel was too close to the radiant, draped over the lit cabinet heater. The towel evidently did not vent in the heat of the fire as expected and the contents ignited immediately with the melting of the valve, probably by burning gas from the hose. The fire service expressed concern that if the cylinder valve had melted later an explosion and fireball may have affected the fire crew.

When the heater was pulled out, part of the timber framing was found to be damaged.

**Suspected causes and significant factors:** The timber had been ignited by excessive heat radiating from one side of the appliance, due to a misaligned unit and lack of specified air vents for the cavity. A number of other faults were found with the installation.

<table>
<thead>
<tr>
<th>Date:</th>
<th>14/05/2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>Clutha District</td>
</tr>
<tr>
<td>Equipment:</td>
<td>Fixed space heater</td>
</tr>
<tr>
<td>Accident type:</td>
<td>Fire</td>
</tr>
</tbody>
</table>

**Losses:** Damage to space heater and timber above.

**Summary of events:** A new house had two space heaters of the same brand installed, one inbuilt and one free-standing. About a month after moving in, the owners tried to demonstrate their inbuilt heater to friends. They were unable to ignite it and smelled gas, so they called the manufacturer. They were advised to turn it off, open the windows, then try again.

The heater was not lit until the next day. Gas was smelled again. Within an hour smoke began emerging from between the unit and the wall on one side. The fire service was called and found a small fire in the cavity housing the heater.

<table>
<thead>
<tr>
<th>Date:</th>
<th>-/05/2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
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<tr>
<td>Equipment:</td>
<td>Fixed space heater</td>
</tr>
<tr>
<td>Accident type:</td>
<td>Fire</td>
</tr>
</tbody>
</table>

**Losses:** Damage to space heater and surrounding timber.

**Summary of events:** Timber beside a fixed space heater caught fire.

**Suspected causes and significant factors:** Jets may have been out of alignment. The clearance distance from the appliance to a combustible surface complied with instructions.
**Date:** 01/06/2006  
**Location:** Palmerston North City  
**Equipment:** Cabinet heater  
**Accident type:** Fire  

**Losses:** Heater and cylinder destroyed by fire.

**Summary of events:** An owner ignited her LPG heater and went to the kitchen. Five minutes later the smoke alarm sounded and she discovered that the heater was on fire. She turned the heater controls off and phoned the emergency services. She then closed the cylinder valve and dragged the appliance from the living room to the front veranda. The fire service arrived around 15 minutes later and extinguished the fire.

**Suspected causes and significant factors:** The suspected cause was a leakage at the QCC connector. A high-pressure gas leak was reproduced in tests when the regulator was connected and a light force was applied perpendicularly to the line of the valve outlet. The QCC’s flow-limiting valve evidently activated, keeping the fire to a minimum.

---

**Date:** 21/06/2006  
**Location:** Stratford District  
**Equipment:** Cabinet heater  
**Accident type:** Explosion, fire  

**Losses:** Garment repair shop destroyed.

**Summary of events:** The cylinder for a cabinet heater used on commercial premises had just been filled. The owner smelled gas when she connected it and waited half an hour before lighting the heater. A fire started around the controls. She carried the heater outside, on the way igniting flammable materials. The fire service attended, but the property was gutted.

**Suspected causes and significant factors:** Possibly an insecure hose connection; the crimp had come away. Fire damage around the control unit was noted.

---

**Serious gas accidents must be notified immediately** (section 17 of the Gas Act 1992). This can be done by freephone on: **0800 104 477**.

**A serious gas accident notification report must also be completed.** This should be filed with ESS within seven days of the accident occurring.

A report form can be found at the back of this book and online by visiting the ESS web site at: **www.ess.govt.nz**.
Date: 26/06/2006  
Location: South Taranaki District  
Equipment: Cooker  
Accident type: Fire  

**Losses:** Cottage destroyed. Occupant hospitalised with burns to the face.

**Summary of events:** An elderly occupant of a farm cottage in a remote valley attempted to light a gas ring on his kitchen bench. As he did this, flames flashed back to the valve of the nine-kilogram cylinder about a metre away from the burner. He attempted to extinguish the fire with a damp towel, receiving burns to his face, then walked out of the cottage. A neighbour 250 metres away who had seen the smoke came to assist. There were several explosions and by the time the fire service arrived the cottage was destroyed.

