



IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: COR 2014 3017

FINDING INTO DEATH WITH INQUEST

Form 37 Rule 60(1)

Section 67 of the Coroners Act 2008

Deceased:	Barry Lawrence PURTELL
Delivered on:	31 August 2018
Delivered at:	Coroners Court of Victoria, 65 Kavanagh Street, Southbank
Hearing date:	Inquest heard at Bendigo 12, 13 and 14 December 2016
Findings of:	Coroner Paresa Antoniadis SPANOS
Counsel assisting the Coroner:	Leading Senior Constable Andrea HIBBINS from the Police Coronial Support Unit
Representation	Mr Andrew IMRIE appeared on behalf of WorkSafe Victoria
Catchwords	Vapour/blast explosion, Rochester Hotel, burns sustained in a blast, refrigerant, unqualified handyman, DIY

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I, PARESA ANTONIADIS SPANOS, Coroner,
having investigated the death of BARRY LAWRENCE PURTELL
and having held an inquest in relation to this death at Bendigo on 12, 13 and 14 December 2016:
find that the identity of the deceased was BARRY LAWRENCE PURTELL
born on 18 July 1979
and that the death occurred on 15 June 2014
at The Alfred Hospital, 55 Commercial Road, Melbourne, Victoria 3004
from:

I (a) BLAST INJURIES
in the following circumstances:

INTRODUCTION¹

1. Mr Purtell was a 34 year-old qualified diesel mechanic. He had been in a relationship with Kylie Carter for over ten years and they had two children together, Jackson and Maddison who were eight and four years of age respectively when their father died. Mr Purtell and Ms Carter separated about two years earlier and he had been residing at the Rochester Hotel which was operated by his friends Denise and Wayne Conway [the Conways] for between 12 and 18 months. Mr Purtell had been employed by Cloverdale Motors, Naneela, for about 18 months.
2. Although Mr Purtell was a heavy drinker of alcohol and smoked at least one packet of cigarettes a day, he had no serious medical conditions or significant medical history.

EXPLOSION AT THE ROCHESTER HOTEL

3. On Saturday 14 June 2014, the licensees of The Rochester Hotel [the Rochester], 39 Moore Street, Rochester, were the Conways. On 14 June 2014, they arranged a private gathering at the Rochester to mark the closing of the hotel and to show their appreciation to their regular customers, friends and supporters. Throughout the evening, there were a number of discussions about who would be able to assist in cleaning the hotel the following day and removing their furniture and chattels.²

¹ This section is a summary of background and personal circumstances and uncontentious circumstances that provide a context for those circumstances that were contentious and will be discussed in some detail below.

² Mr Purtell had been 'lending a hand' helping the Conways vacate the premises from Thursday evening, through the weekend of Friday 13, Saturday 14 and Sunday 15 June 2014. See Exhibit B, statement of Wayne Conway dated 16 June 2014.

4. Mr Purtell, a diesel mechanic, and Mr Lobb, a boiler maker by trade who worked as a welder, were both at this gathering and offered to move the refrigeration compressor from the cellar in order to assist. The working party was arranged for the next day, 15 June 2014.³
5. While Mr Purtell and Mr Lobb were in the cellar working on removal of the refrigeration compressor, a gas explosion occurred in the cellar causing injuries to both of them and resulting in their deaths. As no one else was in the cellar at the time of the explosion, how the explosion occurred is to be gleaned from circumstantial evidence and from the evidence of forensic and other experts set out in some detail below.

INVESTIGATION AND SOURCES OF EVIDENCE

6. This finding is based on the totality of the material the product of the coronial investigation of the deaths of Mr Purtell and Mr Lobb. That is, the brief of evidence compiled by Detective Senior Constable David (Bernie) Quinlan from the Echuca Crime Investigation Unit, additional material obtained by my assistant Leading Senior Constable Andrea Hibbins from the Police Coronial Support Unit, the statements, reports and testimony of those witnesses who testified at inquest and any documents tendered through them.
7. All of this material, together with the inquest transcript, will remain on the coronial file.⁴ In writing this finding, I do not purport to summarise all the material and evidence, but will refer to it only in such detail as is warranted by its forensic significance and in the interests of narrative clarity.

PURPOSE OF A CORONIAL INVESTIGATION

8. The purpose of a coronial investigation of a *reportable death*⁵ is to ascertain, if possible, the identity of the deceased person, the cause of death and the circumstances in which death occurred.⁶ It is self-evident that the deaths of Mr Purtell and Mr Lobb fall within the definition of a reportable death.
9. The *cause* of death refers to the *medical* cause of death, incorporating where possible the *mode* or *mechanism* of death. For coronial purposes, the *circumstances* in which death occurred refers to the context or background and surrounding circumstances, but is confined

³ Exhibit A, statement of Wayne Conway dated 16 June 2014 at page 30 of the coronial brief. Mr Purtell lived at the Rochester. The process of removing chattels and fixtures and cleaning the hotel had continued through the weekend of 13 and 14 June 2014 and was to continue the next day 15 June 2014.

⁴ From the commencement of the *Coroners Act 2008* (the Act), that is 1 November 2009, access to documents held by the Coroners Court of Victoria is governed by section 115 of the Act. Unless otherwise stipulated, all references to legislation that follow are to provisions of the Act.

⁵ The term is exhaustively defined in section 4. Apart from a jurisdictional nexus with the State of Victoria (see section 4(1)), reportable death includes “a death that appears to have been unexpected, unnatural of violent or to have resulted, directly or indirectly, from an accident or injury” (see section 4(2)(a) of the Act).

