IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: COR 2005 2434

FINDING INTO DEATH WITH INQUEST[1]

Form 37 Rule 60(1)
Section 67 of the ***Coroners Act 2008***

Inquest into the Death of: KATHRYN MARGARET RAY

Hearing Dates:	27 April 2009 – 30 April 2009, 27 July 2009 – 29 July 2009 and 6 August 2009
Appearances:	Mr J Ribbands on behalf of the family of Russell Lee
	Mr M Roser on behalf of Air Services Australia
	Mr J Rule on behalf of the Civil Aviation Safety Authority
	Mr T Begbie on behalf of the Australian Transport Safety Bureau
Police Coronial Support Unit:	Senior Sergeant T Fitzgerald, assisting the Coroner
Findings of:	AUDREY JAMIESON, CORONER
Distributed on:	26 June 2014

[1] The Finding does not purport to refer to all aspects of the evidence obtained in the course of the Investigation. The material relied upon included statements and documents tendered in evidence together with the Transcript of proceedings and submissions of legal representatives/Counsel. The absence of reference to any particular aspect of the evidence, either obtained through a witness or tendered in evidence does not infer that it has not been considered.

I, AUDREY JAMIESON, Coroner having investigated the death of KATHRYN MARGARET RAY

AND having held an inquest in relation to this death on 27 April 2009 – 30 April 2009, 27 July 2009 – 29 July 2009 and 6 August 2009

at Melbourne

find that the identity of the deceased was KATHRYN MARGARET RAY

born on 9 February 1949

and the death occurred on 8 July 2005

at Mount Hotham, Victoria

from:

1 (a) MULTIPLE INJURIES SUSTAINED IN AN AVIATION ACCIDENT

in the following summary of circumstances:

1. Mrs Kathryn Margaret Ray was one of two passengers aboard a Piper PA31-350 Navajo Chieftain aircraft registered VH080 (the Piper aircraft) being piloted by Mr Russell James Arthur Lee (Case No. 2005 2435), that crashed on approach to Mount Hotham aerodrome,[2] Victoria on 8 July 2005 at approximately 5.30pm. Mrs Ray's husband, Mr Brian Ray (Case No. 2005 2436) was the other passenger. Mrs Ray, her husband and Mr Lee were all fatally injured. The aircraft was located three days later on 11 July 2005.

BACKGROUND CIRCUMSTANCES

2. Mrs Kathryn Margaret Ray was 56 years of age at the time of her death. She lived at 241 Hedges Avenue Mermaid Beach, Queensland, with her husband.[3] Her husband was involved in property development and had business interests at Mount Hotham.

SURROUNDING CIRCUMSTANCES

3. Mr Lee and his wife owned and operated R L Aviation, an air charter organisation based in regional Victoria. Mrs Lee was the organisation's Chief Pilot and Mr Lee was the Air Operator Certificate (AOC) holder and Operations Manager. The AOC issued by the Civil

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[2] Mount Hotham aerodrome was privately owned and operated. It consisted of a single runway which was aligned 110°/290° (RWY 11/RWY 29) magnetic direction. The aerodrome reference point elevation is 4,260 feet above mean sea level (AMSL).

[3] Little information was obtained regarding the personal circumstances of Mrs Kathryn Ray in the course of the investigation and Mrs Ray's family were not present during the inquest.

Aviation Safety Authority (CASA)[4] authorised the operation of single and multi-engine aircraft. In order to operate the Piper aircraft in a charter operation, Mr Lee was required by CASA to hold a commercial aeroplane pilots licence and be endorsed with multiengine type rating for the Piper aircraft. He was also required to hold a current Multiengine Command Instrument rating to conduct his operation under Instrument Flight Rules (IFR). Mr Lee renewed his instrument flight rating on 1 July 2005 by passing a flight test conducted by an authorised testing officer. Earlier, on 27 June 2005, he had also satisfactorily passed the command instrument renewal test which is required for a pilot with a commercial aeroplane licence and at the same time met recency requirements according to sub regulation 5.109(1)(a)(iii) of the *Civil Aviation Regulations 1988* (Cth).

4. On 8 July 2005, Mr Lee, pilot of the Piper aircraft submitted a visual flight rules (VFR) flight plan for a charter flight commissioned by Mr and Mrs Ray to travel from Essendon Airport to Mount Hotham, Victoria. Mr Ray was a property developer with business interests at Mount Hotham.

5. The weather conditions in the Mount Hotham area at the time of the flight were extreme. While taxiing at Essendon Airport, Mr Lee requested and was granted an amended airways clearance to fly *only* to Wangaratta due to extreme weather conditions at Mount Hotham. The aircraft departed from Essendon at 4.29pm Eastern Standard Time (EST).

6. At 4.47pm Mr Lee changed his destination to Mount Hotham. At 4.48pm Mr Lee contacted Flightwatch[5] and requested that the operator telephone the Mount Hotham aerodrome and advise of an anticipated arrival time at approximately 5.19pm. The airport manager, who was also an accredited meteorological observer, told the Flightwatch operator that in the existing weather conditions the aircraft would be unable to land. He also indicated that prior to the aircraft departing Essendon, he had twice spoken to the pilot about rapidly deteriorating weather conditions at Mount Hotham, including low cloud, poor visibility and snow showers. The Flightwatch operator conveyed to Mr Lee the message that he would be

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[4] CASA is responsible for the safety regulation of the aviation industry and encourages the industry to accept its obligation to maintain high safety standards.

[5] Flightwatch provided on-request radio services, initial in-flight emergency response and search and rescue time management services to pilots.

unable to land at Mount Hotham. Mr Lee responded to the Flightwatch operator that his passengers were eager to travel.