**Suspected causes and significant factors:** The cylinder valve had melted, indicating the seat of the fire, possibly due to damage or an insecure connection allowing leakage. A spare nine-kilogram LPG cylinder nearby and another connected to a cabinet heater some distance away had both vented from their cylinder relief valves.

---

Date: 13/08/2006  
Location: North Shore City  
Equipment: Fixed space heater, container  
Accident type: Gas leak or escape, explosion  

**Losses:** Damage to gib wall on left-hand side of appliance, damage to appliance.

**Summary of events:** An open-fronted flame-effect gas fire had been installed by a craftsman gas fitter. The manufacturer subsequently commissioned the appliance and gave the go-ahead for the owner to use it. Two months later the owner’s adult son switched on the gas fire at the electrical switch mounted on the wall. He then took a seat on the couch opposite the appliance.

Two to five minutes later there was a loud bang and the appliance log set was propelled from its position in the burner tray on to the lounge floor. The gib wall lining on the left-hand side of the wall housing the appliance separated from the framing in the explosion. The gas fire was then switched off and the installer called.

**Suspected causes and significant factors:** Delayed ignition of the main burner of the gas appliance. This was as a result of vermiculite granules entering the pilot assembly cavity, clogging and obstructing the path between the flame sensor electrode and pilot flame.
Unknown to the owner, a cat had been urinating on the vermiculite bed and may have disturbed the bed, causing it to fill the cavity.

The investigator detected a gas leak with a leak detector on the pilot tube where it connected to the pilot assembly. As the leak was slight and did not register using soapy solution, and as the appliance was open fronted, the investigator considered it would not have been a contributing factor to the delayed ignition. The manufacturer disagreed, however, and considered that the leak could explain the explosion.

**Date:** 16/08/2006  
**Location:** Auckland City  
**Equipment:** Water heater  
**Accident type:** Carbon monoxide poisoning

**Losses:** Four persons exposed to carbon monoxide, with CO blood (carboxyhaemoglobin) levels between 10% and 25% saturation. Three were rendered unconscious, requiring hospitalisation.

**Summary of events:** A family had been living permanently in a house bus. They had apparently installed an LPG water heater and a gas cooker three years prior to this accident. About two weeks prior to the accident it had been noted that the water heater was not heating water properly and the owner made enquiries about what might be wrong with the installation. At about the same time the mother and two children had been seeing a doctor as they had been experiencing flu-like symptoms.

Early in the evening the children had showers in succession, for about 35 minutes, while a meal was prepared using the gas cook-top. It was a cold day and all windows and ventilation openings of the house bus had been closed. Soon after, the father arrived home and the family sat down for a meal. At that point the two children complained of feeling sick and fell unconscious, followed by the mother. The father called emergency services. An ambulance arrived and oxygen was administered. The fire service also attended the scene and ensured the LPG cylinders were turned off and ventilated the house bus. The family members were taken to hospital, diagnosed with carbon monoxide poisoning and treated with hyperbaric oxygen.

**Suspected causes and significant factors:** Location and lack of maintenance of a flueless continuous flow water heater in a combined living and sleeping area. The pilot burner of the water heater was found to emit extremely high levels of carbon monoxide and showed signs of being under-aerated, with dust blocking off primary aeration. Although the water heater’s main burner was found not to be emitting significant amounts of carbon monoxide, it may have aided circulation of the combustion products.
through the house bus. Although the cooker appears not to have been set up to run on LPG, it does not appear to have contributed to the accident.

Date: 12/09/2006
Location: Christchurch City
Equipment: Fixed space heater
Accident type: Explosion

Losses: Glass blown out and heater damaged beyond repair.

Summary of events: A flame-effect heater at a care facility had been on for some hours on a medium heat setting before being turned down. Shortly after the residents of the facility had gone to bed, a care worker heard a loud explosion. Responding, she saw a huge flash of flame, after which the fire blew out. Glass from the front of the heater was propelled to the other side of the room but glass on the sides remained intact.

