



**CORONER'S COURT
OF NEW SOUTH WALES**

Inquest: Inquest into the suspected death of missing person Elizabeth O'Pray

Hearing dates: 20 to 22 February 2019; 14 and 15 August 2019

Date of findings: 13 December 2019

Place of findings: Coroner's Court of New South Wales at Lidcombe

Findings of: Magistrate Derek Lee, Deputy State Coroner

Catchwords: CORONIAL LAW – whether missing person now deceased, police search and rescue operation, Optus, Location Based Service, Osprey, mobile phone cell tower, call charge records, JSpectrum

File number: 2016/190895

Representation: Mr R Ranken, Counsel Assisting, instructed by J Herrington and Mr W Nash (Crown Solicitor's Office)

Ms A Horvath for Optus Mobile Pty Ltd, instructed by Mr P Forbes (Baker & McKenzie)

Mr M Seymour for the New South Wales Commissioner of Police, instructed by Ms M Panuccio (Makinson d'Apice)

Findings: I find that Elizabeth O'Pray, who was reported as a missing person to New South Wales Police on 7 March 2016, is now deceased. Elizabeth died sometime between about 8 and 10 March 2016 near Katoomba NSW 2780. Elizabeth most likely died as a result of dehydration, hypothermia and exhaustion after becoming lost in bushland whilst walking.

Non-publication orders: See Appendix A

Table of Contents

1.	Introduction	1
2.	Why was an inquest held?.....	1
3.	Betty's life.....	1
4.	Betty's medical history	2
5.	Prior instances of disorientation.....	3
6.	What happened on Monday, 7 March 2016?	4
7.	Tuesday, 8 March 2016: The initial police response.....	4
8.	Tuesday, 8 March 2016: Telephone contact with Betty	6
	<i>First call at 5:18pm</i>	6
	<i>Second call at 5:55pm</i>	6
	<i>Third call at 5:58pm</i>	6
	<i>Fourth call at 6:42pm</i>	7
	<i>Fifth call at 7:00pm</i>	7
	<i>Sixth call at 7:29pm</i>	7
	<i>Seventh call at 7:50pm</i>	8
9.	Further search efforts to locate Betty	8
	<i>Wednesday, 9 March 2016</i>	8
	<i>Thursday, 10 March 2016</i>	8
	<i>Friday, 11 March 2016</i>	9
	<i>Doubts about the accuracy of the information from Osprey</i>	9
	<i>Saturday, 12 March 2016</i>	10
	<i>Sunday, 13 March 2016</i>	11
	<i>Monday, 14 March 2016 to Friday, 18 March 2016</i>	11
	<i>Saturday, 19 March 2016 and following</i>	11
10.	Is Betty now deceased?	12
11.	Issues for consideration at the inquest.....	13
12.	Was the police search reasonable and appropriate in the circumstances?.....	13
13.	Was the information obtained using the Osprey system incorrect?	14
	<i>Location Based Service</i>	14
	<i>Osprey result for Betty's mobile phone</i>	16
14.	Why was the information obtained using the Osprey system incorrect?.....	18
15.	Were the actions of Optus in attempting to identify the problems with the information timely and appropriate in the circumstances?	18
	<i>Call charge records for Betty's mobile phone</i>	18
	<i>Information provided on 12 March 2016</i>	19
	<i>Initial attempts at verification of information</i>	19
	<i>Subsequent attempts at verification</i>	21
	<i>Enquiries with JSpectrum</i>	22
16.	Acknowledgments	24
16.	Findings pursuant to section 81 of the <i>Coroners Act 2009</i>	24
17.	Epilogue	24

1. Introduction

1.1 Elizabeth O'Pray, or Betty as she was known to those closest to her, had a lively sense of adventure and a love for going on long walks. On 7 March 2016 Betty left her home in Medlow Bath in the Blue Mountains region to go on one of her well-known walks. She did not return home and was reported missing by her daughter later that evening. In the hours, days, and weeks that followed an extensive search effort by the New South Wales Police Force and other supporting agencies was mounted in an attempt to locate Betty and identify any signs of life. Despite mobile phone contact being made by Betty the day after she was reported missing, and mobile phone technology being available to those looking for her, Betty has never been found.

2. Why was an inquest held?

2.1 In cases involving long-term missing persons it is sometimes suspected, for various reasons, that the person is deceased. When the police suspect that a missing person may have died, that suspected death becomes reportable to a Coroner under the *Coroners Act 2009* (**the Act**).

2.2 The primary question which a Coroner seeks to answer is whether the person is, in fact, deceased. If the Coroner reaches that conclusion then the Coroner must also seek to answer questions about where and when the person died, and what was the cause and manner of their death. The manner of a person's death means the circumstances surrounding their death and the events leading up to it. If any of these questions cannot be answered then a Coroner must hold an inquest. Sadly, it is often the case that even after a coronial investigation and an inquest a Coroner is unable to answer all, or most, of these questions.

2.3 In Betty's particular case, for reasons which are set out in more detail below, the available evidence leads to a conclusion that she is now deceased and that her death occurred during search efforts conducted by NSW police. Therefore, Betty was regarded as having died in the course of a police operation. This meant that, according to the relevant section of the Act which applied at the time¹, an inquest into Betty's death was mandatory. Part of the reasons why such inquests are mandatory is to ensure that there is an independent and transparent investigation of the circumstances of the death, and the relevant conduct of any involved police officers. This is not to suggest that the conduct of the police involved in the search for Betty should be the subject of adverse comment. Indeed, the evidence suggests to the contrary that the conduct of the police involved was entirely appropriate.

3. Betty's life

3.1 Inquests and the coronial process are as much about life as they are about death. A coronial system exists because we, as a community, recognise the fragility of human life and value enormously the preciousness of it. Recognising the impact that a death of a person has, and continues to have, on the family and loved ones of that person can only serve to strengthen the resolve we share as a community to strive to reduce the risk of preventable deaths in the future.

3.2 Understanding the impact that the death of a person has had on their family only comes from knowing something of that person's life and how the loss of that life has affected those who

¹ *Coroners Act 2009*, section 23(1)(c) (since amended).

loved that person the most. Therefore it is extremely important to recognise and acknowledge Betty's life in a brief, but hopefully meaningful, way.

- 3.3 Betty was born in 1939 in a town near Glasgow, Scotland. She worked as a nurse and was known to have an adventurous spirit. No doubt this spirit was part of the reason which led to Betty moving to Australia when she was just 22 years old. Upon arriving in Brisbane Betty sought to continue work as a nurse. However due to local barriers to entry in continuing with her chosen profession, Betty took up work as a governess on a cattle station in central Queensland. After about three or four years, Betty returned to Brisbane and worked as a dance teacher. She later moved to Sydney with a group of other dance teachers.
- 3.4 Betty initially lived in Riverwood, Wiley Park and Bullaburra. She never married, but had a daughter, Kate Pellegrini. It seems that Betty had a great fondness for the Blue Mountains area. Kate fondly recalls regular trips to Katoomba with her mother in the holidays, and staying with her mother's groups of friends. Such trips were usually accompanied by litres of Betty's famous spaghetti sauce which would be precariously balanced in the backseat of the car on the way to Katoomba.
- 3.5 In 2012 Betty moved to her house in Delmonte Avenue, Medlow Bath. Betty loved her cottage which was perched on the escarpment at Medlow Bath, and at every opportunity proudly told anyone who would listen of the beautiful views it offered into the valley.
- 3.6 Kate describes her mother as having a quick wit and a personality that could light up a room. Betty had much time for others, loved a good conversation, and was generous to a fault. She was a voracious reader and had an impressive library which she was loath to cull. Her sense of adventure imbued her everyday life and she was known to take much joy in simply going for a Sunday drive and exploring a place that she had never been to before.
- 3.7 With her endearing quirky nature, Betty was known to frequently and unintentionally delight everyone with spontaneous thoughts and ideas, which came to be known as Betty-isms. Kate's favourite Betty-ism related to her mother's faithful, but mechanically temperamental, old Datsun 1200, which Betty called "Darling". On one occasion Betty's Datsun failed to start and she and Kate were left without a rider. Betty had a sudden brainwave and exclaimed that she could buy a ride-on mower, which she could ride to work whilst trimming all the nature strips and collecting money in the process. Luckily for Kate, Betty decided to abandon this ingenious business model and instead made the more sensible, but less creative, decision to buy another car.
- 3.8 Kate describes her mother as one in a million, and knows that she will never meet anyone like her mother ever again. It is truly devastating to know that Betty has been so abruptly separated in tragic circumstances from her daughter, her three beautiful granddaughters who she showered with love and biscuits, and her family and friends.

