

SOUTH



AUSTRALIA

## FINDING OF INQUEST

*An Inquest taken on behalf of our Sovereign Lady the Queen at Coober Pedy in the State of South Australia, on the 9<sup>th</sup>, 10<sup>th</sup> and 11<sup>th</sup> days of April and the 22<sup>nd</sup> day of May 2002, before Wayne Cromwell Chivell, a Coroner for the said State, concerning the death of Robert Gregg .*

*I, the said Coroner, find that, Robert Gregg aged 13 years, late of 1062 Crowders Gully Road, Coober Pedy, South Australia died at Coober Pedy, South Australia on the 22<sup>nd</sup> day of September 2000 as a result of electrocution.*

### **1. Introduction**

- 1.1. Robert Gregg and his family lived in a ‘dugout’, an underground house, at Crowders Gully Road, Coober Pedy.
- 1.2. Robert’s father, Rodney Gregg, was building underground ‘extensions’ to the dugout. Whether building these ‘extensions’ might have resulted in Mr Gregg finding opal is irrelevant for present purposes. He had a ‘development lease’ which entitled him to build the extensions.
- 1.3. At about 10:30am on Friday, 22 September 2000 Mr Gregg climbed down the ladder in the access shaft to the ‘extensions’ intending to begin work. He connected the extension cord to the floodlight he had been using. The light did not come on. He called up to his sons, Robert and Nathan to turn it on. The power came on soon afterwards.
- 1.4. Mr Gregg picked up the floodlight (a rectangular light in a metal frame) and felt a surge of electricity through his body. In his statement he described what happened next:

‘I couldn’t let the light go. I tried to kick it from my hand but I couldn’t move my leg.

The next I remember is waking up in the dark.

I felt around next to me and felt a face lying next to me. I saw it was my son Robert, 13 yrs. He wasn't breathing.

I dragged him over towards the shaft and started CPR. He vomited and seemed to start breathing but I lost him. I kept up CPR and I'm sure he started breathing again. I kept up CPR until the ambulance arrived. The ambulance people told me to go up out of the shaft.'

(Exhibit C1b, p1)

- 1.5. Nathan Gregg, then aged 11 years, was with Robert on the surface. The boys heard their father call 'Help' after Robert turned the power on for his father. Robert went down the shaft. Nathan said he heard his brother 'cough', and then nothing. He went down the ladder, and:

'When I got there I saw Dad and Robert lying on the floor on their sides. Robert's head was near dad's chest and at right angles to him.

The big floodlight was in between them and on. They weren't moving.

I grabbed Robert and got "zapped".

Straight away I ran up the ladder, turned the power off and called the ambulance.'

(Exhibit C6a, p1)

- 1.6. Dr Heinz Niebuhr attended the scene after the ambulance arrived, at about 11am. When he got to the bottom of the shaft, two paramedics were performing CPR on Robert. Dr Niebuhr intubated Robert, then examined him. There were no signs of life, no respirations, heartbeat or pulse, his pupils were fixed and dilated and there was no corneal reflex. CPR was discontinued and death pronounced at 11:05am (Exhibit C2a).

## **2. Cause of death**

- 2.1. A post-mortem examination of the body of the deceased was performed by Dr T Simon, Pathologist, at Whyalla Hospital on 25 September 2000.
- 2.2. Dr Simon found 'burn-like areas', one beneath Robert's right shoulder and three others on the left chest. He thought that these lesions were electrical burns. Robert's lungs were hyper-inflated, and were deeply congested, as were his kidneys and liver (Exhibit C3a, p3).
- 2.3. Microscopic analysis of the burn-like areas suggested 'electro-desiccation'.

- 2.4. Dr Simon's conclusion was that the cause of Robert's death was electrocution. I accept his conclusion, and find accordingly.