Suspected causes and significant factors: Delayed ignition, possibly due to a blockage by corrosion in parts of the burner retention strip and cross-lighting tubes. The heater had been used intensively in the nine-month period since the burner had been replaced.

Date: 02/10/2006
Location: Palmerston North City
Equipment: Cabinet heater
Accident type: Gas leak or escape, fire

Losses: Heater and cylinder destroyed.

Summary of events: A resident connected the cylinder to a heater after refilling it. His wife ignited the heater soon after. The heater caught fire immediately and was thrown out onto the front lawn where it burned for a while until the fire service arrived. The fire service made the appliance safe and phoned the local hazardous substances officer to investigate.

Suspected causes and significant factors: Leakage from the QCC connection system. A leak was reproduced by applying a light force to the regulator, perpendicular to the valve outlet. The leakage persisted with a replacement regulator of the same make and model. Expert examination revealed the seal in the QCC valve was squashed on to the end of the back check module, where the regulator probe enters. The resultant flattening and tearing probably caused gaps and leaks. This problem has been ascribed to previously documented seal nipping.
Suspected causes and significant factors: Both cooker supports had been mounted upside down so that heat was reflected onto the canister by the cooking equipment. A warning label on the correct assembly method had worn off. Other significant factors included the use of outdoor cookers in the confined space of a van, a lack of instructions on the correct use of the cooker and the design of the cooker – it was not difficult to assemble and operate the appliance with the cooker supports upside down.

Date: 18/10/2006  
Location: Hastings District  
Equipment: Other  
Accident type: Fire  
Losses: Buckling of tractor’s steel, burnt paint, LPG cylinders rendered unusable and gas vented. Locking of grub screw on gear shaft.

Summary of events: A tractor had been towing a frost protection unit for an hour in the early morning when the unit caught fire. The operator exited the tractor cab and called for fire service assistance. The tractor was engulfed in fire when the fire service arrived. Upon arrival there was a reported hissing of gas but no particularly loud noise. The fire was easily extinguished. Gas continued to come out of the cylinders after the fire because the valves were melted and otherwise fire.
damaged. The cylinders were removed from the tractor and the valves were closed on one cylinder and removed from others.

**Suspected causes and significant factors:** Gas leakage suspected. A POL cylinder connector was found to be loose, although this may have been due to the fire. It was suggested that a brazed joint in copper pipe running to the burner could have been affected by the heat of operation of the equipment.

**Date:** 30/10/2006

**Location:** Marlborough District

**Equipment:** Container

**Accident type:** Fire, explosion

**Losses:** 18-year-old youth died and four companions (age 16-18) injured, one seriously. Fire damage to car.

**Summary of events:** This accident is subject to a Coroner’s Inquest. Apparently, gas was being released from a cylinder in a parked car for inhalation. This was inadvertently ignited by the lighting of a cigarette. One of the occupants apparently inhaled the burning gases and subsequently died in hospital.

**Suspected causes and significant factors:** Apparently, release of LPG in a confined space, ignited by a cigarette being lit.

**Date:** 01/11/2006

**Location:** Invercargill City

**Equipment:** Cabinet heater

**Accident type:** Fire

**Losses:** Cabinet heater destroyed.

**Summary of events:** A cabinet heater caught fire and the equipment was taken outside the house. The fire service attended after the occupants called the emergency services and turned the cylinder valve off.

**Suspected causes and significant factors:** Possible leak around the cylinder connection point (the regulator was destroyed by heat).

**Date:** 23/11/2006

**Location:** Marlborough District

**Equipment:** Installation pipework, water heater

**Accident type:** Fire, explosion

**Losses:** Severe damage to large area of backpacker lodge. Van parked alongside gutted. Lodge closed with associated loss of income.

**Summary of events:** During the evening at a backpacker’s lodge an occupant was alerted by smoke. Seconds later, he and other occupants heard two bangs, about 30 seconds apart. Exiting, they observed a column of flames by two 45-kilogram LPG cylinders. One of them called the emergency services.
Suspected causes and significant factors: Possible gas leakage from installation pipework, ignited by a water heater flame, with fire spreading to the cylinders and rapidly accelerating with the sudden release of gas following the destruction of 'pigtail' hoses or the activation of pressure relief mechanisms. The installation lacked excess flow valves, as specified in the LPG Association’s Code of Practice Number 2.