4. Betty's medical history²

- 4.1 Betty had a history of chronic smoking. In June 2012 examinations identified Betty has having features consistent with chronic obstructive pulmonary disease, but it was noted that Betty's heart, lungs and pleural spaces appeared otherwise normal.

² The medical history and factual background has been drawn from the helpful closing submissions of Counsel Assisting.

- 4.2 A month later in July 2012, Betty was found by her daughter to be still in bed at midday, and difficult to rouse. Upon waking, Betty was speaking words in a jumble and unintelligible in meaning. Her right arm was also shaking in a tremor. Betty later returned to her normal self and presented to hospital. On examination she was found to be able to move her limbs, and speak, normally. However it was later noted that Betty had drifted off to sleep and on waking again appeared obtunded and speaking nonsensical words although she remained able to move her limbs and face muscles normally. The attack abated after 10 minutes. Imaging showed no features of acute intracranial haemorrhage or stroke although findings suggestive of previous infarction and/or haemorrhage were noted. A diagnosis of transient ischaemic attack (**TIA**) was formulated and Betty was later discharged, with advice to follow up with her general practitioner.
- 4.3 Shortly after this incident Betty moved to her house in Delmonte Avenue, Medlow Bath. From that time, she began taking regular medication, including: Clopidogrel (a blood thinner used to reduce the risk of heart disease and stroke); Irbesartan (an angiotensin II receptor antagonist used mainly for the treatment of hypertension); and Simvastatin (a lipid-lowering medication used to decrease the risk of heart problems).
- 4.4 On 10 June 2014, Betty presented to the Katoomba Medical Practice with her daughter for a driver's licence medical examination. At that time, it was reported that Betty had experienced short term memory issues for many years and that she had previously gotten lost whilst driving, although she had not done so for many years, and had always managed to find her way home again. A mini mental state examination was administered and identified no significant cognitive impairment.
- 4.5 Betty last saw a medical practitioner on 22 June 2015 for a drivers licence medical review. At that time, it was noted that Betty was not driving as often any more, but still felt confident driving, and wished to keep her licence current. Betty had experienced no recent accidents. It was also noted that her medical conditions were well-controlled, with nil further events since the TIA in 2012, and that her mobility and cognition were assessed as being good. Dr Gardiner, the GP who saw Betty (and who had seen her previously between March and June 2015), noted that whilst Betty was relying on her daughter for some assistance with transport and memory difficulties, she still seemed to have relative independence and awareness of her medical issues.

5. Prior instances of disorientation

- 5.1 Betty enjoyed her walks, and was known to walk long distances. After she stopped driving in 2015 Betty walked more frequently, often to the local shops. Her regular walking routes also included walking from her home along the Great Western Highway to Katoomba, a return trip of about 10 kilometres. She would also walk over the railway crossing at Medlow Bath train station and out to Grand Canyon Road towards the Katoomba Airfield and further to Point Pilcher Lookout, a return trip of about 17 kilometres. Betty was also known to walk onto other tracks that led away from Grand Canyon Road.
- 5.2 On some occasions whilst out walking Betty came across members of the public who found her to be in an apparently disoriented state. One occasion in February 2015 Betty was found collapsed on a walking track in the Point Pilcher area. Emergency first aid, and Betty was found to be conscious but initially unable to string sentences together. Betty was provided with some water, nourishments and a rain coat. After a while she became more coherent and was able to

give her name to the people who found her. When they asked her what she was doing, Betty told them she was on her way to the shops. Once she appeared well enough to walk, she was driven back to her home in Medlow Bath.

- 5.3 About a month or two before Betty went missing she was found disoriented but not distressed in Cascade Street, Katoomba. Betty was unable to provide her address or the direction where her home was located. Betty was given some water and subsequently became more coherent, telling the person who had found her that she had gotten lost again. Betty was subsequently driven home, and a note was left for Betty's daughter advising that Betty had been picked up when she was lost.

6. What happened on Monday, 7 March 2016?

- 6.1 At about 11:30 am, Kate called her mother from work to check up on her as was her usual practice. Betty sounded normal and Kate asked her what she was going to do that day. Betty said that she might go for a walk, which was something she said every day. Kate suggested she not go too far and finished the conversation by saying, *"I'll see you this afternoon"*.
- 6.2 When Kate finished work at 4:30 pm that day, she tried to call her mother, calling both her home phone and her mobile phone. There was no answer. Kate made a number of further attempts to contact her mother as she drove from work towards home. Still, there was no answer.
- 6.3 At about 7:30 pm, Kate arrived at her mother's home in Medlow Bath. It was in darkness. She checked the surrounding areas such as the train station and drove to Point Pilcher, the back of Medlow Bath and surrounding streets. She drove back to the Medlow Bath train station a few times and spoke to her husband Michael, a police officer at Lithgow who suggested she come home.
- 6.4 Michael walked the track from Betty's home in Medlow Bath to Katoomba but he too was unable to locate her. He suggested they report her missing to the police.
- 6.5 Shortly after 11:00 pm on 7 March 2016, Kate met a friend at the Katoomba Police Station and reported her mother missing. At that time the last known contact with Betty was the telephone call with her daughter some 12 hours prior.
- 6.6 After she reported her mother missing to police, Kate and her friend drove around for a few hours looking in different areas searching for her including along all the tracks her friend's car was able to access, including Point Pilcher. She also returned to her mother's home in case she had returned home.

7. Tuesday, 8 March 2016: The initial police response

- 7.1 Upon receipt of the missing person report, Katoomba Police immediately began conducting relevant checks including making enquiries of Katoomba Hospital. A police event was created and a photo of Betty was obtained. The report was broadcast and a canvas was made of City Rail CCTV by City Rail security, which showed nil result.

- 7.2 Between 3:00 am and 5:30 am on Tuesday, 8 March 2017, General Duties police searched the Katoomba CBD and nearby walking tracks along the Great Western Highway between Katoomba and Medlow Bath.
- 7.3 At 7:00am Sergeant Dallas Atkinson of Blue Mountains Police Rescue became aware of Betty having been reported missing. Sergeant Atkinson had been a member of the Blue Mountains Police Rescue Squad for nine years and a qualified Land Search and Rescue Coordinator since 2009. He had been involved in and coordinated hundreds of search and rescue operations, including many involving elderly persons, particularly those suffering from dementia. Sergeant Atkinson was briefed with known information relating to Betty and when she was last seen, but was not told of the incident from February 2015 when Betty was found on the Pilcher Trail. Sergeant Atkinson immediately formed the view that a land search operation should commence.
- 7.4 As part of the initial land search operation, the Blue Mountains Rural Fire Service (**RFS**) and State Emergency Service (**SES**) were contacted to request volunteers to assist with the search. A Field Search Headquarters was established at the Medlow Bath Rural Fire Brigade. Police also attended Betty's home and confirmed that she was not there.
- 7.5 An inquiry was made of the United Service Station at Medlow Bath about possible CCTV footage, however police were advised that there were no security cameras that covered the Great Western Highway service station frontage. That information would prove inaccurate.
- 7.6 Sergeant Atkinson discussed proposed search areas around the Medlow Bath township and Great Western Highway corridor between Medlow Bath and Katoomba and suggested teams be tasked to canvass properties in the streets nearby Betty's home. As a result, search teams were deployed for canvassing in Bellevue Crescent and Delmonte Avenue, Medlow Bath and all roads north of the Great Western Highway, Medlow Bath.
- 7.7 At about 9:49 am, assistance was sought from the NSW Police Aviation Support Branch (POLAIR). These resources were subsequently tasked to search the bike track which runs along the Great Western Highway from the Explorers tree to Bellevue Crescent, then north along the Grand Canyon Road to the end to Pilchers Lookout. From about 1:40 pm until 2:25 pm, POLAIR conducted air searches of those areas without success.
- 7.8 Sergeant Atkinson also created a post on the Blue Mountains Police Rescue Facebook page that included a photograph of Betty and a brief overview of her disappearance.
- 7.9 Over the course of 8 March 2016 the following information was received from members of the public:
- (a) James Pocknal reported that he knew Betty and had seen her smoking outside her house at about 11:45 am. At the time she was wearing a blue/grey top and lighter coloured slacks.
 - (b) Peter Richardson reported that he had seen Betty walking along Railway Parade, Medlow Bath at the top of Sommerset Road heading in the direction of Katoomba at about 2:00 pm. She was seen wearing a cream top and carrying a brown handbag.
 - (c) Natalie Shiels reported that she had seen Betty on the southern side of the Great Western Highway near the Mazda dealership and the Hydro Majestic at about 3:30 pm wearing a

beige jacket and with a brown handbag. In a subsequent statement Ms Shiels estimated that she saw Betty at about 2:45 pm, and recognised (but did not know her name) from having seen her numerous times before walking along the side of the road between Medlow Bath and Katoomba. On 7 March 2016 Ms Shiels noted that Betty was not walking at the time but was facing towards Katoomba.