### **3. Investigation**

- 3.1. Following Robert's death, the extension leads and the floodlight were seized by Mr Neville Mitchell, Manager, Electrical Supply for the District Council of Coober Pedy, and Mr Patrick O'Toole, the Council Electrician.
- 3.2. Mr O'Toole's report (Exhibit C5d), shows that when he and Mr Mitchell tested the lamp, they were unable to demonstrate the fault. When they heard that technicians from the Office of the Technical Regulator ('OTR') were coming to Coober Pedy the next day, they did not proceed with further testing.
- 3.3. Mr James Watson, the Principal Technical Standards and Safety Officer with the OTR, and Mr Robert Anderson, a Technical Standards and Safety Officer attended Coober Pedy on Saturday, 23 September 2000. Both were 'authorised officers' under the Electricity Act, 1996.
- 3.4. Messrs Mitchell and O'Toole handed over the equipment to Messrs Watson and Anderson. They had been informed by Mr Gregg that the floodlight had been connected to the electricity supply via three extension leads which passed up the shaft, over the ground to the verandah at the front of the dugout, up and across the rafters of the verandah to a double adaptor inserted in a combination switch socket outlet near the washing machine. This in turn was connected to a twin socket outlet above the family room window which, upon closer inspection, did not have an earth wire going on to the junction box.
- 3.5. Mr Watson's report sets out his conclusions, after examining the wiring at the Gregg's dugout and the equipment involved, as follows:
- '1) The socket outlet, adjacent the washing machine at the house, (that had the extension cords and portable electric floodlight connected to it) did not have the earth contact connected to the earthing system. This eliminated one of the elements in protection against indirect contact with live parts. The lack of earthing of this earth contact would allow the exposed metal of an appliance or light fitting (including the exposed metal of the portable floodlight allegedly involved in the incident) to be alive when a fault occurs between live parts and exposed metal of any appliance or light fitting supplied through the socket outlet.

- 2) There was no supplementary protection by the use of a residual current device (safety switch) to protect against residual current flow from the circuit or the equipment supplied through the circuit.
- 3) The insulation resistance between the live conductors and the earthing conductors in the extension cords and the portable floodlight tested individually was greater than 200 meg-ohm. This value meets the requirements of the applicable standards.
- 4) The continuity of the earthing conductors in the extension leads and supply flexible cord attached to the portable floodlight was adequate to ensure the operation of the circuit protective device, with correctly sized fuse element installed, had they been individually connected to a socket outlet with the earth contact correctly earthed.
- 5) No voltage difference was measured between the exposed metal of the portable floodlight and earth when it was energised. For this test the supply flexible cord was reconnected to the portable floodlight and the terminal cover refitted. The portable floodlight was energised through the three flexible cords and connected in turn to each of the socket outlets of the double adaptor that is connected to the combination switch socket outlet adjacent to the washing machine. The portable floodlight was dismantled after this test and I found the basic insulation of one of the live conductors had been damaged. The damage was sufficient to record a low resistance between one of the live pins on the plug and the live conductor at the point of damage to the conductor insulation. The cable with the insulation damage was connected between the incoming terminals and the live contact of the lampholder.
- 6) Insulation resistance tests were carried out on the washing machine and were found to be satisfactory. I was informed that the washing machine was not connected to the socket outlet and not operating at the time of the incident.
- 7) Insulation resistance tests were carried out between the live conductors and the green/yellow insulated conductor of the cable between the twin socket outlet located outside and adjacent to the entrance to the family room and the combination switch socket outlet adjacent to the washing machine. The result met the requirements of AS/NZS 3000.2000 Wiring rules.'

(Exhibit C10, p2-3)

- 3.6. In oral evidence, Mr Watson explained that if the combination switch had been earthed, there should have been sufficient current returning via the earth wires to the junction box to melt the fuse, thereby shutting off the power and preventing electrocution (T82).
- 3.7. More desirably, if a 'Residual Current Device' ('RCD'), also known as a 'Earth Leakage Circuit Breaker' ('ELCB'), had been fitted, the circuit would have been broken within milliseconds of current flowing through Mr Gregg (T83).
- 3.8. Mr Watson said that even the small amount of current (perhaps less than 1 ampere, even as low as 300 milliamperes) flowing through the defect in the wire to the frame

of the lamp, through the human body to earth was sufficient to cause serious injury or, tragically in Robert's case, death because the current was sustained for a substantial time (T97).

#### **4. Issues arising at the inquest**

4.1. In Coober Pedy, the electricity supply is provided by the District Council of Coober Pedy. Electricity is generated at a powerhouse operated by the Council, and the Council is responsible for distribution throughout the community.

#### **4.2. Why was the wiring in that state?**

Mr Gregg told me that he and his wife purchased the property in 1990. In August 1999 they returned from Queensland, having rented out the place while they were away. Mr Gregg said that the tenants had 'trashed' the place, and the power had been disconnected because they did not pay the account (T53).

4.3. When Mr Gregg requested reconnection, it was noted by the Council employees that the main switch was blown. A private contractor, Mr Michael Maylin, was called in and he replaced the main switch and the earth stake, allowing the power to flow.

4.4. When carrying out the reconnection, the Council employees also noted that the service fuse attachment pole did not have sufficient clearance, nor did the meter box. These conditions were breaches of Australian Standard AS3000. As a result of this, a 'Notice of Faulty Electrical Installation' dated 20 August 2000 (Exhibit C5c) was sent to Mr Gregg, giving him 28 days to rectify the faults.