7. At 5.14pm Mr Lee reported to air traffic controller Mr Neil Ingarfield that the aircraft was overhead at Mount Hotham and requested a change of flight category from VFR to instrument flight rules (IFR)[6] and in order to conduct a Runway 29 Area Navigation, Global Navigation Satellite System (RWY 29 RNAV GNSS) approach via the initial approach fix[7] HOTEA (which is Hotham Airport). Mr Ingarfield advised Mr Lee that he had identified the aircraft on the Air Situation Display (ASD) and also advised him that there was "NO IFR TRAFFIC".[8]

8. At 5.25pm Mr Lee broadcast on the Mount Hotham Mandatory Broadcast Zone frequency that the aircraft was on final approach for Runway 29 (RWY 29) and requested the Mount Hotham Airport Manager, Mr Roger Haddrell, to switch on the runway lights. After turning on the lights, Mr Haddrell attempted to communicate this information to the pilot but he received no response. No further transmissions were received from the aircraft.

9. The last radar contact with the aircraft was recorded at 5.22pm. The forecast last light was for 5.35pm.

10. Hazardous weather conditions ensued over the following two days and restricted the search for the aircraft primarily to foot and horseback. Recent moderate to heavy snowfall resulted in extensive snow cover in the area. One hundred personnel were involved in the search on 9 July 2005 and seven rotary aircraft were on standby but were not able to fly due to the conditions. On 10 July 2005, a further 120 personnel searched on the ground and it was only later in the day that aircraft could be used, but failed to locate the Piper aircraft.

11. The wreckage of the Piper aircraft was located by helicopter at 10.30am on 11 July 2005. The aircraft had flown into trees in a level altitude slightly banked on the right. Initial impact was at about 200 feet below the elevation of the Mount Hotham aerodrome. The

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[6] IFR is a category of flight that is subject to discretionary pilot choice and dictates the manner in which the flight is navigated and conducted by the pilot.

[7] The point from which the initial segment of an instrument landing system (ILS) approach begins (source: Cambridge *Flightpath – Glossary of Aviation Terms* Cambridge University Press 2011).

[8] Exhibit 1 – Statement of Neil Bernard Ingarfield dated 16 April 2009.

aircraft had broken into several large sections and an intense fire had consumed most of the cabin. All occupants were fatally injured.

INVESTIGATION

Disaster Victim Identification

12. Senior Sergeant Edward Pollard from the State Coroners Assistant Unit (SCAU) (as it then was) requested the attendance of Victorian Institute of Forensic Medicine (VIFM) identification experts at the scene of the aircraft collision. Forensic Odontologist Dr Anthony Hill and Forensic Anthropologists, Dr Soren Blau and Dr Chris Briggs travelled to Mount Hotham on 11 July 2005 and attended the scene. They were joined by Forensic Odontologist, Dr Richard Bassed on 12 July 2005. The VIFM personnel assisted in the removal of the bodies from the aircraft for transportation to the State Coronial Services Centre for examination.

13. On 14 and 15 July 2005, Dr Soren Blau examined the skeletal remains. Dr Briggs also conducted examinations on 15 and 20 July 2005. Dr Blau reported that:

The three bodies showed evidence of severe burning. While soft tissue survived, numerous skeletal elements and fragments were also recovered. The human bones recovered from the crash site showed evidence of heat-induced changes including colour alteration, fracturing and extreme fragmentation.

14. The bone fragments from all three individuals were determined to be adults. Examination of the femur from case number 2434/05 was determined to be most likely from a female.

15. DNA testing between samples from Mrs Ray's remains and that of her children Tom and Jack, provided additional support to her presence within the aircraft.

16. Forensic Odontologist Dr Anthony Hill undertook ante mortem and post mortem dental comparison and reported that the identity of Mrs Ray was established.

17. On 20 July 2005, a Disaster Victim Identification Report was presented to the then State Coroner, Graeme Johnston. A Certificate of Identification was subsequently signed by the State Coroner indicating that the identity of Kathryn Margaret Ray had been established based on the dental comparison, DNA results and circumstantial evidence. I accept and

adopt State Coroner Johnston's signed Certificate of Identification regarding Mrs Ray's identity.

Medical investigation

18. Dr Shelley Robertson, Senior Pathologist at the VIFM performed an autopsy on the body of Mrs Ray. Dr Robertson reported that the post mortem examination identified mild coronary atherosclerosis. No other significant natural disease was identified. She stated that Mrs Ray's injuries were consistent with high impact forces and that the nature and severity of the injuries indicated that death would have occurred almost instantaneously upon impact with the ground. Dr Robertson reported that there was no evidence to suggest that Mrs Ray was alive during the post crash fire noting that toxicological analysis was negative for cyanide, carboxyhaemoglobin and volatile compounds. Toxicological analysis isolated small amounts of benzodiazepine at blood concentrations consistent with therapeutic use. Dr Robertson attributed the cause of Mrs Ray's death to multiple injuries sustained in an aviation accident.

POLICE INVESTIGATION

19. The police investigation and preparation of the coronial inquest brief was undertaken by Sergeant E. D. Pollard of the State Coroners Assistants Unit (as it then was).

AUSTRALIAN TRANSPORT BUREAU INVESTIGATION

20. The Australian Transport Bureau (ATSB) is the aviation body with legislative responsibility under the *Air Navigation Act 1920* (Cth) to investigate the circumstances of aircraft accidents and incidents.

Location of the aircraft collision

21. The Piper aircraft's impact site was on the side of a steep ridge approximately five kilometres south-east of Mount Hotham aerodrome and to the left of the extended centreline of RWY 29. The area was heavily timbered with large trees estimated to be between eight to ten metres high. During the impact sequence, the aircraft has broken into several large sections. Pieces of the aircraft have been located in an area 100 metres by 20 metres wide and spreading up the ridge from 4,060 feet to 4,130 feet AMSL. The main wreckage was located at GPS position 37°5′12.74′′S 147°22′33.11′′E.

22. According to the ATSB analysis of the wreckage, the damage to the engines and propellers was consistent with both engines delivering power at the time of impact. The landing gear was extended but its position prior to the impact was inconclusive. The wing flaps were found to be fully retracted. The right wing fuel tanks ruptured and fed the fire that occurred after impact, resulting in the destruction of most of the fuselage including the instrument panel and avionics. The aircraft was not fitted with a flight data recorder or a cockpit voice recorder.