⁶ Section 67(1).

to those circumstances sufficiently proximate and causally relevant to the death, and not all those circumstances which might form part of a narrative culminating in death.⁷

10. The broader purpose of any coronial investigations is to contribute to the reduction of the number of preventable deaths through the findings of the investigation and the making of recommendations by coroners, generally referred to as the *prevention* role.⁸
11. Coroners are empowered to report to the Attorney-General in relation to a death; to comment on any matter connected with the death they have investigated, including matters of public health or safety and the administration of justice; and to make recommendations to any Minister or public statutory authority on any matter connected with the death, including public health or safety or the administration of justice.⁹ These are effectively the vehicles by which the coroner's prevention role can be advanced.¹⁰
12. It is important to stress that coroners are not empowered to determine the civil or criminal liability arising from the investigation of a reportable death, and are specifically prohibited from including in a finding or comment any statement that a person is, or may be, guilty of an offence.¹¹

FINDINGS AS TO UNCONTENTIOUS MATTERS

13. As he was able to be identified visually despite his injuries, Mr Purtell's identity was confirmed by a Statement of Identification signed by his mother Susan Beverley Purtell on 18 June 2014. Also uncontentious were the date and place of death. I accordingly find, as a matter of formality, that Barry Lawrence Purtell, born on 18 July 1979, late of 39 Moore Street, Rochester, died at the Alfred Hospital, 55 Commercial Road, Melbourne, on 15 June 2014.

MEDICAL CAUSE OF DEATH

14. Mr Purtell was taken by ambulance to the Rochester football oval from where he was air-lifted to the Alfred Hospital. Mr Purtell suffered a cardiac arrest en route and could not be

⁷ This is the effect of the authorities – see for example *Harmsworth v The State Coroner* [1989] VR 989; *Clancy v West* (Unreported 17/08/1994, Supreme Court of Victoria, Harper J.)

⁸ The 'prevention' role is now explicitly articulated in the Preamble and purposes of the Act, compared with the *Coroners Act 1985* where this role was generally accepted as 'implicit'.

⁹ See sections 72(1), 67(3) and 72(2) regarding reports, comments and recommendations respectively.

¹⁰ See also sections 73(1) and 72(5) which requires publication of coronial findings, comments and recommendations and responses respectively; section 72(3) and (4) which oblige the recipient of a coronial recommendation to respond within three months, specifying a statement of action which has or will be taken in relation to the recommendation.

¹¹ Section 69(1). However, a coroner may include a statement relating to a notification to the Director of Public Prosecutions if they believe an indictable offence may have been committed in connection with the death. See sections 69 (2) and 49(1).

resuscitated. On arrival at the Alfred Hospital, at 5.10pm, Mr Purtell was pronounced deceased.

15. Forensic pathologist Dr Joanne Glengarry Parsons from the Victorian Institute of Forensic Medicine [VIFM] reviewed the circumstances of death as reported by police to the coroner (Police Form 83), the medical deposition from the Alfred and post-mortem CT scanning undertaken at VIFM and performed a full post-mortem examination or autopsy on Mr Purtell's body in the mortuary. Having done so, Dr Glengarry provided a written report of her findings.¹²
16. Dr Glengarry's anatomical findings included blast injuries of lung (contusions, lacerations and parenchymal haemorrhage); left pneumothorax; bilateral haemothoraces; mediastinal emphysema; 40-50% total body surface area partial thickness burns; less than 1% total body surface area full thickness burns and inhalational injury (tracheal and bronchial mucosal erythema and oedema, burns to nose, mouth and face); anterior pericardial contusion and no significant natural disease.¹³
17. Dr Glengarry advised that the pattern of injuries sustained can be classified according to the United States Department of Defence Classification as involving both primary blast injury (blast injury to the lungs) and quaternary blast injury (burns) and, in combination, imply that Mr Purtell was close to the origin of the explosion. She also advised that the injuries to the lungs were significant and likely to account for Mr Purtell's rapid clinical deterioration en route to the Alfred.
18. Dr Glengarry concluded that it would be reasonable to attribute Mr Purtell's death to *blast injuries*.
19. The available evidence supports a finding that Mr Purtell died as a result of blast injuries.

THE FOCUS OF THE CORONIAL INVESTIGATION AND INQUEST

20. The focus of the coronial investigation of the deaths of Mr Purtell and Mr Lobb was firstly on the cause of the explosion, encompassing the nature of the gases involved, the inherent dangers of working with gas and the ignition source. A secondary focus was on the legislative regime for the labelling, handling, transportation and storage of the gases involved in the explosion. The issues are somewhat interrelated but the evidence relevant to each will be outlined separately below.

¹² Dr Glengarry's report outlining her formal qualifications/experience is at pages 118-136 of the coronial brief.

¹³ Summarised at pages 130-131 of the coronial brief but detailed in her 15 page autopsy report.

CAUSE OF THE EXPLOSION: MAINTENANCE OF REFRIGERATION COMPRESSOR

21. The Conways took over the lease of the Rochester in 2011, Denise Conway being the licensee in a formal sense, responsible for the general running of the hotel, while her husband Wayne Conway looked after maintenance, including arranging maintenance and repairs of hotel plant like the refrigeration compressor [the compressor].¹⁴
22. The compressor at the centre of this investigation was located in the cellar which was approximately five metres square. While the cellar had no windows, it had cellar doors which led to the laneway, and could also be accessed via stairs from the ground level bar of the Rochester.¹⁵ The compressor was a multi-appliance unit that operated the cool room, the bottle fridge in the bar and the glass chiller.¹⁶
23. Prior to the Conways taking over management of the Rochester, the compressor and other plant had been serviced in 2009-2010 by CMS Refrigeration & Electrical Service, Elmore, a business owned by Craig Skeers. The refrigerant added by Mr Skeers (on one occasion by one of his employees) was SP34M which he described as a non-flammable non-toxic gas containing greater than 95% 1,1,1,2-tetrafluoroethane, less than 1.95% propane, less than 1.95% butane and other ingredients determined to be non-hazardous making up the balance.¹⁷ At inquest, he testified that this was the same *type* of non-flammable refrigerant as SP34E except that the latter contained ethane whereas SP34M contained methane.¹⁸
24. Since the Conways took over the running of the Rochester, the compressor had been serviced by David Scott of Scott's Refrigeration on two occasions, most recently on 26 June 2012. Mr Scott was a qualified refrigeration and air conditioning mechanic who ran his own business based in Echuca and had almost 40 years' experience in the industry.¹⁹
25. According to Mr Scott, on 26 June 2012, he replaced a faulty TX evaporator valve in the keg cool room, replaced the liquid line filter and added gas to refill the refrigeration system. Mr Scott's evidence was that while it is best practice to bleed a system entirely so as not to create

¹⁴ Transcript page 7 and following.