8. Tuesday, 8 March 2016: Telephone contact with Betty

First call at 5:18pm

- 8.1 At about 5:18 pm, Kate called her mother again on her mobile phone and this time Betty answered it. Kate asked her mother where she was and she said, "*I'm lost.*" Kate told her mother that everyone was looking for her and Betty said, "*I know, I can see the helicopter but it can't see me.*" Betty asked whether she should try to find water, although a previous neighbour of hers, who was with Kate at the time and listening in to the conversation, thought Betty asked whether she should try to find a road.
- 8.2 Kate suggested to her mother not to move around as it would make it more difficult for her to be found. Betty's former neighbour asked Betty if she was okay, and Betty told her that she was. The phone call was immediately reported to police and Sergeant Atkinson was advised of it.

Second call at 5:55pm

- 8.3 At about 5:55 pm, Sergeant Atkinson contacted called Betty, who answered it. Sergeant Atkinson introduced himself, and Betty explained that her phone battery was very low. Sergeant Atkinson was mindful to keep the conversation brief so as not to use up too much of the phone's battery. Betty informed him that she:
- (a) was in the bush but did not know where she was;
 - (b) was uninjured other than having scratches, but was feeling cold;
 - (c) could not hear trains or traffic; and
 - (d) did not know whether she was near water.
- 8.4 As a result of the conversation Sergeant Atkinson formed the opinion that Betty was alert, her responses were relevant and timely and she was aware of her need for assistance. She did not sound confused and it was apparent she was thinking of ways to help her situation. Sergeant Atkinson was also mindful of the fact that Betty had already been exposed to the elements for over 24 hours, and that a second night in the bush could have serious consequences for her health and safety.

Third call at 5:58pm

- 8.5 Therefore, Sergeant Atkinson considered how to obtain a location fix on Betty's phone. He called Betty again at 5:58pm to ask about the make of her phone in order to determine if it could be

located using GPS technology. After being told that the phone was an old Nokia handset³, Sergeant Atkinson formed the view that it would not be equipped with built-in GPS functionality.

- 8.6 As a result, Sergeant Atkinson made enquiries regarding the use of a system known as Osprey. This is an interface used by NSW Police to gain triangulation information for phones on the Optus network. The operation and functionality of the Osprey system will be discussed in greater detail below.
- 8.7 Shortly after this third phone call, an Osprey search was performed. It provided a location (S 33° 42' 40.982" E 150° 17' 58.801") which suggested that Betty's phone was serving off a mobile phone tower located at Valley Road, Katoomba adjacent to the Katoomba Fire Control Centre. This tower was right by the location of the Field Search Headquarters. It also indicated the phone was approximately 200 metres south of that location, in the vicinity of Narrowneck Road. Although it was not known at the time, this information was most likely inaccurate.

Fourth call at 6:42pm

- 8.8 Relying on the information obtained from Osprey, Sergeant Atkinson tasked another police officer to drive to the intersection of Narrowneck and Farnells Roads. When that officer was in location, Sergeant Atkinson called Betty at 6:42pm. Once Betty answered the call Sergeant Atkinson instructed the officer to drive north along Narrowneck/Valley Road with the sirens of the police vehicle on. While on the phone to Betty, Sergeant Atkinson was unable to hear any sirens through the phone. He told Betty to immediately call him back if she heard the siren.

Fifth call at 7:00pm

- 8.9 At about 7:00 pm, Sergeant Atkinson was advised that a NSW Ambulance helicopter (Rescue 24) was en route to the Katoomba area so called Betty again. He told her that a helicopter would be overhead shortly and asked her to call him back if she could see or hear the helicopter. Sergeant Atkinson also suggested to Betty to wave her phone towards the helicopter if she saw it. This is because the helicopter crew were equipped with night vision goggles, which could assist them to see the light of a mobile phone screen.
- 8.10 Sergeant Atkinson provided the crew of rescue 24 with the information received from Osprey regarding the location of Betty's handset. He requested that the crew commence their search at that location and expand the search out in an expanding box fashion. After Rescue 24 arrived in the Katoomba area, Sergeant Atkinson attempted to contact Betty a number of times, but on each occasion the call went straight to voicemail.

Sixth call at 7:29pm

- 8.11 At 7:29 pm, Sergeant Atkinson received a call from Betty's phone. When he answered the call, he did not hear Betty's voice and only heard rustling sounds consistent with when someone accidentally makes a call while their phone is in their pocket – a bump dial. Sergeant Atkinson was unsure whether the call was accidental or not and so he listened for about 30 seconds, in case Betty was waving the phone around to attract the attention of the helicopter. Sergeant

³ It was subsequently established that Betty's mobile phone was an older handset that was subscribed to the Optus network and only had 2G network access functionality. The Optus 2G network was launched in 1993 and subsequently turned off in August 2017. By 2016 the most common mobile phone technologies in use were the 3G and 4G networks.

Atkinson did not hear the sound of the helicopter or any other background noise through the phone and so he terminated the call. He called Betty immediately back to ascertain the reason for the call, and called two more times over the subsequent 20 minutes. On each occasion, Sergeant Atkinson's calls went to voicemail.

Seventh call at 7:50pm

- 8.12 At 7:50 pm, Sergeant Atkinson received another call from Betty's phone, again consistent with a bump dial. Sergeant Atkinson listened for about 50 seconds, again in an attempt to hear the helicopter or other background noise but did not hear anything that might assist in determining Betty's location.
- 8.13 At about 7:51 pm, Sergeant Atkinson received a blank text message sent from Betty's phone. He sent a text message back asking, "*Have you heard the helicopter?*" but did not receive any reply
- 8.14 At about 8:20 pm, Rescue 24 advised they had completed their search and returned to Bankstown.
- 8.15 At about 10:43 pm, Sergeant Atkinson attempted to call Betty's phone to determine if it was still active. The phone rang twice before he terminated the call, which indicated to him the handset was still active and in range of a cell tower.
- 8.16 At 11:12 pm, Sergeant Atkinson sent a text message to Betty stating, "*Elizabeth. We are still looking for you. Don't turn your phone off*". He never received a reply to that text message.
- 8.17 At 12:54 am on 9 March 2016, Sergeant Atkinson called Betty's phone but the call went straight to voicemail.

9. Further search efforts to locate Betty

Wednesday, 9 March 2016

- 9.1 On 9 March 2016, over 70 persons were deployed in the field to search and canvas areas predominantly on the western side of the Katoomba township. These areas were identified primarily on the basis of the triangulation information obtained using the Osprey system the previous evening. Four helicopters were used to assist the search. Further, between 8:00 pm and 10:00 pm that night a POLAIR fixed-wing aircraft fitted with Forward Looking Infra-Red (**FLIR**) also searched the area.

Thursday, 10 March 2016

- 9.2 On 10 March 2016, 97 personnel from NSW Police and volunteer agencies were deployed in the field. The search and canvas areas were tasked predominantly between Katoomba and Medlow Bath, including the Explorers Road area, the Nellies Glen area and bushland immediately to the west of the Great Western Highway. These search areas represented an expansion of the area already searched with more weight being placed on Betty's known usual walking route between Medlow Bath and Katoomba, and less weight on the reliability of the triangulation obtained from Optus via the Osprey system.

- 9.3 The search areas included the Cascade Dams catchment area on the eastern side of the railway/highway corridor. Two NSW Police trail-bike riders were tasked to search all tracks and trails to the south east of Medlow Bath, including the Cascade Dams catchment area and the Radiata Plateau area. Two helicopters were also deployed to assist the search.
- 9.4 Enquiries were also made with members of the public who had reported possibly seeing Betty on 7 March 2016. However these reports were found to be inaccurate with the person sighted most likely not Betty.
- 9.5 That evening, information was received in relation to a report from a resident in Nelson Road, Katoomba of possible voice contact on the night of Tuesday, 8 March 2016. A coordinated line search was subsequently conducted by police officers, with the use of a handheld FLIR, in a southerly direction from the rear of the properties at the western end of Farnells Road towards Nelson Road. It was noted that the bushland in this area was steep and extremely thick, and sometimes impenetrable for a fit and agile adult. The search failed to locate anything of interest.

Friday, 11 March 2016

- 9.6 The search effort on 11 March 2016 involved 81 searchers deployed to search bushland around Farnells, Nelson and Stuarts Road Katoomba and the area to the west of Mort Street, Katoomba. These areas were of particular interest due to the information received the previous evening.
- 9.7 In addition, searches were undertaken in bushland further into the Radiata Plateau west of Pulpit Hill Road and bushland around the Upper Cascade Dam. This included four police and RFS trail bikes searching the trails in the Cascade Dams catchment area and off Grand Canyon Road to the east of Medlow Bath.
- 9.8 A police helicopter was also requested but was unable to complete any searching due to deteriorating weather conditions. In fact, all search efforts on 11 March 2016 were cut short by a severe thunderstorm approaching the area.