23. The ATSB investigation determined that the aircraft systems had been operating normally but that the aircraft was not equipped for flight in icing conditions.[9] There were no indications prior to, or during the flight, of any problems with the aircraft systems that may have contributed to the accident. Mr Lee had not complied with the requirements for a flight under the IFR or in accordance with the VFR. Their investigation also determined that the weather conditions were such that Mr Lee would have been denied adequate visual reference with the possible result that he may have experienced disorientation and loss of situational awareness.

24. The ATSB investigation did not identify any evidence of physiological factors that affected the performance of Mr Lee. Evidence emerged that Mr Lee was prone to risk taking behaviour as a pilot and that he may have been under some pressure from his passengers to proceed to Mount Hotham in the knowledge of the extreme weather conditions. According to the ATSB investigation, Mr Lee was known by his Chief Pilot and others, including staff at Mount Hotham and other pilots, to adopt non-standard approach procedures to establish his aircraft clear of cloud at times of adverse weather conditions at Mount Hotham. The ATSB were also aware that the CASA had held concerns about Mr Lee's performance as an operator for some time. Although the ATSB investigation was unable to determine why Mr Lee had persisted with his attempt to land at Mount Hotham aerodrome during the reported unsuitable conditions, it speculated that Mr Lee's *overconfidence and commercial or family pressures influenced his (sic) decision making.*[10]

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[9] "Icing" refers to the accumulation of ice on the wing leading edges and engine air intakes (source: Cambridge *Flightpath – Glossary of Aviation Terms* Cambridge University Press 2011).

[10] Exhibit 3 – ATSB Transport Safety Investigation Report (p 73 IB).

Mr Lee's qualifications

25. Mr Lee held the necessary and appropriate commercial pilots licence and all necessary and appropriate endorsements required by the *Civil Aviation Regulations 1988* (Cth) to operate the Piper aircraft. His flying experience in total hours was 4,770 and 1,268.7 hours in this type of aircraft. He had flown 126.3 hours in the last 90 days and 3.2 hours in the last 24 hours. He held a Class 1 medical certificate.

26. The Chief Pilot (Mrs Lee) informed the ATSB that her husband had flown into Mount Hotham 204 times in the past 6 years and in 2005, had conducted 51 flights into Mount Hotham.

27. On the morning of 8 July 2005, Mr Lee had flown family members including his wife to Mount Hotham. He returned to Essendon Airport to pick Mr and Mrs Ray up for the charter flight and intended to return to Mount Hotham later in day, where he would rejoin his family.

Mr Lee's performance as a pilot

28. According to Mr Roger Haddrell, Mount Hotham Airport Manager, Mr Lee had flown into and out of Mount Hotham on many occasions and he was not aware of any adverse incidents involving his aircraft.[11] Mr Haddrell knew that Mr Lee was very familiar with the aerodrome and had landed successfully many times including in times of less than perfect weather conditions.[12]

29. Staff at Mount Hotham and pilots interviewed by the ATSB reported that they had observed Mr Lee fly into and land at Mount Hotham in unfavourable weather conditions by adopting non-standard approach procedures to establish his aircraft clear of cloud. Mr Lee is reported to have told others that in these circumstances of unfavourable weather conditions he would fly down a valley to the south-east of Mount Hotham aerodrome, locate the Great Alpine Road and follow it back to the aerodrome.

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[11] Transcript of Proceedings (T) @ p 44.

[12] T @ p 45.

30. The Air Traffic Controller (ATC), Mr Ingarfied, had had previous dealings with Mr Lee in the course of normal operations of a pilot in ATC communications into and out of Mount Hotham and could recall no adverse incidents.[13]

31. CASA field office staff had apparently held concerns about Mr Lee's performance as a pilot and had been monitoring his performance for some time. In the two years prior to the accident at Mount Hotham, CASA had not identified any significant operational issues that warranted their intervention.

32. The ATSB investigation found that formal surveillance of the operator in the two years prior to the accident had not identified any issues of significance that would have warranted CASA taking any action against the operator. The ATSB also found that absent a reason for CASA taking action against a particular operator, the safety of the operator's actions are dependent on the safety culture within the organisation itself and even more critically dependent on the operation or decision-making of the pilot in command of any particular flight.

Evidence of commercial pressure

33. It is reported that Mr Lee had told the ATC at Essendon Airport that Mr Ray's business interests at Mount Hotham could have a positive impact on his own business through Mr Ray's patronage and promise to refer passengers onto him. Mr Ray had made numerous visits to Mount Hotham in recent times as part of his role in the development of a resort on the mountain. On a background that Mr Lee is reported to have assured Mr Ray that the weather conditions at Mount Hotham had never prevented him from landing at the aerodrome, Mr Lee is reported to have told the Flightwatch operator on the day that Mr Ray was keen to land at Mount Hotham aerodrome when he stated that "....our customer is keen to have a look at it".[14]

JURISDICTION

34. At the time of Mrs Ray's death, the *Coroners Act 1985* (Vic) (the Old Act) applied. From 1 November 2009, the *Coroners Act 2008* (Vic) (the new Act) has applied to the finalisation

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[13] T @ p 27.

[14] Exhibit 3 @ p 2 and p 7.

of investigations into deaths that occurred prior to the new Act commencement.[15] In the preamble to the new Act, the role of the coronial system in Victoria is stated to involve the independent investigation of deaths for the purpose of finding the causes of those deaths and to contribute to the reduction of the number of preventable deaths and the promotion of public health and safety and the administration of justice. Reference to preventable deaths and public health and safety are mentioned in other sections of the Act.[16]

35. Section 67 of the new Act describes the ambit of the coroner's findings in relation to a death investigation. A coroner is required to find, if possible, the identity of the deceased, the cause of death and, in some cases, the circumstances in which the death occurred.[17] The *'cause of death'* generally relates to the *medical cause of death* and the *'circumstances'* relates to the *context* in which the death occurred.