Date: 01/12/2006
Location: Tasman District
Equipment: Laundry dryer
Accident type: Fire

Losses: Commercial dryer destroyed by fire. Three to four rooms and roof severely fire damaged. Water damage after plastic water pipes burst.

Summary of events: The fire seems to have originated from inside an approximately one-year-old gas-fired commercial dryer that was being used to dry towels on a 55-minute cycle.

Suspected causes and significant factors: Drying of a large, balled load, possibly impregnated with flammable products. Fire-suppression equipment may have been inadequate for the isolated situation.
Date: 04/02/2006

Location: Waitakere City
Equipment: Fixed space heater
Accident type: Fire

Losses: Burns to faces and arms of two kitchen workers, for which treated and discharged. Cooker damaged.

Summary of events: A gas fitter had repaired a leak on the main gas line to a restaurant meter. He disconnected and tagged a range in the kitchen, then retested for soundness. He turned the supply back on and informed staff that they could now use gas appliances in the kitchen except for the tagged range.

The next morning, a kitchen worker placed a ham in the oven of the cooker adjacent to the disconnected unit and turned on the thermostat control. After an hour or so, it was discovered that the ham was not cooking and two kitchen workers attempted to light the oven pilot. When the flame was applied in the pilot and main burner area, there was an explosion and a large fireball erupted from the oven, engulfing and injuring both workers.

An ambulance was called and they were taken to hospital, treated and released the same day. The fire service was also called, and identified the gas oven as the source of the explosion, turning it off at the isolation valve immediately behind.
**Suspected causes and significant factors:** Unresolved. An ESS investigator’s findings were referred to the Plumbers, Gasfitters and Drainlayers Board, which on further investigation disagreed with them.

**Date:** 31/03/2006

**Location:** Tauranga District

**Equipment:** Fixed space heater

**Accident type:** Explosion

**Losses:** Extensive damage to space heater, minor damage to property.

**Summary of events:** A newly installed flame-effect space heater had only been used once in a test run. The second time, it was turned on at the wall switch by the owner, who noticed the main burner had not lit and turned it off after a minute or two. When he immediately switched it on again, the front glass blew out with a loud bang, narrowly missing him. The heater was severely damaged, and shards of glass projected about five metres across the lounge and caused minor damage to the surroundings.

**Suspected causes and significant factors:** Delayed ignition due to a blocked pilot and/or ignition of gas leaking from an internal joint. The design allowed fine vermiculite ‘embers’ to enter the pilot assembly through the rear of the guard and impede ignition. Once the pilot assembly was cleared, normal ignition with flame laddering across the whole burner was observed. Substantial leakage was found at a joint on the burner outlet of the main control valve, but as this was downstream of the appliance control the leakage occurred only when the appliance was on.
Date: 15/05/2006
Location: Manukau City
Equipment: Fixed space heater
Accident type: Fire

Losses: Significant fire damage to wall and to heater.

Summary of events: An inbuilt space heater had been on at the full setting in the evening and was switched off when the tenants went to bed. The following morning a tenant got up to go to work and smelled burnt timber. He noticed smoke near the lounge ceiling and around the heater grill and went to investigate. The heater and pilot light were both out, but the wall was hot and steam came out when he squirted water into the grill. He called the fire service.

Suspected causes and significant factors: Proximity of combustible material to the appliance. There was a gap in the appliance top plate, which was intended to act as a heat shield, near a combustible surface.

Date: 06/2006
Location: North Shore City
Equipment: Fixed space heater
Accident type: Fire

Losses: Severe fire damage to house. Gas installation destroyed. Floorboards in front of heater burnt right through.

Summary of events: An occupier had left a panel heater operating all day and into the evening with clothes drying in front of it. Neighbours noted smoke coming from the premises and alerted the emergency services. The suspected cause was the drying of clothes close to a heater for an extended period of time.

Suspected causes and significant factors: Suspected drying of clothes close to the heater over a period of several hours.

Date: 01/08/2006
Location: Auckland City
Equipment: Fixed space heater
Accident type: Explosion

Losses: Lower right leg injured by glass, exposing artery. Wound could not be stitched and may have required skin grafts.