Doubts about the accuracy of the information from Osprey

- 9.9 By this time, it appears that Sergeant Atkinson had concerns about the accuracy of the triangulation information obtained via Osprey.
- 9.10 On the morning of 11 March 2016, Sergeant Atkinson conducted some tests with the assistance of an officer from the NSW Police radio operations group. Osprey was used to track Sergeant Atkinson's phone (which also used the Optus network) as he drove around the Katoomba and Medlow Bath area. For the most part, the Osprey results accurately reflected Sergeant Atkinson's location. However, Osprey did not update his location in the Pulpit Hill Road area, the Great Western Highway between Explorers Tree and the southern side of Medlow Bath and the south western corner of Katoomba township.
- 9.11 Later that day, call charge records for Betty's phone over 8 and 9 March 2016 were obtained. The records suggested that Betty's handset was approximately 330° (generally north-west) from the cell tower on Valley Road at the time of the calls on the evening of 8 March 2016. This information contradicted the previous information obtained from Osprey, and also cast doubt on the reliability of the reported voice contact reported from Nelson Road on 8 March 2016.

9.12 At about 6:40 pm on 11 March 2016, a report was received of a possible voice heard in bushland in the Peckmans Plateau area, to the south of Nelson Road, Katoomba. Police officers were deployed to the area and reported that they believed they heard a female voice but were unable to determine exactly from where the voice was coming. A POLAIR helicopter conducted a search using FLIR but the source of the voice was not identified and nothing of interest was located.

Saturday, 12 March 2016

9.13 The search effort continued on 12 March 2016 with a total of 90 volunteers deployed to the field, predominantly in the areas around Peckmans Plateau, Nellies Glen and the Six Foot Track, largely in response to the possible voice contacts in that area on the previous evening.

9.14 In addition, a RFS bike and two Police trail bikes were again tasked to search all tracks running off Grand Canyon Road and Medlow Bath. A POLAIR helicopter completed a search of the Peckmans Plateau area and the escarpment north from Cahills Lookout to Medlow Bath, including the cliff-lines bounding the Radiata Plateau. The helicopter also searched Katoomba township to the south of the Field Search Headquarters focusing on all bushland areas scattered throughout the town and urban interface areas.

9.15 At about 8:40 am, Sergeant Atkinson telephoned the Optus Operations Centre and spoke with an Optus employee, Mohammed Sahim. Sergeant Atkinson explained the current situation in relation to the search and the information Optus had provided. Relevantly, Mr Sahim told Sergeant Atkinson that the original directional information provided by Optus would be about 90% accurate. Sergeant Atkinson requested an Optus technician to attend Katoomba to assist and, on his account, was advised that it would not be possible for this to occur on a weekend (although Mr Sahim could not recall this aspect of the conversation).

9.16 Sometime during the day, Sergeant Atkinson received information from Kate that she had viewed CCTV footage at the United Service Station, Medlow Bath, which depicted her mother walking along the Great Western Highway and then Railway Parade on the afternoon of 7 March 2016. The footage showed Betty walking along the Great Western Highway (towards the train station) outside the service station at about 1:40 pm and then walking south on Railway Parade (towards Katoomba) at about 1:55 pm.

9.17 This is significant because it placed Betty on the other side of the railway line from her house in the vicinity of one of her known walking routes and corroborated the reported sighting by Mr Richardson on 7 March 2016. Furthermore, it placed Betty in a position that was outside the sector provided in the information from Optus.

9.18 At about 10:40 am Kevin Micallef, a network engineer in the Optus Tier One team, called Sergeant Atkinson. Mr Micallef said that the information in the call charge records concerning the direction of 330° was inaccurate and that the correct information was essentially that which was first provided via Osprey on 8 March 2016 – that is, a direction of 190°, with an error of 60° either side.

Sunday, 13 March 2016

- 9.19 On 13 March 2016, the search effort continued with a total of 73 searchers deployed to the field, including bushland in the south-western corner of Katoomba, Nellies Glen and the southern side of the Radiata Plateau. In addition, further canvassing was performed in Medlow Bath and a POLAIR helicopter was tasked to search the Medlow Bath area, in particular Grand Canyon Road.
- 9.20 During the course of the day, Sergeant Atkinson made contact with Dr Paul Luckin, an anaesthetist based in Queensland with a particular interest in survivability. Sergeant Atkinson provided Dr Luckin with information regarding Betty, her health and medications, the clothing she was believed to be wearing, the weather in Katoomba over the previous six days, the topography and vegetation in the search area and the conversations with her on 8 March 2016. On the basis of this information, Dr Luckin expressed the view that it was almost certain that Betty would by that time be deceased and most likely passed away on either 9 or 10 March 2016, and that there was only a 5% chance she was still alive.

Monday, 14 March 2016 to Friday, 18 March 2016

- 9.21 Over the course of 14 to 18 March 2016, search efforts continued in a number of areas including Nellies Glen, Grand Canyon Road, the western side of South Katoomba, Cascade Dams, Katoomba township, Explorers Road, Peckmans plateau, and Katoomba Airfield.
- 9.22 In addition to those searches a number of further requests were made, seeking further information from Optus. On the afternoon of 18 March 2016 Sergeant Atkinson was provided with a map purported to reflect the coverage area of the cell tower sector which Betty's phone had pinged on 8 March 2016. The map depicted a shaded area generally to the north west of the cell tower situated at Valley Road, Katoomba. This area contradicted information that had previously been supplied by Optus.

Saturday, 19 March 2016 and following

- 9.23 Search efforts continued on 19 March 2016, predominantly in the Grand Canyon Road area.
- 9.24 At 10:15 am that day, Sergeant Atkinson and Inspector Tabor contacted the Optus Management Centre and spoke with Russell Gibson. Sergeant Atkinson referred to the map supplied the previous day, which appeared to contradict information previously supplied by Optus. On this basis, Sergeant Atkinson requested that an Optus technician be provided to assist police with the interpretation of the information that had been provided by Optus. This resulted in Andrew Molkentin being dispatched to Katoomba from Wollongong to assist.
- 9.25 Mr Molkentin arrived at the Field Search Headquarters at about 2:30 pm, where he was briefed by Sergeant Atkinson in the presence of Detective Scott-Majhet. Over the course of the afternoon, Mr Molkentin conducted some further investigations and confirmed to Sergeant Atkinson that the sector map provided the previous day was definitely the relevant sector in relation to Betty's phone activity on the evening of 8 March 2016. As a result of this information, together with the CCTV footage and information from Mr Richardson, Sergeant Atkinson was confident that Betty was likely to be in the area generally between Katoomba and Medlow Bath, with the area of most interest being the Grand Canyon area, the Cascade Dams catchment area and surrounds.

- 9.26 While searches continued over the following days, Mr Molkentin and Detective Scott-Majhet conducted field testing in several locations around the Katoomba and Medlow Bath areas to assist in confirming the areas serviced by the Katoomba cell tower. The results of that testing were plotted onto the map received from Optus on 18 March 2016, and suggested that there may have been a fault with the JSpectrum software.
- 9.27 Between 20 and 31 March 2016, further searching was conducted in the areas around Grand Canyon Road, the Cascade Dams catchment area, and Katoomba Creek. Possible investigative leads were identified in North Katoomba, south of Katoomba airfield, north of Lower Cascade Dam, and the area surrounding the Great Western Highway between Medlow Bath and Blackheath. All of these areas were searched with nothing of investigative value located. Further search activities were also conducted on 10 May 2016 in a number of areas between Katoomba airfield and Katoomba Creek.
- 9.28 Despite the extensive searches undertaken Betty has not been found.