36. A coroner may also comment on any matter connected with the death, including matters relating to public health and safety and the administration of justice.[18] A coroner may also report to the Attorney General and may make recommendations to any Minister, public statutory authority or entity, on any matter connected with a death which the coroner has investigated including recommendations relating to public health and safety or the administration of justice.[19]

INQUEST

37. An inquest was held on 27 - 30 April 2009, 27 – 29 July 2009 and 6 August 2009.

Evidence at inquest

38. Evidence was obtained from the following witnesses:

- Neil Bernard Ingarfield - Air traffic controller
- Roger Allan Haddrell - Airport Manager, Mount Hotham
- Ian William Brokenshire – Team Leader, ATSB

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[15] Section 119 and Schedule 1 – *Coroners Act 2008.*

[16] See for example, sections 67(3), 72 (1) & (2).

[17] Section 67(1).

[18] Section 67(3).

[19] Section 72(1) & (2).

- Bernard Malcolm Hole – Metallurgist
- Rudy Spiessl - Licensed Aircraft Maintenance Engineer
- Robert James MacGillivray – Aeronautical Design Engineer, Aviation Consultant
- Neville Robert Blythe – Senior Transport Safety Investigator, ATSB
- John Howard Castran – Valuer/Estate Agent
- Clive Henry Phillips – Aircraft Accident Investigator
- John William Baker – Mechanical Engineer
- Ewen James Jarvis – Pilot
- Michael John Cavenagh – Senior Transport Safety Investigator, ATSB
- John Arthur Botham - Aviation Consultant, CASA
- Kevin John Chapman – Senior Investigator, ATSB
- Senior Sergeant Edward Damien Pollard – State Coroner's Assistants Unit

39. At the commencement of the inquest Mr Begbie of Counsel, appearing on behalf of the ATSB informed the court that an independent expert would not be of any assistance to my investigation because:

when the parties' experts met they found ultimately that the areas of agreement were far more considerable than the areas of disagreement..... collectively, the parties think that the raw data, the primary evidence is so substantially in agreement that the only question remains as to what conclusions should properly be drawn from that...[20]

40. The main issue for the inquest related to the ATSB finding that the accident resulted from a controlled flight into terrain, meaning that *the aircraft was not out of control at the time it impacted the mountain.* [21]

41. According to the ATSB's own research, 30% of general aviation accidents in the decade to 2001 were caused by controlled flight into terrain (CFIT). According to the ATSB Report, research conducted internationally identified that 80% of commercial transport-aircraft accidents in the period 1979 to 1991 occurred in the approach and landing phase and CFIT accidents.

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[20] T @ p 6.

[21] T @ p 7.

CFIT occurs when an airworthy aircraft, under the control of the flight crew, is flown unintentionally into terrain, obstacles or water...and is...*more common during the approach and landing phase.* [22]

42. The ATSB concluded that both engines were operating at the time the aircraft crashed but an outstanding issue related to the opinion of Mr Hole[23] that the damage exhibited by the right-hand propeller system and engine was consistent with the propeller not rotating under power at the time of impact. The ATSB contended that Mr Hole's opinion was formed without looking at the totality of the evidence, including the damage at the accident site, and without consideration being given for the damage caused to the aircraft as it crashed through trees.

43. Mr Begbie also submitted that consideration should be given to the weather conditions at the time and that the pilot had a particular style *which might mean that he was less cautious than other pilots.*[24] Other matters to take into account were that the aircraft had no known maintenance or engineering problems and no problems with the aircraft were communicated over the radio, and that this should be considered on a background that it is known that the pilot was in radio contact with Mount Hotham Airport very shortly before the accident. In addition, it was an agreed fact that the right propeller was not feathered[25] and this needed to be considered in relation to Mr Hole's expert opinion that there could have been engine power loss. Mr Begbie indicated that there would be evidence given that in the event of an engine power loss, one of the very first things a pilot will do is feather the propellers so as to minimise any drag or resistance that the aircraft experiences when that engine is no longer developing power.[26]

44. According to Mr Begbie, the interested parties agreed on a number of matters thus far identified in the course of the investigation, which included that the initial impact to the

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[22] Exhibit 3 - @ p 11 (p 84 IB).

[23] Mr Hole prepared a report at the request of the ATSB, however, at the time of the inquest he was a CASA employee. I was advised by Mr Rule however that at the time he authored that report, he was not a CASA employee – T @ p 22.

[24] T @ p 9.

[25] Feathering is a basic procedure involving the angle of the propeller that competent pilots would follow in the event of engine failure.

[26] T @ p 9.

propeller was front-on and the damage sustained by the propeller was consistent with this directional impact. He said:

> *....the parties collectively will agree that in this case the impact to the propeller was right near the centre of the propeller, not the extremities of the blades, and that the damage to the blades on the right-hand engine was very different from the damage to the blades on the left-hand engine. So there's agreement about that key fact.*[27]

45. There was also agreement that the exhaust pipe sustained some damage at a point in time when the temperature of that exhaust pipe was less than 400 degrees Celsius and that there was a cable fitting which connected a flexible cable to a throttle lever that was missing when Mr Spiessl attended the accident site approximately twelve months after the accident.[28] Despite substantive agreement on some key issues, Mr Begbie emphasised that there was divergence in opinion regarding how and/or when these matters came to be.

ENGINE FAILURE

46. At the outset of the inquest, Mr Ribbands on behalf of Mr Lee's family submitted that the state of the evidence was such that I would be unable to conclude one way or another the accident's precise sequence of events. While not desirable, the result would be a partially open finding because I would not be able to ascertain positively one way or another, to the requisite degree of proof, that is, on the balance of probabilities, what the precise sequence was. Nevertheless, the issues he said that had arisen from his client's perspective and from the investigations of Mr Spiessl was that there was a possibility that Mr Lee had experienced an engine failure in the starboard engine at a point in time shortly prior to the collision.

47. The evidence that is said to support the theory that an engine failure caused the fatal air crash includes the butterfly carburettor issue, the damage to the propeller on the right engine, the crack in the flange on the propeller assembly, the absence of spiral cracking in the forward journal, the analysis of the exhaust pipe and the temperature that was said to have damaged it. Mr MacGillivray's analysis of the flight and prior occurrences of problems with the throttle assemblies were also raised in support of the theory/proposition of engine

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[27] T @ p 10.

[28] *Ibid.*

failure being the fundamental causative factor. Engine failure could also be supported as the causative factor if there was evidence that the propellers had been feathered at the time of the accident.