Summary of events: A direct vent flame-effect space heater had not been used for some weeks. The homeowner attempted to light it, flicking on the high- and low-flame switches of the three-switch control. He then turned aside to use the television remote control. Moments
later, there was a loud explosion and the living room was showered with shards of glass from the front of the heater. The owner felt a sharp pain in one leg, but managed to turn off the heater switches before crawling to the bathroom to wrap a severe laceration. He then drove to the local medical centre and was transferred to hospital.

*Suspected causes and significant factors:* Natural gas leaking from the joint connecting the main supply pipe to the appliance and accumulating in the burner chamber until the user tried to light the heater. There was little air movement to displace the accumulated gas in the direct vent appliance. A similar incident had occurred several months previously, but the leak had not been detected, possibly due to an incorrect testing method, and the original explosion had been attributed to displaced vermiculite causing delayed ignition.

<table>
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<th>Date:</th>
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<tbody>
<tr>
<td>Location:</td>
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<tr>
<td>Equipment:</td>
<td>Fixed space heater</td>
</tr>
<tr>
<td>Accident type:</td>
<td>Explosion</td>
</tr>
</tbody>
</table>

*Losses:* Explosion damage to appliance, including broken glass panels.

*Summary of events:* A tenant activated a flame-effect gas fire in the lounge, using the electrical controls mounted on the side of the appliance. Moments later he heard a loud explosion coming from the gas fire and the sound of broken glass, which upon investigation he found to have come from the front cover of the appliance. The appliance was switched off and the building manager of the housing development was informed.

*Suspected causes and significant factors:* Insufficient gas pressure at the gas fire to sustain the safe operation of the burner ignition system, due to an insufficient pipe size. No other faults could be found with the appliance and the burner system functioned normally when tested with no other appliances running. When tested for soundness, the gas pipe system registered no pressure loss after 20 minutes.

The landlord had apparently been notified of a problem with the gas fire a few days earlier.
### Date: 30/08/2006

**Location:** Wellington City  
**Equipment:** Main, regulator station  
**Accident type:** District gas shutdown, gas leak or escape  

**Losses:** Long-running gas outage with significant disruption and economic loss to the wider community.

**Summary of events:** On first investigation of gas outages reported to the network operator, some district regulator stations were found to have shut off due to slight overpressure, with plugs of water in the network. Later that day, suspected potable water ingress was confirmed by water analysis and this triggered efforts by the Council to find the source. The gas network operator isolated gas feeds into the area of water ingress and the Council isolated the water feed.

The network operator also began isolating gas to individual consumers, with considerable delay in some cases due to access difficulties. Reports of the smell of gas were received from the public, including strong smells in buildings in the surrounding area. Checks were carried out but gas was found to be below detectable levels. Water and grit were found to have entered the gas mains and in a few cases water had entered the installations.

Rehabilitation of the mains and the restitution of gas took several months to complete.

Gas supply to consumers in the affected area was lost for periods ranging from days to several weeks.

**Suspected causes and significant factors:** Rupture of a gas main and the consequent water and rubble ingress by high-pressure water from a broken, redundant water service. Water first broke through encasing cast iron then the PE gas main. The separation distance between the gas and water mains complied with the minimum specified in gas distribution Standard NZS 5258.

### Date: 04/09/2006

**Location:** North Shore City  
**Equipment:** Cooker  
**Accident type:** Fire  

**Losses:** Tiles damaged in fire suppression efforts and substrate scorched, requiring re-installation of appliance and fireproofing of wall.

**Summary of events:** A consumer had been cooking rice in a large pot with the pot edge about one centimetre from an adjacent tiled wall. She had turned the rice off to cool for about 10-15 minutes when there was a loud bang. Upon investigation she discovered a two to three centimetre crack in a tile adjacent to the pot. She applied a tea towel to the tile, which remained hot. She then called the fire service who removed the tile and found scorching on the particle board substrate behind.
Suspected causes and significant factors: Proximity of combustible materials to a heat source, without fire-rated protection behind the tile as specified in the installation Standard (at time of installation).

Date: 08/09/2006
Location: New Plymouth City
Equipment: Water heater
Accident type: Fire
Losses: Water heater burnt out. Lost business and time to restaurant.

