CORONERS ACT, 2003

SOUTH *AUSTRALIA*

FINDING OF INQUEST

An Inquest taken on behalf of our Sovereign Lady the Queen at Adelaide in the State of South Australia, on the 24th day of July 2019 and the 10th day of January 2020, by the Coroner's Court of the said State, constituted of David Richard Latimer Whittle, State Coroner, into the death of Heather Diane Pearce.

The said Court finds that Heather Diane Pearce aged 47 years, late of 10550 Mallee Highway, Lameroo, South Australia died at Tea Tree Swamp Road, Reedy Creek, South Australia on the 13th day of January 2018 as a result of carbon monoxide toxicity. The said Court finds that the circumstances of her death were as follows:

1. Introduction

1.1. Heather Diane Pearce, born on 23 November 1970, died on 13 January 2018, aged 47. She was overcome by carbon monoxide, when showering in a bathroom with an internal gas hot water service which was non-compliant and was not installed in accordance with technical and safety regulations.

2. Cause of death

2.1. Dr Karen Heath performed a post-mortem examination and in her report states the cause of death as carbon monoxide toxicity. I find that Mrs Pearce died as a result of carbon monoxide toxicity.

3. Background

3.1. The background and circumstances of Mrs Pearce's death are largely established by reference to the statements of her husband, Mr Grantley Pearce[1] and further details

[1] Exhibits C1a, C1b and C1c

provided by Mr Pearce to counsel assisting in the inquest, as recorded in a note of a telephone conversation dated 11 October 2019, now admitted as an exhibit[2].

3.2. Mrs Pearce lived at Lameroo with her husband and their children.

3.3. Since 1994, the Pearce family owned a property at Reedy Creek, several hours drive from Lameroo. It was originally acquired by Mr Pearce's father. Accommodation on the property comprised a caravan, a free-standing unit with a kitchen and bedroom, and a bathroom unit. These facilities were only used during the family's infrequent attendances at the property.

4. History of the bathroom and the hot water heater

4.1. The bathroom unit was a three-metre diameter concrete water tank, converted and sold as a bathroom, purchased by Mr Pearce's father in about 1996. He installed an instantaneous gas hot water heater, without a flue, and did the plumbing. He covered the outlet at the top of the heater, apparently designed to accommodate a flue, with a metal plate. Mr Grantley Pearce played no part in that, and does not know exactly why his father did not install a flue, or why he placed the plate on top of the heater. Mr Pearce senior died some years ago.

4.2. Mr Pearce perceived that the heater always operated effectively in providing hot water for showering. With one exception, it had never broken down and had never been serviced. Some five years or so prior to Mrs Pearce's death, the heater was not working properly and Mr Pearce found that rust from the plate on top of the heater was falling onto the flame. He removed the rusty plate and replaced it with a piece of sheet-metal plate he found in the shed. The heater then seemed to work effectively again.

5. 13 January 2018

5.1. On Saturday, 13 January 2018 Mr Pearce travelled to Reedy Creek with his wife and two of their three children, Jeffrey, 16 and Ben, 11 to shear sheep. That night, after tea, Jeffrey went to shower in the bathroom, taking 10 to 15 minutes. Mr Pearce followed him, and also showered for about 10 to 15 minutes. When Mr Pearce came out of the bathroom, Mrs Pearce went straight in. Mr Pearce returned soon afterwards to brush his teeth, finding Mrs Pearce using the toilet. She finished and got into the shower,

[2] Exhibit C1d

while Mr Pearce was still in the bathroom. She asked him to shut the door as he left. The night was cold and windy.

5.2. Mr Pearce got into bed, started reading and fell asleep. He woke up about 15 minutes later and noticed that his wife was not there. He went to look for her and found her dressed in her pyjamas, lying on the bathroom floor. The shower and the sink tap were still running; he believes for warmth. The cap was off the toothpaste. Mrs Pearce was curled up with her hands and arms under her head and did not appear to have fallen. Mr Pearce grabbed his wife and pulled her out of the bathroom. She was not breathing and was unresponsive. Mr Pearce asked Jeffrey to call an ambulance.