48. On the other hand, according to Mr Begbie, I am able to find a very ready explanation for the accident, namely the pilot's flight in the extreme weather conditions and the location that he was flying.[29]

(a) Evidence of feathering

49. According to Mr Spiessl, a licensed aircraft maintenance engineer, in flight *a pilot would choose to feather the engine to reduce the drag caused by the propeller which would otherwise be(sic) windmilling.*[30] Mr Spiessl agreed with Mr Ribbands that *windmilling* is the effect of the wind rushing through the propeller causing it to rotate, or in other words, it is the propeller driving the engine.[31]

50. The evidence did not support the proposition that the propellers had been feathered. The interested parties agreed on this point. Mr Spiessl admitted in evidence that the opinion expressed in his report was reliant on accepting the position of Mr Hole's opinions[32] which of themselves were found to be unreliable on this issue. The interested parties agreed that feathering is a basic procedure that competent pilots, including Mr Lee, would follow in the event of engine failure.

(b) Evidence of throttle butterfly closure

51. The proposition that the throttle butterfly was found to be in the closed or idle position suggested that the engine was at idle prior to impact. Mr Spiessl stated:

The fact that the throttle butterfly was closed strongly indicated to me that the engine was not operating under power at the time of impact and that at best the engine was at" idle" only, if not shut down by the pilot.[33]

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[29] T @ p 993.

[30] T @ p 240.

[31] T @ p 241.

[32] T @ p 247.

[33] Exhibit 12 – Statement of Rudy Spiessl dated 28 April 2009.

52. This proposition included the reasoning that the fitting bolt on the lever arm may have sheared off or come loose mid flight, however this point became highly questionable during the course of Mr Hole's and Mr Spiessl's *viva voce* evidence. I have had regard to the fact that Mr Spiessl did not examine the engine until approximately 12 months after the incident whereas both Mr Phillips and Mr Baker had seen the physical components of the aircraft remains proximate in time to the collision and reported that the component was jammed shut. In addition, Mr Spiessl in his own evidence stated that he had neither seen nor heard of any such similar incident previously occurring in a Piper aircraft. Ultimately, I have formed the view that the proposition regarding the likely position of the butterfly prior to the collision is highly speculative.

(c) Significance of propeller damage

53. Mr Hole, Mr Spiessl and Mr MacGillivray were all of the view that because the left propeller showed damage in the form of uniform backward curling and the right propeller was absent similar damage, that this was evidence that the right engine could not have been under power at the time of the impact. However, Mr Spiessl[34] conceded that his views were piggybacked onto Mr Hole's views. Similarly, Mr MacGillivray, an Aeronautical Design Engineer and pilot, based his views[35] in part on his experience of two examples where the propellers were operating under power at the time of impact with the ground, in part by reading other ATSB reports and also on his acceptance of Mr Hole's views.

54. Mr Hole's views were not uniformly accepted by witnesses Mr Blythe, Mr Phillips, Mr Cavenagh and Mr Baker.

(d) Crack in the flange

55. It was agreed that a crack in the flange that attaches the crankshaft to the propeller would have been caused by the application of rearward force. There was however a lack of consensus as to what would be the flow on effect. Mr Hole opined that there would have been no rotational power whereas Mr Blyth and Mr Baker were of the view that the crack did not of itself prove there was no rotational power.

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[34] T @ pp 244-245.

[35] T @ pp 328-329.

(e) The absence of spiral cracking on the forward journal

56. In Mr Hole's opinion spiral cacking on the forward journal would be seen if a propeller is under power at the time of impact. The corollary of this opinion was that the absence of spiral cracking was indicative that the propeller was not under power at the time of impact. Mr Baker on the other hand said that the absence of spiral cracking on the forward journal only proved that there was no repeated propeller strikes, rather than proving there was no propeller power at the time of impact.

57. I was not compelled by Mr Hole's opinion and his observations did not point to strong and cogent evidence that the right propeller had no rotational power at the time of impact. I am more convinced by Mr Begbie's submissions that the observed propeller damage is consistent with the impact sequence.[36]

58. I accept the submission of Mr Begbie in relation to the significance of the evidence of the blade damage, the crack in the flange and the absence of spiral cracking on the forward journal and that is, that the right propeller did not experience the same damage as the left propeller because the propeller, the engine and the wing became *separately liberated in the collision.*[37]

(f) The significance of exhaust damage

59. Additional support for the proposition that the flight was not under power at the time of the crash was according to Mr Hole, supported by his findings on testing pieces of the exhaust pipe.

60. I was not persuaded by Mr Hole's evidence in this regard. His testing lacked rigor and he made a number of unsubstantiated assumptions. According to Mr Blythe, even to assume an operating exhaust temperature of 400 degrees was *a significant oversimplification.*[38] In addition, Mr Hole conceded that:

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[36] T @ p 1018.

[37] Ibid.

[38] T @ p 431.

..one must also consider the possibility that the exhaust pipe may have been damaged during removal of the engine at the accident site.[39]

61. I attach no weight to this aspect of Mr Hole's opinion purporting to support that the flight was not under power at the time of the aircraft crash.

FLIGHT CONDITIONS

(a) Flight aids

62. Mr Ingarfield was employed by Airservices Australia (Airservices) as an ATC. On 8 July 2005 he commenced a 3.00pm–11.00pm rostered shift in which he had responsibility for the combined airspace in the Ovens, Dookie and Hume sectors (known collectively as Ovens). The Ovens airspace consists of 20,000 feet and below underlying the Benalla and the Eildon Weir sectors.[40]

63. Mr Ingarfield's evidence included an explanation of the difference between IFR and VFR. He said that IFR *is a set of rules that the pilot has to fly by ...using the instruments within the aircraft or ground-based navigation aids. He may also fly visually. It doesn't preclude him from flying visually at all.* VFR is another set of rules, *where the aircraft is basically flying visually.* The pilot may also use navigation aid in conjunction with VFR but whilst flying with VFR, the pilot must *remain clear of all cloud at all times.*[41]

64. In addition to the availability of instruments and visual flight Mr Lee also had a global positioning system (GPS)[42] for navigation purposes. Where a pilot is conducting a GPS non-precision approach to Mount Hotham or, indeed, to any other aerodrome in the country, there is an established system that gives a pilot various waypoints as their first points of approaches, so that regardless of the direction of the approach, the pilot can choose the nearest one and then arrive at that at a particular altitude. The pilot follows a path into the next point and so on which leads the pilot into the airport. In this instance Mr Lee changed

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[39] Exhibit 7 – Report of Mr Bernard Hole dated 14 September 2006 @ paragraph 3.7.