Summary of events: Restaurant staff had been noticing the smell of gas for two days but when the smell disappeared it was thought not to be anything. Reportedly, they found they had no hot water and repeatedly reset a circuit breaker in response. They heard a loud bang but thought the noise was made by a customer in the building. Two of them investigated but found nothing. Ten minutes later they smelled burning plastic. They checked some new equipment, thinking the smell came from there. Finding nothing, they then checked the electrical switch box and found the circuit breaker had activated. Investigating further they went into the ceiling area and discovered a fire.

Suspected causes and significant factors: Most likely an electrical fault in or around the appliance high-voltage ignition transformer, with repeated re-setting of a circuit breaker a contributory factor. However, gas leakage, possibly from a ‘Mac’ union connection to the gas appliance, was not ruled out. The water heater was undersized for the task required of it.

Date: 19/09/2006
Location: North Shore City
Equipment: Fixed space heater
Accident type: Explosion
Losses: Damage to glass and steel panels of appliance.

Summary of events: The homeowner attempted to light a glass-fronted gas fire located in the lounge. He had activated the electrical switches on the gas fire and was walking away when he heard a loud explosion accompanied by the sound of shattering glass. Glass was propelled throughout the lounge and steel panels on the front of the gas fire were bent outwards. He immediately switched off the gas fire and informed the manufacturer of the event.

There had been two previous instances of the gas fire not igniting properly, both resulting in loud bangs, although the glass had stayed intact on those previous occasions. The gas fire had not been serviced since installation some two years previously. The explosion relief panel had not activated and was still stuck to the
foam liner, indicating that it had not moved in the explosion. The panel was spring loaded at the lower front section, but the glass housing was not spring loaded.

**Suspected causes and significant factors:** Insufficient pressure at the burner to sustain rapid ignition. A build-up of vermiculite around the sides of the pilot housing cavity was a factor that could have affected the ignition system.

**Serious gas accidents must be notified immediately** (section 17 of the Gas Act 1992). This can be done by freephone on: **0800 104 477**.

A **serious gas accident notification report must also be completed.** This should be filed with ESS within seven days of the accident occurring.

A report form can be found at the back of this book and online by visiting the ESS web site at: [www.ess.govt.nz](http://www.ess.govt.nz).
Electricity accidents must be notified immediately (section 16 of the Electricity Act 1992).

The notification numbers are:
All hours accident notification service 0800 104 477
Freefax 0508 SAFE ENERGY – 0508 723 336

An electrical accident notification report must also be completed. This should be filed with the Energy Safety Service within two weeks of the incident.

The address is at the bottom of this page

When reporting, please photocopy this form to preserve your book, or download a copy from www.ess.govt.nz.

Details of victim

Name  ___________________________________________  □ Male  □ Female

Address  ___________________________________________

Age ______  Occupation ____________  Company  _______________________

Place and time of accident

Place of accident  _______________________________________

Date of accident  ____ / ____ / ______  Time of accident  ________  □ am  □ pm

Causes

Description of accident (attach full details of accident including sketches/photographs)  _____________________________________

Possible cause(s) of accident  _____________________________________

continues 1/2
**INJURIES**

<table>
<thead>
<tr>
<th>Type of injury(s) (tick or number)</th>
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<th>Non-fatal</th>
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<tbody>
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<tr>
<td>Was resuscitation given?</td>
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<td>No</td>
</tr>
<tr>
<td>Method of resuscitation</td>
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</table>

**DAMAGE**

Describe any damage or loss incurred by the accident

Name(s) of any witness, investigator or other person who could provide information

Address and contact number

**EQUIPMENT INVOLVED**

<table>
<thead>
<tr>
<th>Equipment involved (type)</th>
<th>Voltage</th>
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<tbody>
<tr>
<td>Condition of equipment involved</td>
<td>Date installed</td>
</tr>
<tr>
<td>Electrical protection involved (type)</td>
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<tr>
<td>Did it operate correctly?</td>
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</tr>
<tr>
<td>If ‘No’, state reason it did not operate correctly</td>
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</table>

**NOTIFIER**

Name of person reporting accident

<table>
<thead>
<tr>
<th>Owner</th>
<th>Occupier</th>
<th>Regd. person</th>
<th>Employer</th>
<th>Other</th>
</tr>
</thead>
</table>

Company

Address

Telephone ( )

Facsimile ( )

Date / /
Gas accidents must be notified immediately (section 17 of the Gas Act 1992).