¹⁵ Transcript page 12 and following.

¹⁶ Exhibit S, statement of David Scott dated 18 June 2014 at page 98 of the coronial brief.

¹⁷ Exhibit R, statement of Craig Michael Skeers dated 27 June 2014 at page 96 of the coronial brief. The possibility that the compressor had been re-gassed with yet another refrigerant, outside the ministrations of Mr Skeers or Mr Scott was not fully investigated and remains open.

¹⁸ Transcript page 135.

¹⁹ Ibid.

a “shanty” of gases within, it was not uncommon to top up a leaking system, particularly where cost was an issue and this was the preference of the client.²⁰

26. Mr Scott found no existing label or other information to indicate which refrigerant gas within the compressor before he tended to it. He chose the refrigerant SP34E to “top up” the system on this occasion and attached a label to the unit in accordance with his normal practice to advise others working on the compressor in the future of its contents.²¹ In choosing SP34E, Mr Scott was guided by the setting of the TX valve which is suited to a particular refrigerant or refrigerants and will not work properly with incompatible refrigerants. The setting of the TX valve indicated to Mr Scott that one of three refrigerants could be used - R12, a gas being phased out in the industry; R134A a replacement for R12 that requires an oil change from a mineral to an ester (or synthetic) oil and is therefore a more costly exercise; and SP34E a “drop-in” replacement compatible with both mineral and ester oils and the therefore the cheaper option in this instance.²²
27. Mr Scott testified that he would never use a flammable gas to top up a leaking system and did not believe that SP34E was flammable. However, he would not like to test this in a confined space such as a cellar, where the leaking gas which is heavier than air would sit or pool and might be ignited. In the absence of pooling and an ignition source, he believed that the SP34E contained gases that posed a *risk of asphyxiation, rather than flammability*.²³
28. The compressor needed attention again in October to November 2013 when it was ‘icing up’ and Mr Conway turned to Mr Purtell who was residing in the residential part of the Rochester. Mr Conway knew that, as a motor mechanic, Mr Purtell worked with motor vehicle refrigerants and, without turning his mind to whether or not he was formally qualified to do so, thought that the fixing the compressor was an analogous task. According to Mr Conway, Mr Purtell was a skilled man and who was always willing to help out.
29. Apart from knowing that he used refrigerant gas that came in canisters he had brought home from work, Mr Conway was not aware of the gas used by Mr Purtell on this occasion. He did say that whatever Mr Purtell did rectified the fault and the compressor stopped icing up.²⁴

²⁰ Ibid and transcript page 150. Mr Wilkinson also commented on this practice at transcript page 31.

²¹ Exhibit S and transcript page 151. See also the evidence of Mr Skeers at transcript pages 136 and following where he gives similar evidence about best practice.

²² Transcript pages 150 and following. See also the evidence of Mr John Clark at inquest at transcript pages 110-112 where he also discusses the use of mineral oils and synthetic oils with refrigerants within any working system. See also Mr Skeers’ evidence to the same effect at pages 136 and following.

²³ Exhibit S and transcript pages 149, 154.

²⁴ Transcript pages 11-13 and Exhibit A, page 33 of the coronial brief. In Exhibit B, statement of Wayne Conway dated 1 August 2014 at pages 36-37 of the coronial brief, he described the refrigerant gas used as coming in ‘blue canisters with a red emblem of letters or cumbers or both.’

30. Anthony Murphy was the business owner and operator of Cloverdale Motors, Nanneela, described by him as a country automotive workshop where Mr Purtell had worked as a motor mechanic for some 18 months. According to Mr Murphy, Mr Purtell was knowledgeable about the re-gassing of automotive air conditioners which he did in the course of his employment. The product used at Cloverdale Motors to re-gas automotive air conditioners was “HyChill R134” [HyChill] - also referred to as “HyChill minus 30” in some of the material - which came in aerosol canisters and “Jay Air R134” which came in a 25kg gas bottle. Mr Murphy was not aware that Mr Purtell had used the HyChill to re-gas the compressor at the Rochester.²⁵
31. According to the Material Safety Data Sheet [MSDS] for HyChill HC Refrigerants tendered in evidence, they comprise a propane/isobutane/ethane blend that is a *flammable* gas used as a refrigerant and is normally stored under pressure in liquid form.²⁶

CAUSE OF THE EXPLOSION: PREPARING TO REMOVE THE COMPRESSOR

32. A number of people were helping the Conways clean and vacate the Rochester on 15 June 2014. Other than Yarran Emery who had been into the cellar earlier in the day to disconnect the power from the post mix machine,²⁷ the available evidence suggests that no-one other than Mr Lobb and Mr Purtell went down into the cellar that day.
33. Before lunch, Michael Delben saw Mr Purtell go down the manhole to the cellar and heard him and Mr Lobb having a laugh down there. When Mr Delben saw water flowing from a pipe within the cellar, he asked if they were alright. Mr Purtell said they were okay and that it was just water. Mr Delben did not see Mr Lobb and Mr Purtell when he spoke to them through the manhole but he did note that the light was on. After being in the cellar for about half an hour, Mr Lobb and Mr Purtell came back up through the manhole.²⁸
34. Everyone had fish and chips for lunch, after which Mr Lobb told Mr Conway that he was going home to get a hacksaw they needed in the cellar.²⁹ In the meantime, Mr Purtell was loading his personal belongings from his room at the Rochester into his motor vehicle.
35. When Mr Lobb returned a short time later, David Johnson saw him and Mr Purtell both go down into the cellar. He heard them talking down there but could not distinguish what they were saying. About five minutes later, Mr Johnson heard an almighty “whoosh”, saw a mist

²⁵ Statement of Tony Murphy dated 5 August 2014 at page 103 of the coronial brief.

