



MAGISTRATES COURT *of* TASMANIA

CORONIAL DIVISION

Record of Investigation into Death (Without Inquest)

*Coroners Act 1995
Coroners Rules 2006
Rule 11*

I, Olivia McTaggart, Coroner, having investigated the death of Michael Lewis Petterwood

Find, pursuant to section 28(1) of the Coroners Act 1995, that:

- a) The identity of the deceased is Michael Lewis Petterwood;
- b) Michael Lewis Petterwood died at his place of work of natural causes in the circumstances set out in this finding;
- c) The cause of death is atherosclerotic coronary vascular disease; and
- d) Michael Lewis Petterwood died on 25 September 2019 at the premises of Nyrstar Hobart Pty Ltd (“Nyrstar”) at 300 Risdon Road, Lutana in Tasmania.

In this finding, I have had regard to the evidence in the comprehensive investigation into Mr Petterwood’s death. The evidence comprises the Police Report of Death for the Coroner, identification and life extinct affidavits, report of the State Forensic Pathologist, toxicology report, ambulance records, Mr Petterwood’s medical records, affidavits of key personnel and witnesses from Nyrstar, affidavit of Anne Petterwood, documentation from Work Safe Tasmania, Nyrstar investigation report, forensic evidence and photographs.

Background

Mr Michael Lewis Petterwood was born on 12 October 1959 and was aged 59 years at his death. He had been married to Anne Marie Petterwood for 39 years. There are two adult children to the marriage, Mark Petterwood and Scott Petterwood. At the time of his death, Mr Petterwood worked at Nyrstar zinc smelter (formerly Electrolytic Zinc Company) in Lutana, Hobart. He had worked there for 32 years, having commenced employment in January 1987. He was a loved husband, father and friend to many. He contributed to the community and had been a volunteer firefighter with the Risdon Vale Fire Brigade since 2000. He was an active and respected member of that brigade.

Circumstances Surrounding Death

Nyrstar, the employer of Mr Petterwood, is a primary zinc smelter that has been operating at the same site in Lutana for 102 years. Its operation involves converting zinc concentrate into

zinc metal. Throughout the production process, a number of by-products are produced. The four primary processes of the factory are roasting and acid production, leaching and purification, electrolysis and, finally, casting. Mr Petterwood worked in the roast and acid plant, a section of the factory that roasts sulphur from the concentrate. The by-product of this process is the gas sulphur dioxide, which is converted into sulphuric acid in another section of the plant. Sulphur dioxide is a noxious gas in high concentrations. Nyrstar takes numerous precautions, as itemised in the affidavit evidence, to protect workers in that area from exposure to unsafe levels of the gas.

At 4.10pm on Wednesday, 25 September 2019, Mr Petterwood was performing his usual work in the roast and acid plant at Nyrstar and working with a long-time friend and employee, Mr Glen Bennett. In his affidavit for the investigation, Mr Bennett describes in detail the events leading to Mr Petterwood's death. I fully accept Mr Bennett's evidence and set out the relevant passage from his affidavit to describe the incident:

“On 25 September 2019, I was working with Michael. Michael was taking a long time to complete tasks and walk around the workplace. This was unusual for him.

Michael and I were at the Number #6 conversion (Converter). We were trying to bring an acid plant online. This means we needed to divert gas through another channel. We were trying to convert SO₂ to SO₃, mixed with water this creates H₂SO₄. Michael and I have conducted this process hundreds of times over the years and it is second nature to us.

Michael was in the plant doing a start-up. We had just introduced gas to the plant. I understand that Michael was walking from the drying tower damper (strong acid area) and has taken his acid proof suit off (coat version). Michael then walked alongside the SO₂ blower to the vein controller. He flicked the switch from local to remote so that the veins could be controlled by computers in the control room. He has then put his suit onto the stair railing next to the SO₂ blower.

I tried to get Michael on the Hooter and calling him on the radio. He was very slow doing these tasks, a lot slower than usual. I asked Michael to open #7 valve so we could introduce gas to the back masses of the #6 converter. Michael wasn't responding to our calls on the radio. Finally Michael called on the radio to say “he needed help” and “he couldn't breathe, and that he was having a rest near 4B damper”. I rushed out to see how he was. He was responding to my questions, he said he couldn't breathe, he was looking purple and yellow with his eyes partially closed. His arms were stiff and he went very clammy. He took a breath and laid back. I gave him mouth to mouth. I contacted the control room to tell them we had an emergency and needed the EROs (Emergency response offices (sic)) up here immediately. In the meantime,

Michael slumped backwards and just laid there with his eyes wide open. Maurice (my manager) arrived soon after and we started CPR. We continued until Daniel arrived. Maurice, Daniel and I lifted Michael out onto the concrete, so that we could lay him on a flat and safe surface. Maurice and Daniel continued CPR and I was told by Maurice to keep an eye out for the ambulance. I went and got the plant under control when the ambulance arrived.”