**The notification numbers are:**
All hours accident notification service 0800 104 477
Freefax 0508 SAFE ENERGY – 0508 723 336

A gas accident notification report must also be completed. This should be filed with the Energy Safety Service within seven days of the incident.

*The address is at the bottom of this page*

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### SECTION A  
**Gas appliance and installation incidents or accidents**

<table>
<thead>
<tr>
<th>Date of incident</th>
<th>Time of incident</th>
<th>Address and/or exact location</th>
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<tbody>
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<th><strong>Gas type</strong></th>
<th><strong>CNG</strong></th>
<th><strong>LPG</strong></th>
<th><strong>Natural (except CNG)</strong></th>
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<th><strong>Fire</strong></th>
<th><strong>Gas leak or escape</strong></th>
<th><strong>Explosion</strong></th>
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<tr>
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<th><strong>Carbon monoxide poisoning (incomplete combustion)</strong></th>
<th><strong>Other</strong> (please specify)</th>
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<tr>
<th><strong>Environment</strong></th>
<th><strong>Building</strong></th>
<th><strong>Outside</strong></th>
<th><strong>Caravan/Mobile home</strong></th>
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<th><strong>Injury</strong></th>
<th><strong>Fatality</strong></th>
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<tr>
<th><strong>Other</strong> (please specify) e.g. lost time</th>
<th><strong>Other</strong> (please specify)</th>
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**continues 1/4**
Equipment type (tick all applicable and complete Section B)

**Appliance**
- [ ] Commercial
- [ ] Industrial

- [ ] Cabinet heater
- [ ] Fixed space heater
- [ ] Laundry dryer
- [ ] Vaporiser
- [ ] Barbecue
- [ ] Cooker
- [ ] Oven
- [ ] Fryer
- [ ] Light
- [ ] Water heater
- [ ] Refrigerator
- [ ] Boiler

**CNG station**
- [ ] Dispenser
- [ ] Storage vessel
- [ ] Compressor
- [ ] Container
- [ ] Installation pipework
- [ ] Other (please specify) ___________

Summary description of events surrounding incident or accident (attach sketches, photos etc)

Actions to ensure safety at scene (e.g. soundness test, odorant check, emergency services call-out)

Description of loss (injuries, extent of damage, costs etc)

Causal factor(s) (tick all applicable)

- [ ] Alteration
- [ ] Assembly
- [ ] Carelessness
- [ ] Connection problem
- [ ] Design fault
- [ ] Filling of cylinder
- [ ] Installation
- [ ] Maintenance lacking
- [ ] Manufacturing defect
- [ ] Misuse
- [ ] Operator error
- [ ] Proximity to combustibles
- [ ] Record error
- [ ] Supervision lacking
- [ ] Third party damage
- [ ] Ventilation poor
- [ ] Working procedure error
- [ ] Workmanship lacking

Suspected cause(s) and/or significant factors ________________________________
Remedial action taken or recommended (to minimise the chance of recurrence elsewhere)

Owner/User or person working on or near equipment

Name __________________________ Status (e.g. owner, hirer, servicer) __________________________

Contact details __________________________

Occupation (of worker or user)

☐ Gas worker ☐ Other worker ☐ General public

Affected parties (person(s) affected by loss)

Name __________________________ Occupation (if relevant) __________________________

Contact details __________________________

Age (if relevant) __________

Notifier (person completing this form)

Name __________________________ Date notified __________________________

Other persons (person(s) who may assist with enquiries)

Name __________________________ Occupation (if relevant) __________________________

Contact details __________________________

Other reports (attach, or provide name and contact details) __________________________

SECTION B Gas equipment details

Appliance

Manufacturer __________________________ Make __________________________

Model/Serial no. __________________________ Manufacture date or age of appliance _______

Rating (output/pressure etc) __________________________ Date installed or purchased _______

Installer __________________________ Certifier __________________________

Last service details __________________________

continues 3/4
**Portable LPG**

Regulator fitted? [ ] Yes [ ] No

Connection to regulator or cylinder (type)