²⁶ Exhibit N. Marketed under the trade names HyChill Minus 10, Minus 30, Minus 30EC, Minus 40 and Minus 50 and systematic name Propane/2-Methylpropane/Ethane.

²⁷ Exhibit C, statement of Wayne Conway dated 3 November 2014 at page 40 of the coronial brief.

²⁸ Statement of Michael Delben dated 18 June 2014 at pages 55-56 of the coronial brief.

²⁹ Exhibit A at page 33 of the coronial brief.

come up from the cellar and felt a powerful force knock him off the stool he was sitting on in the bar area upstairs from the cellar. He also described a pungent odour and a burning sensation to the nose and throat. Mr Johnson heard Mr Lobb and Mr Purtell screaming as they exited the cellar through the rear doors that lead onto the laneway to the north of the Rochester. He called 000 at 1.33pm.³⁰

36. Observations of the scene after the explosion, indicated a quantity of hand tools to the north and west of the cellar, including spanners, pliers, shifters, a hack saw and a can of lubricant. There were copper pipes going up the wall and travelling east under the floor plus pipes going to the south and up the wall as well. Three copper pipes on the compressor had been cut and two of the pipes had been bent to crimp the line and two of the other cut ends had been crimped. The cuts to the copper piping appeared to have been relatively new.
37. In the circumstances it is reasonable to infer that these cuts were made by either Mr Lobb or Mr Purtell in preparation for removal of the compressor.³¹

CAUSE OF THE EXPLOSION: THE GASES IN THE CELLAR & THE IGNITION SOURCE

38. Accepting for present purposes that immediately prior to the explosion the compressor contained gases that were flammable as well as gases that posed a risk of asphyxiation,³² it is necessary to ascertain the ignition source which caused the explosion. As the scene of the explosion, the cellar was extensively and systematically photographed by a forensic officer and its layout, contents and state immediately following the explosion captured. These photographs were referred to throughout the inquest.³³
39. Neil Christopher Coghill is a dairy farmer with a trade qualification as an automotive mechanic and is volunteer fire fighter with the Country Fire Authority [CFA] of some ten years' experience with the rank of Second Lieutenant. Mr Coghill heard the fire siren and received a message on his phone about an incident at the Rochester at 1355 hours. He was at the CFA station within a short time and, while the original message was about a gas leak, soon formed the view that an explosion may have taken place.³⁴ As he was approaching the Rochester, Mr Coghill was smelling for gas but could detect none. Nor were there any signs of smoke or fire.

³⁰ Statement of David James Johnson dated 16 June 2014 at page 23 of the coronial brief.

³¹ Summarised at pages 5-6 of the coronial brief.

³² See paragraphs 23, 27 and 30 above and paragraphs 45, 53 and following for more about the nature of these gases.

³³ Exhibit D, a book of 22 photographs taken at the Rochester. The photographs were taken by Forensic Officer Laura Noonan of the Victoria Police Forensic Services Centre under the supervision of Forensic Officer Brennan, as an arson chemist or specialist – see paragraph 40 and following below. Also, Exhibit T, statement of Justyn Paul Brennan dated 6 October 2014 at page 149 of the coronial brief.

³⁴ Exhibit I, statement of Neil Christopher Coghill dated 18 June 2014 at pages 76-77 of the coronial brief.

40. Brett Allan Kyne is a production line operator at Fonterra Echuca who has been a member of the CFA for 17 years and held the rank of Lieutenant. He also received the message about a gas leak at the Rochester at 1355 hours.
41. After the main gas line into the Rochester was turned off by one of their colleagues, Mr Kyne and Mr Coghill were instructed by their Officer in Charge to don their breathing apparatus. After doing so they used a gas detector in the vicinity of the front door and the door down to the cellar to ascertain that gas levels were safe, they entered via the external doors to the cellar, bringing the safety line and gas detector with them.³⁵ While they remained in the cellar and moved around and in the vicinity of piping and cylinders, the gas detector continued to read zero indicating there were no explosive gases present and they ensured that the valves on any gas cylinders were shut.³⁶
42. They inspected the cellar for signs of what happened and found a piece of fabric with a burnt edge on the floor, some shrivelled plastic near a broom and, laying on the floor near the compressor, a hack saw, cut pipes and a pile of tools, being wrenches, shifters and the like.³⁷
43. At inquest, Mr Coghill added that there was dishcloth hanging from the rafters that had slightly burnt edges and that the bristles on the broom had shrivelled up as well as the plastic near the broom. This modest fire damage suggested to Mr Coghill that there had been a flash, a sudden heating and cooling event, rather than a fire.³⁸ By reference to the dishcloth hanging on the rafter which had evidence of burning on its right side, Mr Kyne opined that the ignition source for the explosion was on the left or opposite side of the cellar where the cigarette lighter was located.³⁹
44. As at 16 June 2014, Justyn Paul Brennan was a Forensic Officer in the Fire and Explosions Unit at the Victoria Police Forensic Services Centre Expert, sometimes referred to as an arson chemist or specialist.⁴⁰ Mr Brennan provided a detailed statement outlining his inspection of the cellar, his findings on inspection of items removed from the cellar and his opinion about how the explosion happened, including the likely ignition source.⁴¹

³⁵ Exhibit K, statement of Brett Kyne dated 17 June 2014 at page 84 of the coronial brief. Note that Mr Kyne had previously operated the Rochester himself and was of the view that this was the only feasible way into the cellar wearing their bulky breathing apparatus. Also, see Mr Coghill's evidence at transcript page 74 *"with a gas – a gas leak, um, we use a gas sniffer – gas sniffer to detect the presence of flammable gases and the explosive limits, the, um – the mixes of the flammable gas with the oxygen...an incident like this is – that's common practice..."*

³⁶ Exhibit I at page 79 and Exhibit K at page 85.