10. Is Betty now deceased?

- 10.1 In any inquest involving the suspected death of a missing person the first question which a Coroner must answer is whether the missing person is now deceased. A finding that a person is deceased is a finding of great significance and seriousness, not only for the family members of that person and the emotional impact that such a finding may have on them, but also because such a finding carries with it important legal and administrative consequences. Such a finding is made on the balance of probabilities, but there must be clear, cogent and exact evidence that a person has died before it can be made.⁴
- 10.2 On 13 March 2016 Dr Luckin noted that Betty had been missing for six days and expressed the opinion “*that there was a very small chance that she might still be alive, possibly 5%*”.⁵ Dr Luckin formed this opinion based on the unlikelihood that Betty would have found a source of drinkable water (with resulting dehydration and eventual death), the absence of food in a person with limited reserves, low overnight temperatures and unfavourable weather conditions with little protection from the elements.
- 10.3 On 16 March 2016 Dr Luckin further expressed the opinion that he did not believe that it was possible for Betty “*to be out in the open and still be alive*”.⁶
- 10.4 Dr Luckin subsequently prepared a report dated 12 July 2016. In it he noted that Betty’s age and medical history placed her at significant risk of a catastrophic medical event that would either cause death, or limit her mobility and her ability to assist searchers to find her. Alternatively, Dr Luckin opined that if Betty did not suffer a sudden and fatal event her ability to survive would be limited by:
- (a) dehydration (with survival beyond three days without water very unlikely);
 - (b) hypothermia (noting that a wet, slim, lightly clothed elderly female would cool rapidly, accelerating deterioration in her condition;

⁴ *Briginshaw v Briginshaw* (1938) 60 CLR 336.

⁵ Exhibit 1, page 342.

⁶ Exhibit 1, page 343.

(c) exhaustion (promoted by her age, absence of food, and the dense terrain); and

(d) her pre-existing medical conditions.

10.5 On this basis Dr Luckin opined that it is most probable that Betty died on 9 March 2016 with the probable cause of death being dehydration, hypothermia and exhaustion, leading to collapse and death.⁷

10.6 **Conclusion:** Having regard to the extensive nature of the police search conducted (with the assistance of a number of external agencies and volunteers) between 8 and 26 March 2016 and beyond, together with the opinion expressed by Dr Luckin, the conclusion that must be reached is that Betty is now deceased.

10.7 As Betty has not been found it has not been possible to perform any postmortem examination to determine a precise cause of death. Betty's age and pre-existing co-morbidities placed her at risk of sudden and unexpected death from natural disease process. Whilst the possibility of an acute medical event sometime on or after 8 March 2016 cannot be entirely excluded, the expert evidence establishes that it is more probable than not that the Betty died as a result of dehydration, hypothermia and exhaustion.

11. Issues for consideration at the inquest

11.1 Prior to the commencement of the inquest a list of issues was circulated amongst the sufficiently interested parties, identifying the scope of the inquest and the matters to be considered. That list identified the following issues relevant to the search effort:

(a) Were the actions of police in attempting to locate Betty reasonable and appropriate in the circumstances?

(b) To what extent, if any, were police efforts to locate Betty adversely affected by the quality of information received from Optus concerning the possible location of Betty's mobile phone and the manner in which that information was received and/or clarified? In particular:

(i) Was the information obtained using the Osprey system incorrect?

(ii) If so, why was the information originally obtained using the Osprey system incorrect?

(iii) Were the actions of Optus in attempting to identify the problems with the information timely and appropriate in the circumstances?

11.2 Each of these issues is discussed in further detail below.

12. Was the police search reasonable and appropriate in the circumstances?

12.1 This issue can be dealt with briefly. The evidence establishes that that the police search effort between 8 and 26 March 2016 was thorough and exhaustive. Police officers, rescue

⁷ Exhibit 1, page 398.

professionals from external agencies, and a number of external agencies were all deployed in a coordinated search effort. Over 20 square kilometres was searched by ground teams and approximately 50 square kilometres was searched from the air. As an example of the level of resources utilised as part of the search, it is noted that on 9 March 2016 four helicopters were deployed simultaneously as part of the search effort. In Sergeant Atkinson's experience, this was the first and only time that such a request was made for a land-based search.⁸ Further the entire Medlow Bath township, a significant portion of Katoomba, and a small section of Blackheath were the subject of canvass activities throughout the search, with many residences canvassed more than once.

12.2 It was entirely reasonable for Sergeant Atkinson to initially rely on the Osprey search results (which are discussed in more detail below) and direct search resources in accordance with those results. Further, it was equally appropriate for Sergeant Atkinson, once concerns about the accuracy of the Osprey search results arose, to remain open to the possibility that Betty was not in the area indicated by those results and to shift the focus of the search to other areas. In this regard, Sergeant Atkinson appropriately assessed and considered information available to him regarding Betty's usual walking routes and behaviour, and directed the search efforts accordingly. Finally, it should be noted that since 26 March 2016 Sergeant Atkinson has continued to conduct search training exercise in areas where he believes Betty may be. Sergeant Atkinson is to be commended for the skill and dedication he has brought in conducting a methodical and comprehensive search effort in an attempt to locate Betty.

12.3 **Conclusion:** The police search effort conducted between 8 and 26 March 2016, and beyond, was entirely reasonable and appropriate in the circumstances.

13. Was the information obtained using the Osprey system incorrect?

13.1 In order to consider this issue, it is first necessary to explain aspects of the Osprey system and the functionality underpinning it. Osprey is the name given to a software platform, or interface, which can be used to search for a mobile phone. Such a search uses data provided by a Location Based Service (LBS). The Optus LBS can be accessed in two ways. Firstly a search for the location of a mobile phone can be run directly within the LBS itself. Secondly a search can be run through an interface such as Osprey. It is used by emergency services and law enforcement agencies, and is supported by a team within Optus known as the Tier One team.

Location Based Service

13.2 A LBS uses different information provided by a mobile phone network and applies a formula to calculate a mobile phone's location. Information used by the LBS includes:

- (a) Cell ID: the identification number for a particular cell on the Optus network;
- (b) Power level: the amount of power the mobile phone has at a point in time;
- (c) Timing advance: the length of time that the signal from the mobile phone takes to reach the mobile phone tower. This information is given as a digit between 0 and 32 with each digit representing approximately 550 m from the cell tower.

⁸ 21/2/19 at T76.27.

(d) Extra octets (a unit of digital information containing eight bits): where available, they provide additional information from neighbouring cell towers which enables the LBS to triangulate the location of the mobile phone and give a more accurate location result.⁹

13.3 If a mobile phone is on the Optus network (that is if the phone is switched on) the LBS should be able to locate that mobile phone and provide the relevant longitude and latitude to within about 550 metres.¹⁰

13.4 To run a search using Osprey a user enters a mobile phone number into the platform. Osprey searches for the location of that mobile number taking coordinates given by the LBS. Osprey converts the information from the LBS into a graphical format and displays it on a map. The following limitations with Osprey should be noted:

(a) An Osprey search identifies whether, at the time of an enquiry, a mobile phone is, or is not, on the network. All phones which are switched on are “on” the network. If a phone is not on the network Osprey will produce a note to indicate this and for the user to contact Optus to check for the last activity of the mobile phone.

(b) Osprey only shows an approximation of where a mobile phone may be, or may have been. Relevantly the Osprey results screen includes a warning message that states, “*All locations shown in Osprey are approximations*”.¹¹

(c) The map generated by Osprey shows an image of a handset with two concentric circles around it. The map legend describes these circles as a margin of error of different radius (500 metres and 1000 metres). However the circles can properly be described as providing a sense of scale rather than indicating a margin of error. The actual margin of error can be greater than what is indicated by the two circles, depending on circumstances such as poor signal strength.

(d) The approximate location of a mobile phone given by Osprey is affected by the following factors:

(i) The more mobile phone towers that a phone can “see”, the more likely there will be an accurate location provided by Osprey. This is because data and parameters from multiple towers can be used to locate a phone more precisely. In the Blue Mountains area there are relatively few mobile phone towers (at least compared to higher density, urban centres), and most of the towers are located in a line along a single main highway. If a mobile phone is only able to “see” one tower, and there is therefore insufficient data to obtain a good approximation of the location of the phone, it may be the case that the best approximation that can be given is that the phone is “near the tower”.¹²

(ii) Topography can result in signal interference between the mobile phone and the serving mobile phone tower giving inaccurate details of the cell ID or timing advance. The particular topography of the Blue Mountains area is very undulating which makes it harder for the LBS to work.

⁹ Exhibit 1, Tab 36 at [16].

¹⁰ Exhibit 1, Tab 36 at [19].

¹¹ Exhibit 1, Tab 32 at [22].

¹² Exhibit 1, Tab 35 at [36].

(iii) Poor signal strength can result in a mobile phone being shown as jumping from location to location, even though there is no actual movement of the phone itself.

(iv) If a mobile phone was only able to pick up a 2G signal it had a lower chance of picking up a signal in the low coverage area like the Blue Mountains.

13.5 Having regard to the above it was noted by Russell Gibson, a senior network engineer working in the Tier One of the Optus Network Management Centre, that in his experience location results provided by Osprey have in some instances been very close to the actual location of a subscriber's phone; in other instances, location results have been kilometres away from the actual location.