5.3. Mr Pearce commenced CPR, as instructed by the operator and waited for the ambulance to arrive.

5.4. Ambulance records[3] state that a call for assistance was received at 2238 hours and paramedics arrived at the scene at 2320 hours. An ECG showed asystole with no signs of life. Mrs Pearce was declared life extinct at 2355 hours.

6. Investigation and expert evidence

6.1. An investigation was conducted by Senior Constable Lawson[4], then based at the Kingston Police Station. Although the cause of death was then unknown, police did not consider that there were suspicious circumstances.

6.2. Mrs Pearce's cause of death only became apparent following the post-mortem examination, which revealed carbon monoxide poisoning.

6.3. Sergeant Moore, a coronial investigation officer, requested the attendance of inspectors from the Office of the Technical Regulator to inspect the bathroom. Mr Ron Meakins, a gas installation and appliance inspector, and Mr Ron Jessen, a senior gas inspector, both with the Office of the Technical Regulator, undertook the inspection and provided a report[5].

6.4. Mr Jessen gave oral evidence at the inquest, elaborating on the matters stated in the report.

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[3] Exhibit C4b
[4] Statement, Exhibit C4a
[5] Exhibit C4c

6.5. Mr Jessen was well-qualified to give expert evidence about the nature of the hot water service and the testing undertaken upon it, as well as the regulatory requirements applying to its installation. He is a qualified plumber and gas fitter who worked for many years as an inspector and technical risk assessor with gas supply companies and commenced as an inspector with the Office of the Technical Regulator in 2014. His duties include conducting inspections and auditing to ensure that installations and appliances are installed and operating according to the relevant standards. He assists industry in interpreting and understanding gas installation standards and performs investigations in relation to incidents involving gas appliances.

6.6. I accept the opinions stated by Mr Jessen in his evidence and in the report.

6.7. Mr Jessen and Mr Meakins attended the Reedy Creek property on 22 January 2018. They found an 'Ascot' hot water heater inside the bathroom, connected to a cold-water supply from the nearby rainwater tank and a gas supply from a nearby outdoor 45 kg LP gas cylinder, with hot water piping from the water heater to the hand basin and the shower.

6.8. No details of the model of heater could be found in records of the Australian Gas Association, the laboratory that provided certification of appliances to be used in Australia at that time. They did find installation diagrams for a heater of similar appearance in a 1979 gas fitting textbook and located photographs of a 1961 'Ascot' brand heater of similar appearance[6].

6.9. They concluded that the hot water service installed in the bathroom was likely to be at least 45 years old and I accept that evidence. On that basis, I find that the heater was second hand when installed by Mr Pearce's father in about 1996 and that it was installed without a hood or funnel, which was likely to have been supplied with it when new, as shown in the photograph of the 1961 'Ascot' brand heater. Plainly, the heater installed in the bathroom was designed to have a hood or funnel and a flue attached to it.

7. Non-compliance with regulatory requirements

7.1. From the evidence of Mr Jessen and the report, I also make the following findings.

7.2. When the heater was installed in about 1996, the regulatory requirement governing the installation of instantaneous hot water services was the Installation Code for Gas

[6] Exhibit C4c pp.27-31

Burning Appliances and Equipment AG601 1990, clause 5.6.4.4[7] providing, 'Unless of balanced flue type, instantaneous multipoint water heaters shall not be installed in domestic bathrooms or toilets'.

7.3. Clause 5.6.4.5 provided, 'The installation of a flueless multipoint instantaneous water heater is not permitted'.

7.4. The heater installed in the bathroom did not have a flue and was therefore not permitted to be installed in the bathroom.