³⁷ Exhibit I at page 80.

³⁸ Transcript pages 78-79.

³⁹ Transcript pages 98-100. Depicted in Exhibit D photograph 12. As to left and right, this is best depicted in Exhibit J.

⁴⁰ As at the date of the inquest, Mr Brennan was employed as a Fire Fighter with the Metropolitan Fire Brigade. Transcript page 177.

⁴¹ Exhibit T at page 149 of the coronial brief.

45. At inquest, Mr Brennan explained that whereas a fire investigator would look for patterns of burning looking for areas of least burning and working towards areas of most burning to identify the source of the fire, at a scene like the Rochester, without a large amount of burning, it takes more intensity of examination to find those patterns, in order to find where the fire originated or the ignition source.⁴²
46. Such fire damage as there was, was around the compressor and to the base of the fuse box that was adjacent to the compressor. Overall the damage in the cellar was relatively minor indicating there had been no sustained fire but a flash, and suggesting there had been flammable gases within the environment. Hence the need to collect items that the gases may have impregnated like fabric items as well as piping from the compressor to test for any residual gas. Among the items collected were a disposable “Bic” cigarette lighter [the cigarette lighter] and an aerosol can without a cap labelled in part “CRC Belt Grip Code 3081 400g net” [Belt Grip].⁴³
47. The items collected on 16 June 2014 were analysed for the presence of flammable and/or combustible liquid or gas. In the Belt Grip product, hydrocarbons were detected consistent with a light petroleum distillate, including n-heptane (consistent with the known contents of Belt Grip) as well as n-propane and n-butane consistent with being from a liquefied gas propellant or a refrigerant.⁴⁴ Rags found in the ceiling area of the cellar contained a combination of hydrocarbons which suggested they had been in contact with the Belt Grip product, a liquefied gas propellant or a refrigerant.⁴⁵ Rags found near an old compressor contained a combination of hydrocarbons which suggested they had been in contact with a liquefied gas propellant or a refrigerant and *possibly* the Belt Grip.⁴⁶
48. At a later time, Mr Brennan received two further items which he analysed for the presence of flammable and/or combustible gases, namely an aerosol canister of HyChill⁴⁷ which contained n-propane, 2-methyl propane (isobutane) and n-butane, ethanol and 2-methyl butane (isopentane) and a cylinder removed from the compressor that contained 1,1,1,2 tetrafluoroethane, 2-chloro 1,1,1,2 tetrafluoroethane, 2-chloro-1, 1-difluoro-ethylene, 2-

⁴² Transcript page 179-180.

⁴³ Transcript page 181-183. The items collected for analysis were 17 in total and are detailed in Exhibit T, together with Mr Brennan’s findings about each.

⁴⁴ Exhibit T at page 153 of the coronial brief. The hydrocarbons detected included n-propane, 1-chloro-2-methyl propane, n-butane, pentane, 3-methyl hexane, cyclopentane, n-heptane and cyclohexane.

⁴⁵ Exhibit T at page 153 of the coronial brief. The hydrocarbons detected included n-propane, 2-methyl propane (isobutane) and 1-chloro-2-methyl propane, pentane, 3-methyl hexane, cyclopentane, n-heptane and cyclohexane.

⁴⁶ Exhibit T at page 153 of the coronial brief. The hydrocarbons detected included n-propane, 2-methyl propane (isobutane), n-butane and n-heptane.

⁴⁷ Exhibit T at page 155 of the coronial brief. A predominantly blue and red aerosol can labelled in part “Hy Chill Hydrocarbon Refrigerant Minus 30* Compatible with all common lubricants Replaces HFC R134a Net Contents 300 grams HR30-300 (barcode) 9335835000231”

methyl propane (isobutane) and n-butane. The results of this analysis indicates that the compressor contained both a flammable gas refrigerant and a fluorinated refrigerant.⁴⁸

49. Mr Brennan's conclusion was that the cause of the explosion and fire was the ignition of the available flammable gas within the cellar, *probably* from the compressor and with *possible* contribution from the Belt Grip product. The pattern of fire damage (such as it was) was consistent with an accumulation of gas around the compressor. As to likely ignition sources, Mr Brennan's opinion was that ignition via a cigarette lighter was the most likely source of ignition, a cigarette butt or cigarette was less likely, as was a spark from an electrical source, while a spark from an impact or cutting was also considered unlikely.⁴⁹

THE REGULATORY FRAMEWORK

50. The coronial investigation and inquest into the deaths of Mr Lobb and Mr Purtell was enhanced by evidence from expert and/or quasi expert witnesses with relevant industry experience and knowledge of the regulatory framework within which the deaths occurred. It has to be said at the outset that, while the regulatory regime is not without its complexities, the deaths occurred in a setting where such rules as there were, were 'honoured in the breach'.
51. John Keith Clark is the Director of HyChill Australia Pty Ltd who gave evidence about the relevant Australian Standards and the correct procedure for removing the compressor safely.⁵⁰ Mr Clark's evidence was that Australian Standard AS/NS 1677 which applied at the material time was reviewed and superseded, as at the date of the inquest, by endorsement of ISO 5149. Irrespective of which standard applied, and *regardless of the type of refrigerant* in the system, Mr Clark testified that if the compressor had been installed, maintained and decommissioned in compliance with the standard, the explosion would not have occurred.⁵¹
52. According to Mr Clark's evidence, the main features of the correct procedure for removing the compressor involves –
- a. Disconnecting the compressor from mains power and turning of all power to the basement area;

⁴⁸ The results of the analysis also confirm a mix of SP34E and HyChill gases within the compressor.