13.6 If a mobile phone is in an area that does not have three cell towers then the LBS is unable to obtain sufficient information from neighbouring cells to triangulate the phone's location. When this occurs the LBS gives a default result which is the location of the serving cell. In March 2016 it was known that the LBS could provide a default result being the location of the serving cell.¹³ However, this was not widely known to relevant Optus employees. In particular Mr Gibson¹⁴, Mr Micallef¹⁵, and Mr Sahim¹⁶ all indicated that they were not aware of this fact.

13.7 As at March 2016 there was no functionality within the LBS that notified a user interrogating the LBS that a default result was simply the location of the serving cell. The only way to distinguish a default result from a more accurate result (where a triangulation has been able to be performed) is to see whether the latitude and longitude of the location result matches the latitude and longitude of the serving cell.¹⁷ This means that if the latitude and longitude of the location result is not the location of the serving cell it is not possible to determine whether or not the result is a default result.¹⁸

13.8 Consequently, without knowing that the location result given by Osprey is in fact a default result, it would be reasonable to conclude that the location result was a positive location for the mobile phone.¹⁹ In evidence Mr Shane Haynes, an Optus senior network engineer, was asked whether Tier One personnel dealing with queries from law enforcement agencies could convey a default result as being a positive result for the location of a handset. Mr Haynes indicated: "*As far as the Osprey is concerned, it is a positive result. It is a location. Whether it is a good location, a bad location, the [Tier One] guys - I don't think they would determine either way. A result for them is a result*".²⁰

Osprey result for Betty's mobile phone

13.9 The Osprey search conducted on 8 March 2016 indicated that Betty's mobile phone was located 200 metres from the serving cell tower at 190°, or in a southerly direction (**the Osprey search result**). The serving cell tower was located at Valley Road, Katoomba (**the Katoomba cell tower**), right next to the location of the headquarters where the search for Betty was being

¹³ 14/8/19 at T39.42.

¹⁴ 22/2/19 at T169.29.

¹⁵ 22/2/19 at T200.15.

¹⁶ 14/8/19 at T19.6-15.

¹⁷ 14/8/19 at T38.47.

¹⁸ 14/8/19 at T39.10.

¹⁹ 14/8/19 at T39.14.

²⁰ 14/8/19 at T39.9.

coordinated. Sergeant Atkinson had no reason to doubt the accuracy of the Osprey search result. In evidence he explained that by March 2016 he had a fair amount of experience with Osprey and “*generally found it to be very reliable*”.²¹ In turn, Sergeant Atkinson’s reliance on the Osprey search result (which was entirely reasonable) had a significant impact upon his decision-making regarding the search for Betty.²² He explained that he felt confident that deploying search resources to the location of the Osprey search result would result in Betty being found quickly.

13.10 However, by 11 March 2016 (three days after the Osprey search results had been obtained) Sergeant Atkinson had several reasons to query the reliability of the Osprey search result:

- (a) Firstly, concentration of search resources in the location of the Osprey search result had obviously been unsuccessful;
- (b) Secondly, whilst the reported voice contact with Betty in the vicinity of Nelson Road, Katoomba on 8 March 2016 was consistent with the Osprey search result, searching of that area on 10 March 2016 had been unsuccessful;
- (c) Thirdly, tests performed on 11 March 2016 using Osprey to locate Sergeant Atkinson’s own mobile phone at different locations produced inconsistent results.

13.11 The above led to a request being made to Optus on 11 March 2016 for the call charge records for Betty’s phone on 8 and 9 March 2016. The records subsequently provided indicated that Betty’s mobile phone was last switched on and active on the Optus network at 7:55pm on 8 March 2016. This was about five minutes after Sergeant Atkinson received the second bump dial from Betty’s phone, and about four minutes after he received a blank text message from her phone. The records indicated that at the time of last known activity, Betty’s mobile phone was approximately 330° from the Katoomba cell tower or, in other words, in a generally north-west direction from it (**the call charge records result**). This direction was almost completely opposite to the direction given in the Osprey search result. Subsequent tests performed on 19 March 2016 revealed that the call charge records result was more accurate than the Osprey search result. The reasons for this are discussed further below.

13.12 **Conclusions:** The information obtained using the Osprey system as to the location of Betty’s mobile phone was plainly inaccurate. It should be noted that a description of inaccuracy in this context is not based upon the fact that Betty’s mobile phone was not found at the location indicated by the Osprey search result; it is clear that her mobile phone has never been found. Rather, the description of inaccuracy is based on (a) the Osprey search reverting to a default result in the absence of insufficient data; (b) that default resulting indicating a directional location almost completely opposite to the call charge record result; and (c) the evidence establishing that the call charge record result is most likely to be a more accurate result of the location of Betty’s phone at the time of its last network activity.

²¹ 21/2/19 at T69.27.

²² 21/2/19 at T69.21.

13.13 The inherent limitations of Osprey and the LBS functionality underpinning it, together with the geographic considerations particular to the Blue Mountains area that were relevant to search functionality, have already been acknowledged above. In this context it is also acknowledged that with the data available to it, the LBS could do little more than produce a result which defaulted to the location of the cell tower which last served Betty's phone. However, the absence of any functionality within LBS which indicated to a user the likelihood of such a default result, created a situation where a user could reasonably consider that a default result was in fact a positive result. Such an outcome could also appropriately be characterised as an inaccurate result.

14. Why was the information obtained using the Osprey system incorrect?

14.1 This issue has already been addressed above in the context of considering the previous issue.

15. Were the actions of Optus in attempting to identify the problems with the information timely and appropriate in the circumstances?

15.1 The first occasion that Optus had to identify the problems associated with the Osprey search result was on 12 March 2016 when Sergeant Atkinson spoke to Mr Sahim. By that time, Sergeant Atkinson had been provided with both the Osprey search result at the call charge records result. In order to assess whether the actions of Optus (or, more precisely, the actions of a number of Optus employees at the time) were timely and appropriate it is first necessary to consider the circumstances surrounding the call charge records result.

Call charge records for Betty's mobile phone

15.2 Mr Gibson dealt with the request from police for the call charge records for Betty's phone. He used a system called Webtrace to provide the information sought by police. Upon search criteria being entered in Webtrace, it is able to produce call records for a mobile phone over a period of time dependent on search parameters. Relevantly, Webtrace does not use information in the LBS.

15.3 As noted already above, the call charge records result indicated that Betty's mobile phone was in almost the complete opposite direction from the location indicated by the Osprey search result. Sergeant Atkinson was asked how receipt of the call charge records result impacted upon his decision-making regarding the search. He said: *"In terms of the decisions I made about the conduct of the search, it didn't have a huge impact because we were already progressing our search into that area to the northwest anyway. What it did, though, was again incite me to seek further answers as to what information was correct, essentially. Like, what information we should be relying on - in terms of the Optus information, what information we should be relying on and I guess, how we come to that conclusion. It motivated me not so much to change the way we were doing the search; I was comfortable that the search was progressing irrespective of that anyway but it certainly gave me - it posed a lot more questions that I wanted answered"*.²³

²³ 12/2/19 at T84.13.

Information provided on 12 March 2016

- 15.4 The questions which Sergeant Atkinson sought answers to eventually led him to speak with Mr Sahim on the morning of 12 March 2016. The purpose of this call was to request that an Optus technician attend the search site in order to provide technical assistance. Sergeant Atkinson was aware that a similar request had been made in a previous large-scale search of a similar nature.
- 15.5 In evidence Sergeant Atkinson was unable to recall precisely what was said during his conversation with Mr Sahim. However he said that he was certain that he explained that police had received two separate pieces of information: the Osprey search result and the call charge records result. According to Sergeant Atkinson Mr Sahim told him that the directional information that had been provided would be “*about 90% accurate*”.²⁴ However, in evidence Sergeant Atkinson could not recall whether Mr Sahim was referring to the directional information contained in the Osprey search result (south of the Katoomba cell tower) or the call charge records result (north-west of the Katoomba cell tower).²⁵ According to Sergeant Atkinson, he was subsequently advised that an Optus technician would be unable to attend the search site as it was a weekend.
- 15.6 In evidence, Mr Sahim similarly also could not recall specific details of the conversation. However he accepted that Sergeant Atkinson was questioning the accuracy of the information that had been provided to him, and that he thought Sergeant Atkinson must have had information from Osprey. This led Mr Sahim to make certain enquiries to investigate whether Osprey was functioning correctly. Part of this enquiry involved Mr Sahim speaking with another police officer in relation to different trace that was occurring in Newcastle. Mr Sahim said he was told that the police officer believed that the phone being traced in Newcastle was at the location indicated by Osprey, although no confirmation was provided that it had in fact been found that location. Mr Sahim did not conduct any other enquiries to confirm whether or not the LBS was functioning correctly.²⁶

Initial attempts at verification of information

- 15.7 Later on 12 March 2016 the duty officer for the Optus Command Centre advised Mr Micallef’s team of the request for clarification sought by Sergeant Atkinson. Part of the role of Mr Micallef’s team was to assist emergency services in life-threatening circumstances. Sergeant Atkinson’s query was allocated to Mr Micallef to action. As an end user of Osprey, Mr Micallef had some experience with the platform and had used it on occasion. However he had no knowledge of the LBS, or how Osprey derived its information. Mr Micallef also had some knowledge of call charge records, but did not know the source of such information.
- 15.8 Mobile phone towers commonly have three antennae, each of which point in a different direction and cover a sector of up to 140 degrees. The centre line for a sector is called the azimuth, which is the direction that the sector points. However there is no definite line between the start and end of a sector, meaning that there can be some overlap. The Katoomba cell tower had three sectors, identified as A-1, A-2 and A-3. The call charge records result indicated that Betty’s handset was associated with the A3 sector which was pointing at 330°.