[40] Exhibit 1 - Statement of Neil Bernard Ingarfield dated 16 April 2009.

[41] T @ p 26.

[42] A method of navigation available to pilots in aircraft that is equipped with a global positioning system unit.

his flight profile from VFR to IFR as he travelled across Hotham and evinced to ATC an intention to conduct the GPS approach which would have led to him making an approach towards what was known as Hotham Echo Alpha.[43] If Mr Lee saw that Hotham Echo Alpha was five miles over in one direction and Hotham Echo India, being the next waypoint, was only a few hundred metres to his right and he was clear, there was nothing erroneous in him flying straight to Echo India. According to Mr Ingarfield, *as long as he's visual he may break off the instrument approach and just land visually*[44] and there is no obligation imposed on the pilot to communicate this change to ATC.[45]

65. In relation to the ATC's ASD displays, Mr Ingarfield also explained the difference between primary and secondary radar return as referred to in paragraph 9 of his statement.[46] He said:

.. primary radar is basically the raw radar that is reflecting from the aircraft itself that the radar head is picking up. Secondary radar is the actual transponder on the aircraft sending a return electronic signal back to the radar head, it shows up on our screen as a symbol and from that we can determine things like the ground speed, the altitude.[47]

66. The primary radar is more accurate according to Mr Ingarfield because the primary is emitting from the actual aircraft itself. Secondary is basically on the same position but the interpretation by the computer may be slightly less accurate.[48]

67. From approximately 4.47pm the aircraft had been flying in uncontrolled airspace. Radar coverage of the aircraft was lost at 5.22pm at approximately 5600 feet. For approximately one kilometre before the loss of coverage the aircraft appears to have been flying straight and level. Mr Ribbands submitted that this is *not inconsistent with the aircraft flying visually*

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[43] According to the ATC, Mr Lee communicated that he was relying on GPS navigation by saying he is now tracking by Echo Alpha. – T @ p 33.

[44] T @ p 29.

[45] T @ p 30.

[46] Exhibit 1 - Statement of Neil Bernard Ingarfield dated 16 April 2009.

[47] T @ p 27.

[48] T @ p 27.

whether or not the runway itself was then able to be seen.[49] From the loss of radar coverage the aircraft descended 1300 feet over approximately six kilometres into a valley with high terrain on either side to the site of impact. I accept that this geography would have limited Mr Lee's ability to manoeuvre his aircraft.

68. The discrepancy between the last radar track and the time of Mr Haddrell's last radio contact with Mr Lee was explained when Mr Haddrell agreed with Counsel Assisting that the discrepancy between the time of his radio contact with Mr Lee at 5.25pm, and the time of the last radar contact with the aircraft at 5.22pm could be attributed to a difference between the clock on the wall in his office and the computerised clock on the radar.[50] Accepting this explanation, it is reasonable to conclude that it is likely to be a matter of seconds prior to the collision time from the last radar track and last radio contact and neither provides any suggestion of mechanical problems with the aircraft.

69. The flight analysis by Mr MacGillivray raised the possibility that Mr Lee was flying visually. He said the radar provided this indication because Mr Lee had navigated a big hill and he was flying on the alignment of the Great Alpine Road. *Apropos* he must have been flying in appropriate conditions for example, free of cloud and with the requisite visibility. I reject Mr MacGillivray's evidence in this regard. It is speculative to predict that Mr Lee could have been able to navigate visually when the preponderance of evidence reflects that he would not have been able to. While Mr Ewen Jarvis did not challenge the suggestion by Mr MacGillivray that Mr Lee may have been attempting a visual approach, he remained doubtful that it could be claimed that Mr Lee continued to maintain an inflight visibility of 5,000 metres continuously clear of cloud and in sight of ground or water. In support of this, Mr Jarvis noted that when Mr Lee claimed to be on final approach, the radar plot shows that at no time was he on final. Mr Jarvis commented with certainty that Mr Lee *did fly straight into a stationary hill – presumably because he couldn't see it or had lost sight of the ground or was*

[49] T @ p 1070.

[50] T @ p 49.

no longer clear of cloud.[51]

(b) Weather conditions

70. The weather conditions at the time of the aircraft crash were extreme, prompting the issuing of a significant meteorological information bulletin. This forecasted severe icing conditions between 5,000 and 14,000 feet. The Mount Hotham aerodrome forecast broken cloud between 1,000 and 9,000 feet and temporary periods of snow and broken cloud at 400 feet. Data available at the Mount Hotham automatic weather station recorded visibility to be no more than 300 metres at the time of the crash. The meteorological observer noted that cloud cover was unbroken between 100-200 feet with heavy snowfall. Mr Lee had been informed by the airport manager (an accredited meteorological observer) that the area was experiencing low cloud cover, poor visibility and showers.

71. The evidence about the flight conditions in and around Mount Hotham on the afternoon of 8 July 2005 was consistent. The conditions were poor and inherently dangerous for flying. At the time, daylight was fading in already overcast conditions.

72. The ATSB investigation report found that the weather conditions were conducive to icing. Mr Lee's aircraft was not fitted with any anti-icing or de-icing equipment.[52]

73. Mr Lee was very familiar with his Piper aircraft and would have therefore been aware of its limitations in this regard. Armed with this knowledge and his knowledge of the weather conditions at or around Mount Hotham aerodrome, he nevertheless made the decision to fly into Mount Hotham. In doing so I accept that he placed the safety of the flight at risk.

74. The ATSB report states that the meteorological conditions at the time of the aircraft crash were conducive of those necessary to produce a 'flat light phenomena' which occurs where light is diffused by a cloudy sky and is likely to occur when the ground is covered by snow. The phenomenon is an optical illusion where the pilot loses their depth-of- field and contrast vision.