Mr Bennett’s account of Mr Petterwood’s demise is corroborated by the Nyrstar transcripts of the radio communications. The transcript indicates that Mr Petterwood’s last radio communication was at 4.20pm, with Mr Bennett requesting the EROs at 4.23pm. ERO, Mr Daniel White, immediately headed out to Mr Petterwood’s assistance in the response vehicle and arrived at Mr Petterwood’s location at about 4.29pm and found him unresponsive. At that time Ambulance Tasmania was called, arriving at Nyrstar at 4.49pm and at Mr Petterwood’s actual location at 5.01pm. Before the arrival of ambulance paramedics, Mr White had checked for signs of life (and saw none), ensured that chest compressions were continuing on Mr Petterwood and deployed the resuscitator and defibrillator. After use of the defibrillator, Mr White detected several short, shallow breaths from Mr Petterwood. Further chest compressions and use of the resuscitator continued with no discernible effect.

The ambulance paramedics, upon arrival, took over resuscitation attempts, including application of a laryngeal mask and administration of adrenaline. Unfortunately, Mr Petterwood was unable to be resuscitated and at 5.27pm was determined to be deceased.

Issues Surrounding Mr Petterwood’s Cause of Death

On 26 September 2019 an autopsy was performed upon Mr Petterwood by the State Forensic Pathologist, Dr Donald Ritchey. Dr Ritchey, in his report, concluded as follows:

“The autopsy revealed a normally developed, obese (obesity defined as a body mass index of greater than or equal to 30kg/m²) adult man with atherosclerotic coronary vascular disease. Specifically there was approximately 80% stenosis of the distal left main and proximal left anterior descending coronary artery and the most proximal segment of the right coronary artery. Plaque disruption and lumen thrombus were not seen. The lungs were markedly congested and heavy. Microscopic sections of the bone marrow revealed numerous dense lymphoid infiltrates consistent with low grade lymphoproliferative disorder/ leukaemia. The immunochemical profile revealed strong staining with both B-cell and T-cell markers suggesting chronic lymphocytic leukaemia (CLL).

CLL is a common malignancy of the bone marrow where malignant lymphocytes circulate into the peripheral blood. It is a low grade malignancy and typically does not cause death by itself. It

can alter the propensity of the blood to coagulate and form clots within blood vessels leading to an increased risk of death by pulmonary thromboembolus or, as in the present case, atherosclerotic coronary vascular disease.

There is enough natural disease to explain the sudden death including the symptoms experienced just prior to death and it is my opinion that natural disease seen at autopsy is the cause of death. The possibility of a significant industrial exposure cannot be completely excluded by autopsy / toxicology criteria alone.”

Dr Ritchey therefore formed the opinion that Mr Petterwood died as a result of natural causes, being atherosclerotic coronary vascular disease with significant contributing factors being obesity and chronic lymphocytic lymphoma.

Although Dr Ritchey found Mr Petterwood to have died of natural causes, a comprehensive investigation was required to determine whether Mr Petterwood's death had been caused or contributed to by exposure to gas, namely sulphur dioxide (SO₂). Although Mr Petterwood's post-mortem blood sample was subject to toxicological testing, the testing was not able to determine whether or not Mr Petterwood had been exposed to this gas. Additionally, the sulphur dioxide levels were recorded as being excessively high immediately after Mr Petterwood's collapse.

On 21 February 2020 I held a case management conference in open court to hear submissions from interested parties regarding the evidence in the investigation and whether the evidence indicated that any exposure to sulphur dioxide caused or contributed to Mr Petterwood's death. Present at the case management conference were Mrs Petterwood, Nyrstar representatives and their counsel, Mr Taylor, and Ms Ansell as counsel assisting the coroner.

Although I had formally invited Work Safe Tasmania to the conference (given its involvement in this matter) no representative from that organisation appeared or responded to the invitation. Given its function, Work Safe Tasmania should, as a matter of courtesy to the Court and in the interest of workplace health and safety, attend coronial proceedings where it has conducted investigations into the particular incident and where it has been invited by the Court to participate.

At the case management conference, the documentary evidence was formally tendered and none of the interested parties submitted that any further investigation was required. I am of the view that the issue of whether Mr Petterwood was subject to sulphur dioxide exposure has been thoroughly investigated. In this regard, I am very grateful to the competent and efficient work of investigating officer, Constable Dean Edwards, for his compilation of the evidence. I

am also grateful for the detailed report produced by Nyrstar. Mr Todd Milne, the Safety, Health, Environment and Quality Manager for Nyrstar has also provided full co-operation in the investigation.