⁴⁹ Exhibit T at page 156 of the coronial brief.

⁵⁰ Exhibit L, statement of John Keith Clark dated 20 October 2014 at pages 105 of the coronial brief. Mr Clark is also the Director of LPG Measurement Technology Pty Ltd and both businesses are based in Kilsyth. Note that in Exhibit L Mr Clark refers to Australian Standard AS/NS 1677 as being current at the time of the deaths and having an expectation that a new standard would soon be published – "either as an endorsement of ISO 5149 or as an Australian Standard based on ISO 5149". Exhibit M was the second statement of Mr Clark dated 26 March 2016 in which he clarified and expanded on his first statement/Exhibit L.

⁵¹ Exhibit L, page 105 of the coronial brief.

- b. Using a refrigerant recovery pump to pump the refrigerant out of the system into a suitable “recovery” cylinder;
- c. Vacuuming the system down to negative pressure and purging it with an inert gas such as nitrogen;
- d. Crimping all refrigerant lines to be cut on both sides of the cut line; and
- e. Cutting the lines and removing the compressor.⁵²

53. Mr Clark expressed the view that the fact that the compressor was topped up on several occasions indicated that it was known to have a leak. With the promulgation of the *Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995*⁵³, Mr Clark testified that it is unlawful to top up a known leaking system. Where a refrigeration system runs low on refrigerant, usually resulting in a loss of cooling capacity, it should be leak tested and repaired before adding refrigerant.⁵⁴

54. Both in his statements and at inquest, Mr Clark voiced concerns about aspects of the regulatory regime as it pertained to refrigerants and the refrigeration industry. Some of those concerns went beyond the immediate circumstances surrounding the deaths of Mr Lobb and Mr Purtell and will therefore not be detailed in this finding. However, this should not be read as a criticism of his views or an assessment of the merits of those concerns.⁵⁵

55. Mr Clark testified on the important role played by Material Safety Data Sheets [MSDS] in the refrigeration industry where refrigeration technicians are expected to source the MSDS relevant to the gas or substance they are using in order to understand its properties and take the necessary safety precautions. This is particularly important with any new gases or substances which may have come into currency after the refrigeration technician obtained his or her trade qualification.⁵⁶

56. The MSDS for “Heatcraft Solpower.SP34E” and “A-Gas SP34E” were provided by and tendered through Mr Clark. He commented on the remarkable discrepancy between the two,

⁵² Ibid and transcript pages 128-129. Mr Wilkinson also commented on this aspect in his evidence at page 30.

⁵³ These regulations were promulgated under the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* [OPASGGMA]. Note that hydrocarbons are neither ozone depleting nor synthetic greenhouse gases and are therefore not covered by the Act or the regulations.

⁵⁴ Exhibit L at page 106 of the coronial brief and transcript page 117 and following.

⁵⁵ For example, Mr Clark expressed the opinion that there was something of a disconnect between the *Dangerous Goods Act 1985* and refrigeration standards, the former regulating the storage, handling and transportation of dangerous goods/gases as a discrete item and the latter not reflecting that fact that once the dangerous goods/gas are in a refrigeration system they will be part of a mixture that is almost always flammable – see transcript page 110. Mr Clark also commented on the need for competency based licensing and training scheme for refrigeration technicians, particularly with the increased use of flammable refrigerants – transcript page 118 and following. See also Mr Wilkinson’s evidence in this regard.

⁵⁶ Transcript page 118 and following.

both marketed as largely tetrafluoroethane refrigerants. The MSDS for the Heatcraft product indicating that it comprised >95% tetrafluoroethane, the balance being propane and/or ethanol⁵⁷, while the MSDS for the A-Gas product indicated that it comprised >60% tetrafluoroethane and < 10% “performance additives nonhazardous” (unspecified)⁵⁸.

57. According to Mr Clark, within the refrigeration industry, blends like SP34E are nominally 90-95% tetrafluoroethane or other major refrigerant (which may or may not be flammable) with up to 5-10% hydrocarbon added to assist with carrying the oil around the system and protect the compressor’s working parts.⁵⁹ Thus while the major part of the mixture may be a refrigerant which is non-flammable, the hydrocarbon component is flammable and it behoves those working with refrigeration systems to consult the MSDS for the oil as well as the refrigerant.⁶⁰
58. Phil Wilkinson provided a statement and gave evidence at the inquest in his capacity of Executive Manager, Government Relations and Technical Services, Australian Institute of Refrigeration, Air Conditioning and Heating [AIRAH].⁶¹ Mr Wilkinson provided a comprehensive statement which set out among other things the AIRAH’s perspective of the issues and challenges facing the refrigeration, air conditioning and heating industry/ies [the sector]. As with Mr Clark, Mr Wilkinson provided an interesting and informed take on the setting within which the deaths of Mr Lobb and Mr Purtell occurred, in the broadest sense. Taken at face value and (necessarily) absent a contradictor, Mr Wilkinson’s observations on the regulatory regime, its gaps and complexities were persuasive.⁶²
59. However, in this finding, I will only refer to those aspects of Mr Wilkinson’s evidence that appear to me to be sufficiently relevant to the deaths. Mr Lobb and Mr Purtell who were not after all qualified refrigeration technicians working within that regulatory regime.⁶³
60. According to Mr Wilkinson, one of the biggest challenges facing the sector is “refrigerant transition” or the challenges that arise when moving the sector from existing high global warming potential [GWP] refrigerant technology to newer environmentally friendly low GWP

⁵⁷ Exhibit O, MSDS for Heatcraft Solpower SP34E issued by Chemwatch. See transcript page 113 and following regarding MSDS and how they are used in industry.

⁵⁸ Exhibit P, MSDS for A-Gas SP34E issued by Chemwatch.

⁵⁹ Exhibit Q, MSDS for one brand of PAG oil used with tetrafluoroethane. See transcript page 111 and following.