Flat light conditions inhibit visual cues, impairing a pilot's ability to perceive depth, distance, altitude or topographical features. Flat light can completely obscure the

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[51] Exhibit 26 - Letter to Gray-Spencer from Ewen Jarvis dated 11 September 2009.

[52] Exhibit 3 @ p 8 & p 15.

features of the terrain, creating an inability for the pilot to distinguish closure rates. Reflected light can give the pilot the illusion of ascending or descending when actually in level flight. In thee conditions a pilot may become spatially disoriented, unable to maintain visual reference with the ground and unaware of actual altitude.[53]

75. Given the known weather conditions at the time, I accept the possibility that if present, a "flat light" phenomena may have impaired Mr Lee's ability to properly control his landing approach to Mount Hotham airfield when he was flying at a low altitude and surrounded by steeply rising terrain.

The evidence of Mr Lee's performance a pilot

76. The basis on which Mr Lee was characterised as a "cowboy" was never substantiated. The characterisation may have been founded on a background of knowledge of the CASA history of counselling and surveillance, but this is of course speculative. He was known to have infringed Air Services airspace in the past. He apparently had a reputation on occasions of bad weather for adopting a non-standard approach to Mount Hotham. There is a vague mention in the evidence about a senior air traffic controller at Essendon Airport speaking to Mr Lee about his behaviour in the weeks prior to the aircraft crash, but there was no clear and cogent evidence of contemporaneous performance concerns either reported to or under investigation by CASA. There was no evidence of any reported performance concerns by ATC, Mount Hotham or from any member of the public who had contracted for flight services from Mr Lee. There is no evidence of a history of Mr Lee intentionally disregarding the safety of his passengers. According to Mr Rule:

...no intelligence has come to CASA's attention to the effect that Mr Lee was in the habit of performing these sort of approaches into Mount Hotham Aerodrome in the years leading up to the accident and nor indeed had any other intelligence come to light that had caused CASA to have any grave concerns that Mr Lee was a pilot prone to taking unnecessary risks.[54]

77. In the circumstances I have not been able to identify what action was open to CASA that could have prevented the events of 8 July 2005. Even if CASA had taken a more proactive

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[53] Exhibit 3 @ p 11.

[54] T @ p 1078.

approach of surveillance and/or monitoring of Mr Lee because of his past regulatory breaches, anything short of preventing Mr Lee from flying is unlikely to have influenced his decision making on that particular day.

78. I also note that the post mortem examination conducted by Dr Shelley Robertson at the VIFM upon the body of Mr Lee did not identify evidence of natural disease (including significant coronary artery disease). Similarly, toxicological analysis of blood retrieved post mortem did not identify any alcohol or other drugs or poisons.

FINDINGS

I accept and adopt the findings of then State Coroner Graeme Johnston's signed Certificate of Identification and find that the identity of the deceased is Kathryn Margaret Ray.

I make no adverse finding against CASA in relation to its oversight of RL Aviation or Mr Lee in the period leading up to 8 July 2005.

I accept the submissions of Mr Roser and find that Air Services Australia and in particular, Mr Ingarfield delivered all the required air traffic control management services to Mr Lee in an appropriate and timely manner and as such there is no relationship between the delivery of those services and the cause of death of Mrs Ray, her husband and Mr Lee.

There was a divergence of views amongst the expert witnesses. I make no criticism of any one of these witnesses merely because their own views may have not been shared by others. Nor am I influenced by the arguments raised about their "independence" in the weight that I ultimately attached to an individual's evidence. I reject the proposition that faced with conflicting evidence that I am restricted in making findings of fact.

The safety of this flight on 8 July 2005 was reliant on the operational decision making of the pilot, Mr Lee. Whether he perceived pressure from the Rays to fulfil the charter agreement by delivering them to Mount Hotham and /or whether that included a perceived pressure to impress them for future commercial purposes, is of little significance because it was Mr Lee and Mr Lee alone that was charged with the safety of himself and his passengers. He ignored all the warnings including Mr Haddrell's warnings that he would not make it into Mount Hotham because of the weather conditions. He did not appear to factor his aircraft's lack of anti-icing and/or de-icing equipment

into his decision making to proceed with the flight. It is not necessary to make definitive findings on whether Mr Lee did not follow standard procedure in conducting his final approach because ultimately it was his ability to fly *per se* that was compromised by the weather conditions.

The preponderance of evidence enables me to be comfortably satisfied that Mr Lee's aircraft was operating normally at the time of the collision. Mr Lee flew his Piper aircraft into Mount Hotham without incident on the morning of 8 July 2005, there were no known maintenance or mechanical problems with the aircraft and there was no indication of mechanical problems referred to in the last radio contact with Mr Haddrell which, I am satisfied would have been within seconds of the collision. During this contact, Mr Lee requested that the lights on the Mount Hotham runway be turned on. He made no articulation that gave any suggestion of problems with his aircraft. In the absence of any substantive indicia of engine failure, and only a number of unsubstantiated theories, I find that the engines were operating at the time of the collision and there is no evidence within the analysis of trajectory of the aircraft that any significant descent or ascent of the aircraft was occurring at the time of the collision, although I accept that the trajectory analysis in itself did not equate to straight and level flight into the side of the hill. I am also satisfied that the engine damage can be comfortably accounted for as damage sustained upon impact rather than damage sustained as a result of loss of power prior to impact.

Mr Begbie urged me to adopt a common sense analysis of the evidence. When all other propositions have not been proved to a *reasonable satisfaction*,[55] the application of Occam's Razor[56] is compelling.

I find that this catastrophic aircraft event is appropriately characterised as a controlled flight into terrain incident. Although faced with conflicting evidence on the issue, I find that this aircraft crash was not caused by engine failure. In the event there was an engine failure on this aircraft, I agree with Mr Rule that *it occurred at a point in time where the pilot had already put himself* – and his

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[55] *Briginshaw v Briginshaw* (1938) 60 CLR 336.