All of the evidence in the investigation leads me to accept Dr Ritchey's opinion and conclude that Mr Petterwood died of natural causes, being atherosclerotic vascular disease.

It is unnecessary, given the ventilation of the issues at the case management conference, to deal with the evidence at length. However, the sophisticated analysis of sulphur dioxide emissions by Nyrstar in its report indicated that, before Mr Petterwood's collapse, the emissions were within the normal operating parameters in the relevant areas. A number of fixed gas monitors recorded a significant peak in sulphur dioxide emissions after Mr Petterwood's collapse. The Nyrstar investigation report stated that, as a result of Mr Petterwood's collapse, he had not undertaken his routine duty of opening the #7 valve which was part of the start-up process for restarting the Number 6 Fluid Bed Roaster and Number 6 Acid Plant. The report further stated that, due to the emergency, other personnel were taken away from their positions in the control room and could not complete this action. This led to a loss of control of the start-up process resulting in higher than normal emissions of sulphur dioxide for approximately 30 minutes. Under normal circumstances, this process would have been undertaken in a timely manner to minimise the risk of emissions. I am satisfied that occurred after Mr Petterwood's collapse and for the reasons indicated by Nyrstar. One of the employees assisting Mr Petterwood, Mr Maurice Jacobson, stated in his affidavit that some time after the paramedics arrived he made his way back to the control room and, at that point, he felt some effects of the higher levels of sulphur dioxide emissions but was not overcome by it.

Importantly, Mr Bennett and other very experienced personnel working at the time, did not detect the distinctive odour and effects of harmful levels of sulphur dioxide at the time of Mr Petterwood's collapse, and no other workers in the area reported any health or medical issues. The expected alarms did not activate. Mr Petterwood was in radio communication with Mr Bennett at the time he commenced having difficulty breathing. It would be expected that he would have informed Mr Bennett of sulphur dioxide exposure if that had been his belief. He did not complain of several symptoms, such as nausea or vomiting or burning of the throat that are said to be characteristic of gas exposure. It is noted by Mr Bennett that Mr Petterwood was moving slowly in his routine work before his collapse, indicative of a health issue.

According to Mrs Petterwood, Mr Petterwood had no history of heart problems. The evidence does not indicate that he had experienced cardiovascular symptoms or had ever been treated for them. I note that he underwent a comprehensive health assessment for his

employment on 8 August 2019, approximately seven weeks before his death. In this assessment, Dr Regan Shaw assessed him as fit for work but wrote a letter, presumably given to Mr Petterwood to take to his private general practitioner, noting the presence of various cardiovascular risk factors. These included hypertension, smoking and high cholesterol levels. There is no evidence that Mr Petterwood attended a general practitioner or sought further advice regarding these issues before his death.

Comments and Recommendations

Most unfortunately, Mr Petterwood suffered a heart attack and died suddenly whilst working at Nyrstar, his long-time employer. As discussed above, he had multiple risk factors and another undetected medical condition which contributed to his death. There was no harmful level of sulphur dioxide in the area of his work at the relevant time and the subsequent emissions of this gas did not play any part in his cause of death. There were no other issues in his workplace that contributed to his death. Nyrstar's response to the medical emergency presented by Mr Petterwood's collapse was prompt and appropriate, as was its involvement in this investigation.

As a further comment connected with this investigation, the evidence indicated that personal sulphur dioxide monitors (as opposed to the fixed monitors) recorded on various occasions harmful concentrations of this gas in the 12 months before Mr Petterwood's death, although not at the time of his death. I accept the evidence of Mr Milne that personal monitors were likely used as "leak detectors" and placed very closely against an area from which a leak of gas may have been emanating. In this instance, the reading was not representative of the actual levels in the wider atmosphere. Other high readings from these monitors were likely due to their recording short puffs of gas emissions in circumstances where personnel were protected by high levels of personal protective equipment. In his evidence, Mr Milne stated that, as a result of an assessment, procedural changes have been made by Nyrstar to ensure that personal gas monitors are used appropriately and that the information captured on the monitors is reviewed frequently. He also stated that, as a result of directions by Work Safe Tasmania, gas leaks (unrelated to Mr Petterwood's death) were repaired. Having investigated the incident relating to Mr Petterwood, Work Safe Tasmania also accepted that Mr Petterwood died as a result of natural causes.

As Mr Petterwood's death was due to natural causes, I am not required under section 24(1)(ea) of the *Coroners Act 1995* to hold a public inquest.

It is not appropriate to make any recommendations in this matter.

In concluding, I convey my sincere condolences to the family of Mr Michael Lewis Petterwood.

Dated: 20 April 2020 at Hobart Coroners Court in the State of Tasmania.

Olivia McTaggart
Coroner