²⁴ Exhibit 1, Tab 4 at [80].

²⁵ 21/2/19 at T90.3.

²⁶ 14/8/19 at T13.19.

15.9 In order to perform his enquiry Mr Micallef did the following:

- (a) He first interrogated the Site Data Records (**SDR**) for the Katoomba cell tower. These records are a database created by the original provisioning teams when a cell tower site is built, and contain information about each site. The SDR indicated that the azimuth for the A-3 sector was recorded as being 330°.
- (b) He next ran a live trace for all mobile phone subscribers that were attached to the A-3 sector on the 2G network with search parameters of five minutes prior to the search. The live trace produced a result for one subscriber. Mr Micallef then used Osprey to obtain the location of the subscriber on a map. Osprey indicated that the subscriber was 190° from the Katoomba cell tower or, in other words, in a southerly direction from it.
- (c) Finally, he interrogated a second database, being the Optus Mobile Network Infrastructure System (**MNIS**). This contains documentation relating to cell towers, including how a cell tower station is configured. Upon reading information contained in the MNIS about the Katoomba cell tower it indicated to Mr Micallef that that the A-3 sector had a southerly orientation of 190°.

15.10 The effect of Mr Micallef's enquiries was that he had two sources of information (from the live trace and MNIS) that the A-3 sector had an orientation of 190°, and one source of information (from the SDR) which indicated that the A-3 sector had an orientation of 330°. In considering this information Mr Micallef concluded that the A-3 sector had an orientation of 190°, and that therefore the Osprey search result was accurate, due to the following:

- (a) The SDR requires changes in information to be input manually. On this basis Mr Micallef was unsure if the information contained in the SDR had been updated or entered correctly.
- (b) As Osprey was a live system it was more likely to convey accurate information than a database (such as the SDR) which relied on manual input of information which left open a larger possibility for error. In evidence, Mr Micallef explained: "*...in my experience Osprey was the official - or is - or was the official platform, pretty much the go to platform for this type of query. It used - in my limited knowledge I would say it used, you know, live information regarding where different subscribers were and seeing that it was a system that was provided to all the emergency services nationwide that were using that system extensively on a 24 by seven basis. Yeah, I certainly would say that I had a - that I would take those results and would have relied on those results*".²⁷

15.11 However, the evidence established that there were two methods for Mr Micallef's conclusion to be verified. Firstly, the subscriber whose mobile phone had been located by the live trace could have been contacted to verify that the mobile phone was in fact at the location indicated by Osprey. Secondly, a technician could attend a cell tower site in order to ascertain whether the information contained in the SDR about the azimuth for a sector was correct.²⁸ Neither method was used on 12 March 2016.

15.12 At about 10:40am Mr Micallef called Sergeant Atkinson and informed him of the result of his enquiries. That is, he told Sergeant Atkinson that the call charge record result was inaccurate,

²⁷ 22/2/19 at T191.37.

²⁸ 22/2/19 at T189.44.

and that the Osprey search result was accurate, with a margin of error of 60° either side of the indicated 190° orientation. Mr Micallef subsequently sent Sergeant Atkinson an email at 5:42pm confirming his conclusions.

15.13 Sergeant Atkinson explained that the information provided by Mr Micallef was “*very confusing*” on the basis that by 12 March 2016 search opportunities based on the Osprey search result were becoming exhausted.²⁹ Sergeant Atkinson said: “*...we continued to work on search areas in that direction, both by air and with ground resources, but by this stage, I mean, we're talking day five of the search. I didn't know what to believe at that point. We were kind of - we were just trying to cover as many bases as we could but that conversation and the subsequent email, it certainly made me doubt the efforts we were putting in to the northwest*”.³⁰

15.14 Further, Sergeant Atkinson explained that in his own mind the information provided by Mr Micallef would have had a significant impact and made him question the search efforts being placed in the opposite direction to the Osprey search result.³¹ However, Sergeant Atkinson was unable to say whether this questioning in his mind actually translated into the actual search efforts.³² The information provided by Mr Micallef had another consequence in that it suppressed Sergeant Atkinson’s desire to have a technician attend the site. Although he explained that the desire did not go away, he said that he “*kind of let go of it at that time*”.³³

Subsequent attempts at verification

15.15 The issue regarding the conflicting information between the Osprey search result and the call charge records result was revisited with Optus by Sergeant Atkinson on the morning of 19 March 2016. On that day Sergeant Atkinson repeated his request for an Optus technician to attend the site. This resulted in Mr Molkentin, a network engineer, being sent to the site. During the afternoon Mr Molkentin conducted a number of tests at the Katoomba cell tower including a visual inspection, a functionality test using engineering software on his phone, checking the cell ID, and checking the azimuth of each sector. These tests led Mr Molkentin to conclude that the sectors conformed to as-built drawings contained in the SDR, meaning that the A-3 sector was oriented 330°, consistent with the call charge record result, and inconsistent with the Osprey search result.

15.16 Mr Molkentin conducted further tests on 20 March 2016 including visiting a number of different locations in Katoomba. At each location Mr Molkentin arranged for an LBS search to be conducted to locate his phone. The result from each search indicated that Mr Molkentin’s phone was located 200 metres and 190° from the Katoomba cell tower, irrespective of his location. This was the same result obtained from the Osprey search result. Later that afternoon Mr Molkentin performed a similar search in the Leura area in order to verify that the apparent problem was not unique to the Katoomba cell tower. The result of that search indicated that he was located 200 metres from the Leura Tower at 190°, when in fact he was in another location entirely. This obviously suggested that the apparent problem was general rather than isolated in nature.

15.17 On the basis of these results Mr Molkentin assumed that there was an issue or a software bug with the LBS. Mr Molkentin subsequently conveyed his test results to Mr Gibson who advised

²⁹ 21/2/19 at T92.19.

³⁰ 21/2/19 at T92.26.

³¹ 21/2/19 at T92.38.

³² 21/2/19 at T91.41.

³³ 21/2/19 a T93.7.

him that the LBS vendors had changed recently from Nokia to JSpectrum. In March 2016 Optus switched over to a new LBS provided by JSpectrum because the previous platform provided by Nokia was end-of-life and no longer supported. In other words Nokia no longer had plans to do any development on the platform or fix any faults with it.

15.18 Notwithstanding the change in vendors, Mr Gibson advised Mr Molquentin that it might be possible to conduct tests using the Nokia LBS. These tests subsequently established that the Nokia LBS accurately identified the location of Mr Molquentin's mobile phone but that the JSpectrum LBS did not. Despite this, it was unfortunately not possible to then input information concerning the last known location of Betty's phone into the Nokia LBS and use it to obtain a more accurate result than the Osprey search result. This is because the Nokia LBS was passive (as opposed to an active LBS) which only recorded the serving cell ID for a mobile phone, even if there were neighbouring cells as well. Therefore, even if it were possible to interrogate the Nokia LBS the only result that would be produced would be the default result from the active JSpectrum LBS. That is, it would produce the same result as the call charge records result.

Enquiries with JSpectrum

15.19 From 21 March 2016 onwards Optus made enquiries with JSpectrum regarding the results of Mr Molquentin's testing. The enquiries indicated that there was a software bug in the JSpectrum LBS caused by values for the radius of the cell tower being recorded as maximum values, which in turn caused the LBS to provide a default result, which was the cell tower location recorded in the LBS. This was the same result produced when insufficient data from neighbouring cells allowed for a triangulation to be performed. The software bug associated with the JSpectrum LBS has since been rectified.