⁶⁰ Exhibit L at page 106 of the coronial brief and transcript page XX

⁶¹ Mr Wilkinson (with formal qualifications in Mechanical Engineering) described AIRAH as an independent, specialist, not-for-profit technical organisation providing leadership in the refrigeration and air conditioning sector through collaboration, engagement and professional development. See also transcript page 26 for the aims of AIRAH.

⁶² Exhibit E, statement of Phil Wilkinson dated 6 July 2016 at page 187 of the coronial brief. As an indication of the complexities, Mr Wilkinson details the myriad of *regulations* that refrigeration technicians need to negotiate day to day – environmental, safety, building, planning, energy efficiency, electrical, plumbing, licensing and health. See Exhibit E at page 192 of the coronial brief and transcript pages 27 and following.

⁶³ Consistent with my discussion with Mr Wilkinson at transcript page 47.

refrigerant technology. The sector needs to accommodate the new set of low GWP refrigerants with a new set of flammability, toxicity or pressure-related safety hazards that demand new design practices, new installation techniques and new operational and maintenance protocols.⁶⁴

61. Mr Wilkinson's evidence was that all refrigerants have the potential to be dangerous if not handled correctly. Moreover, in Australia, those working within the sector have been largely trained in the application of non-flammable, non-toxic refrigerants and will need to upskill as the sector transitions to refrigerants that are flammable, or toxic or operate at very high pressures. Of the estimated 200,000 refrigeration technicians working in the sector only about one per cent have been trained in the use of flammable refrigerants.⁶⁵ Accepting that this is a challenge for refrigeration technicians and the sector as a whole in terms of training and competency, the risk for the do-it-yourself handyman with a broad or general but potentially scant and outdated knowledge base is obvious.
62. At inquest, Mr Wilkinson stressed that with the transition to low GWP refrigerants, the risks inherent in handling refrigerants will only increase as while low GWP refrigerants are considered mildly flammable, they produce quite toxic by-products of combustion. Specifically, the hydrocarbon in the HyChill, namely the tetrafluoroethane is highly flammable and explosive and dangerous to human beings as when mixed with moisture it dissolves moist tissues.⁶⁶
63. Peter Anthony Vitali is a dangerous goods specialist employed by WorkSafe and its predecessors for over 31 years.⁶⁷ Mr Vitali's statement (a mix of factual material, law and expert evidence) was structured as a response to questions posed by my assistant and based on the information she provided to him, including photographs taken at the Rochester after the explosion. Mr Vitali did not attend the scene, nor did he investigate the incident in any formal sense.⁶⁸
64. By reference to the MSDS for both "Heatcraft Solpower SP34E" and "A-Gas SP34E", Mr Vitali gave evidence that they were dangerous goods for the purposes of the **Dangerous**

⁶⁴ Exhibit E at pages 187-188 of the coronial brief. The AIRAH publishes a comprehensive safety guide entitled "Flammable Refrigerants" available on their website which is included in the coronial brief at page 194A.

⁶⁵ Exhibit E at page 188 of the coronial brief.

⁶⁶ Mr Wilkinson was not a chemist but see his evidence at transcript page 32 "Q ...when you say highly -- they produce highly toxic by-products, that's toxic to humans obviously? --- A Yeah the hydrant fluorides given off through new gases, which is I understand, um, when mixed with moisture can dissolve moist tissues. Q People? --- A Lungs and people, yeah."

⁶⁷ Mr Vitali's formal qualifications (Bachelor of Science in Applied Chemistry from RMIT in 1981) and extensive experience in the dangerous goods space is set out in Exhibit G is statement dated 2 December 2016 at page 194.1 of the coronial brief.

⁶⁸ The questions and information provided to Mr Vitali appear in the coronial brief, immediately before his statement commencing at page 194.1.

Goods Act 1985 [DGA] and that they fell within the non-flammable, non-toxic classification but posed a risk of asphyxiation and, accordingly, should have been labelled with the prescribed green diamond cylinder pictogram.⁶⁹ That is, that in the event that those gases leaked into the cellar, they could replace respirable atmosphere and cause a person in the cellar to fall asleep and die from asphyxiation.⁷⁰ By reference to its MSDS, Mr Vitali confirmed that the HyChill refrigerant also fell within the definition of dangerous goods, being a Class 2.1 flammable gas.⁷¹

65. While the cellar was a room that people would go in and out of and not a “confined space” for the purposes of the Occupational Health and Safety Act 2004, Mr Vitali felt strongly that it would attract all the requirements of the Dangerous Goods and Storage Regulations and the Code of Practice thereunder as a “space or area where dangerous goods could accumulate to form atmospheric conditions that are flammable, explosive or asphyxiant” and this could cause injury to people and damage to property.⁷² Accordingly, there was an ongoing obligation on the occupier of the premises to adopt suitable risk controls to prevent injury to persons and prevent property damage associated with the presence of these dangerous goods.
66. The Code of Practice references Australian Standards including, relevantly, Australian Standard AS/NZS 1677 Part 1 & 2 which pertain to the refrigeration system or compressor, as I have referred to it in this finding. Section 5.4(g) of Part 2 of this standard requires where flammable refrigerants are used the class label in accordance with the ADG Code for that refrigerant be placed on the refrigeration system. Once the HyChill was added to the compressor by Mr Purtell, there was an obligation to ensure that the appropriate Class 2.1 label be applied warning of flammable contents.⁷³
67. Mr Vitali’s evidence at inquest echoed the concerns expressed by both Mr Clarke and Mr Wilkinson about the transition to environmentally friendlier but more flammable gases and the need to ensure that appropriate safeguards are in place and heeded. As he put it, with the move to flammable hydrocarbons which are more friendly to the environment and the ozone layer, one is ‘forming a friendship with a different type of dangerous good, one which has fine explosion characteristics requiring extra care and diligence’.⁷⁴

⁶⁹ The WorkSafe “Code of Practice for the Storage and Handling of Dangerous Goods 2013” is included in the coronial brief at page 194.13 and following, as an attachment to Mr Vitali’s statement. The pictogram for this class of gases is shown in Appendix 8 of this Code.