[56] Occam's Razor - The English philosopher, William of Occam (1300-1349) propounded Occam's Razor: "Entities should not be multiplied more than necessary". That is, the fewer assumptions an explanation of a phenomenon depends on, the better it is.

passengers – *in such a position that any engine failure could only have had fatal consequences.*[57]

This controlled flight into terrain incident claimed the lives of three people and could have been avoided if Mr Lee, himself a victim, had heeded the multiple warnings. This was not an incident caused by sudden, unexpected or inclement weather. It was predicted and it was known. This is not an inexact proof but the reverse – the evidence of the weather conditions was strong and cogent. According to Mr Rule:

> *...the pilot Russell Lee made a critical error in judgement in deciding to attempt a visual approach to Mount Hotham Aerodrome in circumstances where he only had marginal conditions and where he must have known that the conditions that awaited him at the aerodrome itself were unlikely to be suitable for VFR flight.*[58]

Although Mr Lee was an experienced and competent pilot, such attributes do not equate to a *carte blanche* right to fly in any weather conditions and contrary to the advice of others and without apparent regard to the capabilities of an aircraft. Although there is no specific evidence that Mr Lee was flying his Piper aircraft in a manner that could be considered dangerous or reckless at the time of the collision, it remains open to me to make a finding of fact that Mr Lee should not have been flying in that place at that time. His actions at this point in his flying history were not consistent with a conservative, competent and cautious pilot discharging his responsibilities, but were to the contrary and led to the fatal consequences.

In considering the totality of the evidence, I find that the deaths of Kathryn and Brian Ray and Russell Lee could have been prevented and it is Russell Lee that could have prevented the deaths.

I accept and adopt the medical cause of death and find that Kathryn Ray died from multiple injuries sustained in an aviation accident.

RECOMMENDATIONS

Mr Ribbands in his final submissions said that there were no useful recommendations he could urge upon me to make which *might prevent a recurrence of this tragedy or assist in the safety of future*

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[57] T @ p 1074.

[58] T @ p 1074.

flights conducted in mountainous terrain or in cold and inclement weather in the southern regions of Australia because effectively:

> *The regulations as they now stand sufficiently address these issues.*[59]

I agree with Mr Ribbands to the extent that it is the existence of regulations that already play a role in the prevention of aviation disasters and it would be trite for me to recommend that pilots should comply with them.

In relation to the ATSB investigation Mr Ribbands submitted that:

> *The failure of the ATSB to remove the engines for further examination has potentially interfered or disallowed a thorough and detailed analysis of the accident.*[60]

I accept that the rigour of the ATSB investigation was compromised by the engines not being removed from the crash site and in all probability lead to greater controversy about the state of the engines at the time of the crash than might have occurred had it been deemed necessary or been economically viable to remove them at the time. Mr Ribbands acknowledged that there are constraints on the ATSB's resources and urged me to make a recommendation for the allocation of greater resources to the investigative body.[61] I consider a broad-brush recommendation about resource allocation to the ATSB beyond my jurisdiction however the discreet reference to how the ATSB may better improve on its investigations by the use of video recording of the scene and the accident investigation are germane to this investigation. Accordingly:

I recommend that the ATSB undertake review of the merits of and its capacity to utilise video recording at all fatal aircraft accident investigations and that such video recording should incorporate the scene and the accident investigation.

I adopt the same position in declining to make a broad-brush recommendation for the allocation of greater resources to CASA consistent with the ATSB's own recommendation concerning CASA reviewing and/or improving its surveillance methods as they relate to the detection of patterns of unsafe practices and non-compliance with regulatory requirements. In addition, I am mindful of the

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[59] T @ p 1072.

[60] T @ p 1072.

[61] T @ 1072-1073.

prolonged period of time that has lapsed since the aircraft crash, the conclusion of evidence at inquest and the finalising of this Finding and consider that there is no probative value to making any recommendation to CASA regarding their surveillance techniques. Furthermore, I accept Mr Rule's submissions to the Court that CASA *is always looking for ways in which it can improve its practices and procedures and make them more effective.*[62] To this end Mr Rule provided an example of CASA's recent roll out of a new software program.

To enable compliance with sections 72(5) and 73(1) of the *Coroners Act 2008* (Vic), I direct that the Finding will be published on the internet.

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

- Mr E. John Maitland, Maitland Lawyers, on behalf of Mrs Melinda Lee
- Mr Mark Gray-Spencer; Riley, Gray-Spencer Lawyers
- Hickey Lawyers on behalf of the Ray family
- Civil Aviation Safety Authority, Legal Branch, Canberra
- Australian Government Solicitor, Canberra, on behalf of Australian Transport Safety Bureau
- Mr Matthew Roser, Blake Dawson Lawyers, Canberra, on behalf of Air Services Australia
- Senior Sergeant T Fitzgerald

Signature:

AUDREY JAMIESON
CORONER
Date: **26 June 2014**

Coroners Court of Victoria

[62] T @ p 1079.

ATTACHMENT 1:

Abbreviations / Terminology:

AMSL = Feet above mean sea level

ATSB = Australian Transport Safety Bureau

ASD = Air Situation Display

ATC = Air Traffic Controller

AUS SAR = Australian Search and Rescue

AVFAX = Air Services pre-flight pilot briefing service – includes weather information

CASA = Civil Aviation Safety Authority

CFIT = Controlled Flight into Terrain

Flat light conditions = occurs where light is diffused by a cloudy sky and is likely to occur when the ground is covered by snow, the phenomena is an optical illusion.

Flightwatch = Flightwatch provided on-request radio services, initial in-flight emergency response and search and rescue time management services to pilots.

IFR = Instrument Flight Rules = using the aircrafts instruments due to reduced visibility (not allowed to fly into cloud)

ILS = Instrument Landing System

IMC = Instrument Meteorological Conditions

MBZ = Mandatory Broadcast Zone frequency

POB = Persons on board

PAPI = Precision approach path indicator (an array of lights used to guide pilots on the correct approach angle when landing.)

RWY 29 RNAV GNSS = Runway 29 Area Navigation, Global Navigation Satellite System

SOP = Standard Operating Procedures

TWAS = Terrain awareness and warning system – uses GNSS = Global Navigation Satellite System

VFR = Visual Flight Rules