7.5. It was also a multi-point water heater, in that it supplied a shower and a basin tap. For that reason, even if the heater had been installed with a hood or funnel on top of it, with a flue then connected to the outside of the bathroom, it would have been non-compliant, in that it was not designed to accommodate a balanced flue. A balanced flue is a double skinned flue, providing two passages, one to draw fresh air from outside to allow clean combustion and the other through which to expel the products of combustion.

8. Testing

8.1. Two tests were conducted to verify the presence of carbon monoxide during the operation of the heater.

8.2. The first test sampled the spillage of combustion products immediately adjacent to the appliance, with the bathroom door closed. The test was limited to ten seconds of appliance operation, due to an alarming rise in carbon monoxide to 960 ppm.

8.3. The second test involved sampling the air in the bathroom through the roof mounted rotary ceiling vent (which was jammed and did not rotate) with the bathroom door closed and the water heater operating. The level of carbon monoxide recorded rose to 2880 PPM at the point of sampling, within 270 seconds. The test was stopped because the reading was about to exceed the capacity of the gauge.

9. Further conclusions

9.1. The operation of the heater was further compromised by the placement of the metal plate on the opening at the top of the heater, rather than that opening being connected to a flue. The metal plate blocked the free flow of combustion products exiting from

[7] Exhibit C4c, Appendix H

the appliance. As a result, combustion products remained in the combustion chamber and deprived the main burners of secondary air, resulting in incomplete combustion and the production of high levels of carbon monoxide.

9.2. Having regard to the cause of Mrs Pearce's death, namely carbon monoxide toxicity, and the observations and testing of the hot water heater, confirming its production of high levels of carbon monoxide, it is clear, and I find, that the source of the carbon monoxide which led to her death was the bathroom heater, installed contrary to the relevant regulations. The unsafe nature of the bathroom heater was exacerbated by its use in a room which was not otherwise adequately ventilated. The cause of death was a direct result of the use of the non-compliant water heater.

10. Public safety warning

10.1. In 2006, the State Coroner issued a public warning over gas appliances in confined spaces, following the death of a man aged 57 who died of carbon monoxide poisoning after using a gas appliance in a caravan.

10.2. As a result of the circumstances of Mrs Pearce's death, and having regard to the evidence of the Senior Inspector of the Office of the Technical Regulator, the Court issues the following warning to the public, not only about the use of indoor gas water heaters, but about indoor gas appliances generally:

10.2.1. Gas appliances which do not comply with technical and safety regulations, or are not installed in accordance with regulations, or which are not operated safely, present serious threats to the health and safety of users, and the consequences of disregarding those regulations may be fatal.

10.2.2. Section 55 of the Gas Act requires operators to ensure that gas appliances comply with and are operated in accordance with technical and safety requirements imposed under the regulations and that such appliances are safe and safely operated. Contravention of this requirement is an offence punishable by a fine of up to $10,000 for individuals or $50,000 for corporations.

10.2.3. Compliance with regulations and safety of appliances may only be ensured if gas appliances are fitted by a licensed tradesperson and are regularly serviced

in accordance with the manufacturer's recommendation. The Office of the Technical Regulator advises that this should occur, in any event, not less than every two years.

10.2.4. If owners or operators of gas appliances are uncertain whether an installation complies with relevant contemporary standards and regulations, an inspection by a licensed tradesperson must be arranged, to ensure safety and avoid the risk of death or serious injury.

11. Recommendation

11.1. Pursuant to section 25(2) of the Coroners Act 2003 the Court may add to these findings any recommendation that might, in the opinion of the Court, prevent, or reduce the likelihood of, a recurrence of an event similar to the event that was the subject of the inquest.

11.2. I recommend that the Office of the Technical Regulator publish a warning to the public, as to the risk of death or serious injury presented by the use of instantaneous gas heaters which do not comply with or are not operated in accordance with technical and safety requirements.

Key Words: Public Warning; Gas Appliances; Carbon Monoxide Poisoning

In witness whereof the said Coroner has hereunto set and subscribed his hand and Seal the 10th day of January, 2020.

State Coroner