- [ ] Screwed by spanner
- [ ] Quick-fit/Clip-on
- [ ] QCC
- [ ] Screwed by hand (with spring loading) [ ] Yes [ ] No
- [ ] Other (please specify)

Container (type) __________________________ [ ] Refillable [ ] Disposable

Nett capacity of LPG container __________________________

Container and value details (markings) __________________________

Regulator details (make and markings) __________________________

Adapter details (markings or type) __________________________

Installation (type) [ ] Pipework [ ] Flue [ ] Control/Safety

- [ ] Device [ ] Building related [ ] Ventilation

Pipe material [ ] PE [ ] Copper [ ] Steel

- [ ] Other (please specify)

Jointing [ ] Weld and solder [ ] Mechanical [ ] Other (adhesive)

**CNG station**

Storage vessel [ ] Cascade [ ] Bottle test dates

- [ ] Bullet [ ] Relief setting Date [ ] / [ ] /

Compressor

Make __________________________ Model __________________________

Relief setting __________________________ Date [ ] / [ ] /

Dispenser

Make __________________________ Model __________________________

Hose markings Semiconducting? [ ] Yes [ ] No

Other (please specify) __________________________
Gas accidents must be notified immediately (section 17 of the Gas Act 1992).

**The notification numbers are:**
All hours accident notification service 0800 104 477
Freefax 0508 SAFE ENERGY – 0508 723 336

A gas distribution accident notification report must also be completed. This should be filed with the Energy Safety Service within seven days of the incident.

*The address is at the bottom of this page*

When reporting, please photocopy this form to preserve your book, or download a copy from [www.ess.govt.nz](http://www.ess.govt.nz).

<table>
<thead>
<tr>
<th>Date of incident</th>
<th>Time of incident</th>
<th>Address and/or exact location</th>
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**Gas type** (tick all applicable)
- Natural
- Tempered LPG
- Landfill

**Accident type**
- Fire
- Gas leak or escape
- Explosion
- Overheating
- Carbon monoxide poisoning (incomplete combustion)
- Other (please specify)

**Environment**
- Building
- Outside
- Underground
- Other (please specify)

**Losses involved**
- Property damage
- Injury
- Fatality
- Other (please specify) e.g. lost time

**Notifiable under the Gas Act?**
- Yes
- No
- Not sure

*Continues 1/4*
Equipment type

- Main
- Service
- District regulator station
- Customer measuring station
- Sales gate station
- Meter
- Other (please specify)

Equipment details (pipes)

- Material
  - PE
  - Cast
  - Steel
  - Other (please specify)

- Pressure
  - HP
  - IP
  - MP
  - LP
  - Size
  - KPa/WG

- Jointing
  - Hf (heat)
  - Ef (electro)
  - Weld
  - Mechanical
  - Other (please specify)

Equipment details (regulators and meters)

- Make
- Model
- Pressure
- Last service details

Summary description of events surrounding incident or accident (attach sketches, photos etc)

Actions to ensure safety at scene (e.g. soundness test, odorant check, emergency services call-out)

Description of loss (injuries, extent of damage, costs etc)
G A S A C C I D E N T S N O T I F I C A T I O N R E P O R T

Causal factor(s) (tick all applicable)

- [ ] Carelessness
- [ ] Design fault
- [ ] Misuse
- [ ] Supervision lacking
- [ ] Workmanship lacking
- [ ] Communications
- [ ] Maintenance lacking
- [ ] Working procedure error
- [ ] Third party damage
- [ ] Other

Suspected cause(s) and/or significant factors

________________________________________

________________________________________

________________________________________

________________________________________

Remedial action taken or recommended (to minimise the chance of recurrence elsewhere)

________________________________________

________________________________________

________________________________________

Owner/Persons involved or reporting incident

Name

Status (e.g. employee, contractor)

Organisation

Contact details

Notifier (person completing this form)

Name

Date notified

Contact details

continues 3/4
**Other persons** (person(s) who may assist with enquiries)

Name

Occupation (if relevant)

Contact details

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**Other reports** (attach, or provide name and contact details)

Name

Date of report

Contact details

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