15.20 It should be noted that even if extra octets from Betty's phone had been available at the time the original Osprey search was performed, the bug in the JSpectrum LBS would still have resulted in the default result being returned.³⁴ However, the subsequent enquiries did not establish at the time why, whether because of insufficient octets or the software bug, the default location provided was not the location of the serving cell tower, but instead a location 200 metres from the tower at 190°. Indeed, it was not until August 2019, at the time of the inquest, that this issue was resolved despite the location of the Katoomba cell tower being checked and corrected in August 2017.³⁵

15.21 The Katoomba cell tower was built in 1995. Its latitude and longitude were recorded in the SDR and MNIS. At the time of construction Global Positioning System (**GPS**) technology was not available for public use and the location of cell towers was manually determined by surveyors. As a result the location recorded in databases such as the SDR and MNIS was less accurate than if GPS had been available to be utilised.

15.22 However the Katoomba cell tower is actually located 200 metres from the location recorded in the SDR and MNIS. This difference between the actual geographic location and that recorded in the relevant databases is most likely a result of the Australian Commonwealth Government Standard for geographic locations being updated in January 2000 from the previous Australian Geodetic Datum. The latter was established before satellite techniques were available and was

³⁴ 14/8/19 at T67.27.

³⁵ Exhibit 11 at [15].

based on an international mathematical model which “*best fits*” the shape of the whole earth.³⁶ As a result of the update coordinates on the Earth’s surface changed approximately 200 metres in a north-easterly direction with the new datum.

15.23 **Conclusions:** When Sergeant Atkinson first raised his concerns regarding the conflicting information contained in the Osprey search result and the call charge record result with Mr Sahim on 12 March 2016 (as the basis for requesting an Optus technician to attend the search site) they were addressed in a timely fashion. However, the conclusion reached then was based on an assumption that was not independently verified. Such verification (in the form of confirmation of the live trace results and on-site inspection by a technician) was available at the time but not utilised. It could not be said that at the relevant time there was sufficiently clear information available to cast doubt on the assumption made and to indicate that independent verification was warranted. This clarity has only been provided with the benefit of hindsight.

15.24 However, the absence of verification had the unfortunate and unintended consequence of temporarily alleviating the concerns held by Sergeant Atkinson, even though there was insufficient basis to do so. This resulted in an opportunity for an Optus technician to be sent to attend the search site on 12 March 2016 being deferred for seven days until 19 March 2016. Although the evidence from Sergeant Atkinson establishes that the information provided by Mr Micallef on 12 March 2016 continued to operate on his mind, causing him to question relevant search efforts, there is no evidence to indicate that the search efforts were rendered inadequate as a result.

15.25 When Sergeant Atkinson revisited his concerns on 19 March 2016 they were appropriately addressed and investigated by having Mr Molkentin despatched to the search site in a timely manner. Moreover, the investigation conducted by Mr Molkentin to verify the previous results provided to police was entirely appropriate.

15.26 It should be noted that in August 2017 the location of the Katoomba cell tower was checked and corrected. At that time the inherent inaccuracy with the Optus search result was not identified. Such identification did not occur until August 2019, at the time of the inquest. It is acknowledged that this issue, and any relevant enquiry that might have been made in August 2017 or thereafter, was not explored in detail during the inquest. However, it may at least be inferred that (a) by August 2017 Optus had available information indicating the reason for the inaccuracy associated with the Osprey search result, and (b) on this basis, there was an opportunity, which was regrettably missed, to identify the inaccuracy sooner.

15.27 It should also be noted that had verification of the kind eventually provided on 19 March 2016 been available on 12 March 2016 it is not possible to conclude that this would have resulted in Betty being found. Had this verification been available on 12 March 2016 it is also unlikely that it would have led to Betty being found alive having regard to (a) the call charge records result not being available until 11 March 2016, some three days after the last known activity on Betty’s mobile phone when it most likely ran out of battery; and (b) the opinion expressed by Dr Luckin on 13 March 2016 as to the Betty’s significantly low prospects of survival.

³⁶ Exhibit 11 at [12].

15.28 Finally, having regard to the rectification of the software bug identified with the JSpectrum LBS, and to the fact that the mobile technology issues explored at inquest were limited to the operation of the 2G network which is no longer operational, it is neither necessary nor desirable to make any recommendation pursuant to section 82 of the Act.

16. Acknowledgments

15.1 Before turning to the findings that I am required to make, I would like to acknowledge, and express my gratitude to Robert Ranken, Counsel Assisting, and his instructing solicitors, James Herrington and William Nash of the Crown Solicitor's Office. Their assistance during both the preparation for inquest, and during the inquest itself, has been enormous.

15.2 I also thank and commend Sergeant Dallas Atkinson for conducting a diligent and thorough search effort to locate Betty, and Detective Senior Constable Peter Scott-Mahjet, the officer-in-charge of the coronial investigation, for compiling a comprehensive initial brief of evidence.

15.3 I thank all of them for the sensitivity and empathy that they have shown in this matter.

16. Findings pursuant to section 81 of the *Coroners Act 2009*

16.1 Having concluded that the reported missing person, Elizabeth O'Pray is now deceased, the findings I make under section 81(1) of the Act are:

Identity

The person who died was Elizabeth O'Pray.

Date of death

Elizabeth died sometime between about 8 and 10 March 2016.

Place of death

Elizabeth died near Katoomba NSW 2780.

Cause of death

Elizabeth most likely died as a result of dehydration, hypothermia and exhaustion.

Manner of death

Elizabeth died after becoming lost in bushland whilst walking.

17. Epilogue

17.1 Kate had one final opportunity to speak to her mother on the phone after she had been reported missing, and it hopefully brought some comfort to them both. However, it is unbearably painful to know that Kate was left, in the days, months, and years that followed, with enormous worry and uncertainty about what would be the last moments of her mother's life. Equally, the thought of Betty herself confronting the fact that she was alone and lost in the dark, amongst the unforgiving elements, is a most distressing one.

17.2 In any missing person case it is too simplistic to speak of closure when families, like Betty's, are confronted with overwhelming loss and agonising uncertainty. However, it is sincerely hoped

that the coronial investigation and this inquest has brought some measure of solace to Betty's family.

17.3 On behalf of the Coroner's Court of NSW, I offer my deepest heartfelt sympathies and most respectful condolences to Betty's family and friends for their most painful loss.

17.4 I close this inquest.

Magistrate Derek Lee
Deputy State Coroner
13 December 2019
Coroner's Court of NSW

Inquest into the suspected death of missing person Elizabeth O'Pray

Appendix A

Pursuant to section 74(1)(b) of the *Coroners Act 2009*:

1. The contents of Exhibit 2, tendered in the *Inquest into the suspected death of missing person Elizabeth O'Pray* is not to be published.
2. The information marked in green in Confidential Exhibit MJC-1 to the Open Affidavit of Michael Corboy sworn 19 February 2019 ("the Open Corboy affidavit") or the information marked in yellow in Confidential Exhibit MJC-2 to the Confidential Affidavit of Michael Corboy sworn 19 February 2019 ("the Confidential Corboy affidavit") is not to be published.
3. The Confidential Corboy affidavit is not to be published.
4. Any information concerning the surveillance device described in the Open Corboy affidavit is not to be published, including:
 - (a) The name of the surveillance device;
 - (b) The fact that the surveillance device is owned and operated by the NSW Police Force;
 - (c) The capabilities of the surveillance device; and
 - (d) the limitations of the surveillance of ice, including counter surveillance measures.
5. Orders 2-4 do not prevent the disclosure of information to and between the following people for the proper purposes of these proceedings:
 - (a) The State Coroner, Coroners and staff of this Court;
 - (b) The solicitor assisting the Coroner and Counsel Assisting the Coroner;
 - (c) The Commissioner of Police, his legal representatives, and staff and officers of the NSW Police Force.
6. Orders 2-4 do not prevent the contents of Confidential Exhibit MJC-1 to be shown to the next of kin, the interested parties or their legal representatives, but Confidential Exhibit MJC-1 is not to be retained by them subject to Order 5 above.
7. At the conclusion of the hearing of the inquest, Optus Networks Pty Ltd, its legal representatives and the next of kin shall forthwith return to the solicitor assisting the Coroner any copy of:
 - (a) Page 3 of the "Operations Log" (at Tab 5 of the Brief of Evidence);

- (b) Page 5 of the “Copy of timeline compiled by investigators and supplied to Sergeant Dallas Atkinson on 11 March 2016” (at Tab 6 of the Brief of Evidence); and
 - (c) Pages 3 and 5 of the Detectives Investigation Log (at Tab 7 of the Brief of Evidence);
8. Thereafter the solicitor assisting the Coroner shall provide a copy of the documents described at Order 7(a) to (c) redacted in accordance with Orders 2-4.
 9. The Confidential Corboy affidavit, Confidential Exhibit MJC-1 and Confidential Exhibit MJC-2 be returned to the legal representatives for the Commissioner of Police (on the application for non-publication orders), following the delivery of findings, subject to the undertaking of the Crown Solicitor to make them available as required by the Court.