⁷⁰ Transcript pages 50-55. Note that Mr Vitali also had incidental concerns about how the carbon dioxide cylinders in the cellar were stored but these were irrelevant to the explosion.

⁷¹ Exhibit G at page 194.2 of the coronial brief and transcript page 50.

⁷² Exhibit G at page 194.2 of the coronial brief and transcript page 56, 68.

⁷³ Exhibit G at page 194.2 of the coronial brief and transcript pages 50 and following, especially page 55.

⁷⁴ Transcript page 58.

68. Based on many years' experience with dangerous goods regulation, Mr Vitali propounded a theory which was as instructive as it was colourful – "*...in life sometimes you're spared, allowed to make one or two mistakes with dangerous goods ...but eventually you combine two or three mistakes in a row and you will have the explosion or the fire ... In this case, the first item was the compressor [being] inside the basement [as opposed to outside in the open air]... So years go by and someone decides to put a flammable gas in it. That's the second mistake... Thirdly, there no warning signs, no ventilation, so it just builds up in there when the leak happens and then, in that room, it becomes a chamber where it's just waiting for an ignition source...after 31 years of being in this Industry...they come for free*"⁷⁵

CONCLUSIONS

69. The standard of proof for coronial findings of fact is the civil standard of proof on the balance of probabilities, with the *Briginshaw* gloss or explications.⁷⁶

70. Adverse findings or comments against individuals or institutions are not to be made with the benefit of hindsight but only on the basis of what was known or should reasonably have been known or done at the time, and only where the evidence supports a finding that they departed materially from the standards of their profession, and in so doing caused or contributed to the death under investigation.

71. Having applied the applicable standard of proof to the available evidence, I find that:

- a. The compressor in the cellar of the Rochester Hotel initially contained a toxic but non-flammable refrigerant that carried a risk of asphyxiation.
- b. The compressor was leaking refrigerant, known to be leaking refrigerant and had been doing so for several years.
- c. Mr Scott from Scott's Refrigeration last re-gassed the compressor on 26 June 2012 using SP34E and affixed a label to the unit to this effect.
- d. In October-November 2013, the compressor was icing over once again and Mr Conway asked for Mr Purtell's assistance.
- e. Mr Purtell obtained HyChill, intended for use in motor vehicle air conditioning units, from his employer, and used it to top-up the compressor.

⁷⁵ Transcript page 59.

⁷⁶ *Briginshaw v Briginshaw* (1938) 60 C.L.R. 336 especially at 362-363. "The seriousness of an allegation made, the inherent unlikelihood of an occurrence of a given description, or the gravity of the consequences flowing from a particular finding, are considerations which must affect the answer to the question whether the issues had been proved to the reasonable satisfaction of the tribunal. In such matters "reasonable satisfaction" should not be produced by inexact proofs, indefinite testimony, or indirect inferences..."

- f. As a result, the compressor contained a mix of a flammable refrigerant (HyChill) and a non-flammable refrigerant (SP34E).
- g. As at 15 June 2014, the contents of the compressor were not accurately labelled and there were no other warnings or notices to alert anyone to the presence of flammable and non-flammable gases within the compressor.
- h. On 15 June 2014, several people including Mr Lobb and Mr Purtell were helping the Conways move out of the Rochester Hotel.
- i. Mr Lobb and Mr Purtell went into the cellar to prepare the compressor for removal, including the cutting and/or crimping of pipes connected to the compressor and containing a mixture of flammable and non-flammable refrigerants.
- j. While in the cellar, either Mr Lobb or Mr Purtell, used a cigarette lighter, likely to light a cigarette.
- k. The cigarette lighter ignited gases in the cellar that had either accumulated over time as a result of the known leak, or as a result of the cutting and ineffective crimping of the pipes by Mr Lobb and Mr Purtell, or both.
- l. Mr Purtell sustained fatal blast injuries and died en route to the Alfred Hospital.
- m. Mr Lobb survived the immediate aftermath of the blast and was air-lifted to the Alfred Hospital but ultimately succumbed to the complications of the chemical burns he sustained.
- n. The deaths were preventable, in the sense that proper maintenance of the compressor that dealt definitively with the leak, could have averted the explosion; proper labelling of the compressor as to its actual contents, could have averted the explosion and proper processes being engaged to dismantle and remove the compressor, could also have averted the explosion.

COMMENTS

Pursuant to section 67(3) of the **Coroners Act 2008**, I make the following comments connected with the death:

1. Mr Purtell and Mr Lobb died in circumstances of a tragic accident in the course of removing the compressor to help out a friend. While both men were good with their hands and happy to lend a hand, their deaths highlight the dangers of unqualified people doing work that requires qualifications or, at least, a solid understanding of the substances and risks involved.

2. There is ample evidence before me that the refrigeration industry which is not without its regulatory complexities, faces additional challenges with the move to low GWP refrigerants, none the least because the low GWP refrigerants are flammable and the vast majority of refrigeration mechanics/technicians were not trained in the use of such refrigerants.
3. However, as neither Mr Purtell nor Mr Lobb were qualified refrigeration mechanics/technicians, I do not consider it appropriate to make further comment or recommendations about industry practices.

I direct that a copy of this finding be provided to:

The family of Mr Purtell

Alfred Hospital c/o Alfred Health

Country Fire Authority

WorkSafe

Mr Phil Wilkinson, A.I.R.A.H.

Mr John Clark, Hychill Australia Pty Ltd

Detective Senior Constable David 'Bernie' Quinlan (#27748) c/o O.I.C. Echuca C.I.U.

Signature:



PARESA ANTONIADIS SPANOS

Coroner

Date: 31 August 2018