4.5. Mr Maylin said that he reported the condition of the installation to Mr Neville Mitchell, then the Manager, Electricity Supply, for the Council. Mr Maylin told me that he could tell from the poor condition of the fuse box, and the age of the materials, that the rest of the wiring in the house was likely to be substandard. He said that this was not unusual in Coober Pedy. In earlier times, there were few trades-people in the town, and people relied upon themselves. He said that people did not welcome being told that their dugout needed to be completely rewired, at considerable expense, when they were used to having electricity with their existing system (T68).

4.6. Mr Mitchell told me that he could not recall this conversation with Mr Maylin, although he recalled his visit, and made a note about the main switch and the earth stake. The note is dated 23 August 1999 (see Exhibit C5c and T103).

- 4.7. It is to be noted that the Notice of Faulty Electrical Installation was restricted in its terms to the clearance of the service fuse, and the clearance of the meter box. Mr Mitchell was unable to recall why, if Mr Maylin did bring other matters to his attention, he did not act upon them (T105). He said that there was some acrimony among electricians in Coober Pedy at the time, and that:

'... Yes, it's a little bit of a funny one. You mention the name Mick Maylin, therefore I must qualify my answer in that regard, is that if Mick Maylin did say that, for example, about an installation it doesn't necessarily mean that we would go out, disconnect that place and condemn it, etc., etc. There was some confusion, and probably still is, about the role of the council in different situations. Mick Maylin believed that we should, for example, check every earth in town at the meter boxes -' (T104)

- 4.8. Mr Mitchell told me that this incident occurred in the context of some acrimony between Mr Maylin and another electrician in the town, and the fact that there were a number of other 'electricians' who had been given rather dubious qualifications by the previous Manager of the power station (T117). He said that he received many complaints from Mr Maylin about substandard work, and it was not possible to fully investigate them all (T118).
- 4.9. It is a great pity that Mr Maylin's complaints about the Gregg premises were not followed up by Mr Mitchell and the Council. Had they done so, then the obvious defects in the wiring would have been apparent, and the power supply should have been disconnected until it was rectified. Robert's death might thereby have been avoided.
- 4.10. Mr Maylin said he also told Mr Gregg about the general state of the wiring at the house:

'I told him (Rod Gregg) that the whole electrical installation from consumer mains right down to the last power point / light was rubbish that is unsatisfactory by the Wiring Rules Regulations. I told Gregg to allow himself 3000 to 5000 dollars to redo the whole installation as the only thing I had seen was the switchboard and nothing else. Without doing a full compliance test on it I could not give him an exact quote.

He had only just got back into town and had no money. It took him about three to four months to pay me about \$100.00 however I need to check that on my invoices.

...

While we were working on the switchboard that is when he (Rod Gregg) was talking to me about what it would cost to bring the installation up to standard. Standing at the switchboard the consumer mains would have to be replaced underground, the

switchboard would have to be upgraded, including the correct height off the ground, prevent water getting into it. It needed a safety switch and circuit breakers. We never looked at anything else.'

(Exhibit C9, p1-2)

- 4.11. Mr Gregg acknowledged that such a discussion had taken place, although he did not appreciate that the need was urgent. He said:

'No. He didn't say that to me. What he said to me, he said, all in, was basically he was too busy to do job but he'll quickly come in, and did what he had to do, and then that was it. And I said, well - he said, 'It's shoddy'. He said, 'You'll have to get it fixed one day', and I said, 'How much?', and he said somewhere between three and five. And I said, 'Oh well'. But, I mean, he only looked at the power box so I couldn't work out how come he was going to charge me 3,000 - 5,000 for the power box.' (T50)

4.12. Role of the District Council

In fact, when Mr Maylin reported to the District Council of Coober Pedy ("DCCP") that the wiring at Mr Gregg's dugout was substandard and dangerous, the DCCP had a statutory duty to follow it up. Section 59 of the Electricity Act 1996 states:

**'59. Electrical installations to comply with technical requirements**

59. (1) A person who connects an electrical installation to a transmission or distribution network must ensure that the installation, and the connection, comply with technical and safety requirements imposed under the regulations.

Maximum penalty: \$50 000.

(2) An electricity officer for an electricity entity may disconnect the electricity supply to an electrical installation that-

(a) is connected to the entity's transmission or distribution network in contravention of this section; or

(b) otherwise does not comply with this Act.

(3) For the purpose of ensuring under this section that an electrical installation complies with the technical and safety requirements, a person may, subject to the regulations, rely on a certificate of compliance issued under this Part in relation to the installation. '

In this case, there is no doubt that the 'person who connects an electrical installation to a transmission or distribution network' was the DCCP.

- 4.13. Section 60 of the Electricity Act also places a legal onus on the occupier of the premises to ensure that electrical installations on the premises comply with the appropriate technical standards. However, the occupier is entitled to rely on a

Certificate of Compliance issued by a licensed electrician if they have engaged one to inspect the premises. Mr Gregg did not engage Mr Maylin for this purpose.

- 4.14. Further, Section 49 of the Act gives extensive powers to an 'electricity officer for an electrical entity' to enter and inspect premises and take action to prevent electrical hazards. I assume, in the absence of strict proof, that the DCCP was an 'electrical entity' in that it was licensed under the Act 'to carry on operations in the Electricity Industry' (see Section 4).

## **5. Recommendations**

- 5.1. Clearly, the wiring installation at the dugout owned by Mr and Mrs Gregg was substandard and dangerous. The absence of an earth in the double socket, and the lack of a Residual Current Device ('Safety Switch'), either of which might have prevented Robert's death, were serious deficiencies.
- 5.2. Both Sergeant Tappin and Mr Maylin told me that there are many examples of such wiring in Coober Pedy. Prior to Robert's death, the District Council took a lenient attitude to this situation, having regard to the particular nature of the town and its inhabitants.
- 5.3. Mr Watson told me that it was standard procedure throughout the State that if it came to the attention of a supplier that an electrical installation was unsafe, this should be reported to the OTR and the powers vested in that office by the Electricity Act 1996 (see Section 62) would be used to audit the premises, and, if necessary, the power supply would be cut off until any deficiencies were rectified (T92).
- 5.4. This should have happened when Mr Maylin reported the condition of the wiring to Mr Mitchell.
- 5.5. Since Robert's death, the OTR has taken steps to address the particular problems in Coober Pedy. Mr Watson said:

'A. The community efforts that we've put forward is basically having residual current by safety switches installed. We see that as the best outcome because it would prevent any incidents occurring similar to this than to go through and check every premises. Basically that is not our role. So we see the promoting of safety switches as the way to go. Presently interstate, in Queensland, due to the fact of their high fatality rate there they are looking at making it possibly a retrospective requirement to fit safety switches. We are monitoring that at the moment and with all the research that they're doing, investigation, where we are keeping tabs on exactly what's happening in that area.

- Q. But there's been a community awareness program or something, has there, carried out -
- A. Right across the state. Also in the mining area up here I've had my officers come up and present two lots of seminars up here now in relation to electrical safety.
- Q. Would you agree that there seems to be a particular problem in Coober Pedy.
- A. Yes, although a similar problem is in other places as well.' (T91)

5.6. Mr Watson said that a number of discussions have occurred between the OTR and the DCCP to ensure that these procedures are complied with. The OTR has conducted a number of seminars in Coober Pedy addressing particular hazards associated with electricity and the opal mining industry. These were reportedly well attended. The electrician (Mr Maylin) has been audited.

5.7. Mr Watson's recommendations at the conclusion of his report were:

- '1) That the public be warned of the dangers associated with "Home handy-persons" attempting to carry out electrical work. On a number of occasions they have unknowingly placed lives at risk.
- 2) Homebuyers need to protect themselves and their families by arranging a safety check on the electrical installation by a reputable licensed electrical contractor prior to purchasing a home. This applies to dwellings of all ages.
- 3) Use only licensed electrical contractors to perform electrical work.
- 4) Ensure electrical contractors supply you with an Electrical Certificate of Compliance for the works carried out.
- 5) Examine flexible cords for signs of damage and if damaged they should not be used until repaired and tested or made unusable by removal of the plug pins and disposed of.
- 6) Electrical safety seminars to be provided to the Opal Mining Industry. (Arrangements are in place for these to be held in May 2001 at four different centres in conjunction with the Opal Mining Industry).'

(Exhibit C10, p4-5)

5.8. I adopt those recommendations, and would add the following:

- That the DCCP ensure that appropriate policies and procedures are in place to ensure that its responsibilities as a supplier of electricity, placed upon it by the Electricity Act, are fully complied with;

- That the OTR continue to monitor the situation in Coober Pedy with a view to ensuring that consumers of electricity have the same degree of safety as do consumers elsewhere in the State, and in particular:
  - continue to oversee the electricity supply operations of the DCCP to ensure that the Electricity Act is being fully complied with;
  - continue to oversee electrical contractors in the town;
  - continue the publicity campaign to encourage the use of safety switches.

*Key Words: Electrocutation; Electrical Safety; Electricity Act*

*In witness whereof the said Coroner has hereunto set and subscribed his hand and*

*Seal the 22<sup>nd</sup> day of May, 2002.*

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*Coroner*