

*R v Cassidy* [2016] NTSC 1

**PARTIES:** **THE QUEEN**

v

**CASSIDY, Nicholas Frank**

**TITLE OF COURT:** SUPREME COURT OF THE  
NORTHERN TERRITORY

**JURISDICTION:** SUPREME COURT OF THE  
NORTHERN TERRITORY  
EXERCISING TERRITORY  
JURISDICTION

**FILE NO:** (21122226)

**DELIVERED:** 6 January 2016

**HEARING DATES:** 28 February 2013, 1, 4, 5 & 6 March  
2013, 11, 12, 13 & 18 June 2013, 25 &  
31 July 2013, 1 August 2013,  
30 September 2013.

**JUDGMENT OF:** BARR J

**CATCHWORDS:**

EVIDENCE – Opinion evidence – low copy number DNA evidence –  
assessment of expert opinion should be left to jury – evidence admitted

EVIDENCE – Admissibility – low copy number DNA evidence – limited  
evidence connecting DNA source object and alleged offence – limited  
probative value – danger of unfair prejudice – evidence not admitted

EVIDENCE – Admissibility – low copy number DNA evidence – possible  
contamination by dusting for fingerprints – more prejudicial than probative  
– evidence not admitted

EVIDENCE – Admissibility – complexity of evidence – undue waste of time  
– more prejudicial than probative – evidence not admitted

*Evidence (National Uniform Legislation) Act 2011*, s 79(1), s 135(a) & (c), s 137,  
s 165(2).

*Latcha v The Queen* (1998) 8 NTLR 122; *R v Richard Bates* [2006] EWCA Crim  
1395; *R v Joyce* (2002) 173 FLR 322, referred to.

**REPRESENTATION:**

*Counsel:*

Applicant:	P Usher and M Chalmers
Respondent:	T Berkley

*Solicitors:*

Applicant:	Office of the Director of Public Prosecutions
Respondent:	Louise Bennett Criminal Lawyer

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IN THE SUPREME COURT  
OF THE NORTHERN TERRITORY  
OF AUSTRALIA  
AT DARWIN

*R v Cassidy* [2016] NTSC 1  
No. (21122226)

BETWEEN:

**THE QUEEN**

AND:

**NICHOLAS FRANK CASSIDY**

CORAM: BARR J

REASONS FOR DECISION ON VOIR DIRE  
EXCLUSION/ADMISSION OF DNA EVIDENCE

(Delivered 6 January 2016)

- [1] On 30 September 2013, I made a ruling in the absence of the jury to exclude evidence of DNA obtained from the shelving unit HA3k, being the combined sample M110267.67A1+A2<sup>1</sup> and any samples derived from it.<sup>2</sup>
- [2] I made a second ruling to admit evidence of the DNA obtained from the plastic and rubber surfaces of the outward facing part of the air vent/grille S5W5, situated on the driver's side of the accused's vehicle, being sample M110267.74B and any samples derived from it.<sup>3</sup>
- [3] I now set out my reasons for the rulings.

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<sup>1</sup> Label as corrected in evidence of Brooke Burke, 4 March 2013.

<sup>2</sup> Including the sample for which the ESR reference was BIO 12191/1.

<sup>3</sup> The ESR reference was BIO 12191/5.

- [4] The accused was charged that between 4 June 2011 and 22 June 2011 he attempted to pervert the course of justice. He pleaded not guilty. His trial commenced on 2 August 2013 and concluded on 21 October 2013. Hearing of the voir dire in relation to defence counsel's application to exclude DNA evidence commenced on 28 February 2013 and continued into early March 2013, but was then adjourned part-heard. The voir dire resumed for a further three days in mid-June and then for two days in late July, and was completed on 1 August 2013. I reserved my decision and asked the learned prosecutor not to refer to the DNA evidence in his opening address to the jury.
- [5] At the time I made the rulings referred to in [1] and [2] above, I had heard the evidence on the voir dire and also a substantial amount (some eight weeks) of trial evidence.
- [6] At the time the voir dire hearing began the accused was also charged with the offence of hit and run. However, the Crown filed a fresh indictment on 2 August 2013 alleging a single count of attempting to pervert the course of justice.
- [7] The Crown contended that the accused was driving his Ford Falcon utility on Girraween Road, Howard Springs, in the early morning of 4 June 2011 at approximately 2.30 am, when the vehicle fatally impacted with Levi Griffiths ("the deceased"). The deceased died immediately or almost immediately as a result of his injuries.

[8] In relation to the alleged attempt to pervert the course of justice, the Crown alleged that the body of the deceased was taken from the location of the fatal impact and left near the former NT Stock Feeds premises at Coolalinga (“the secondary location”).

[9] On the Crown case, the accused’s utility was used to transport the deceased’s body from the scene of the fatal impact to the secondary location. The Crown alleged that the earliest instance of the alleged attempt on the part of the accused to pervert the course of justice was the removal of the body of the deceased from the rear tray of the accused’s utility and placement of the body and some clothing at the secondary location.

### **The shelving unit**

[10] I now explain the relevance of the shelving unit referred to in [1] above.

[11] CCTV images of the accused’s vehicle at the BP Palms service station captured on the night of 3 June 2011, at 8.27 pm, some six hours prior to the fatal impact, were said to show a large flat grey-coloured object having the appearance of a shelving unit, in the rear tray of the accused’s utility.<sup>4</sup>

[12] In my assessment, those images, insofar as they showed the rear tray of the accused’s utility, were of very poor quality. Whether the photo or video images depicted a shelving unit, or some other object, or any object at all, was unclear.

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<sup>4</sup> Refer trial exhibits P129C, and P 130, the BP Palms CCTV footage in its entirety.

- [13] On the Crown case, the object depicted in the rear of the accused's utility *was* a shelving unit, and that shelving unit was still in the rear tray of the accused's vehicle at the time of the fatal impact. The Crown alleged that it was the same shelving unit which Police later seized, on 8 July 2011, from the grounds of the Hells Angels Clubhouse at 165 Girraween Road, Howard Springs, which was then identified by Crime Scene Examiner Senior Constable Gino Mario Rob ("Rob") with the evidence label "HA3k".<sup>5</sup>
- [14] The Crown alleged that, in the course of the fatal impact or afterwards, when the body of the deceased was allegedly transported to the alleged secondary location, the body of the deceased rested on or otherwise came into contact with the shelving unit "HA3k" in the tray of the accused's utility.
- [15] The Crown further alleged that, at some time after the fatal impact, the accused (or someone else) removed the shelving unit from the rear tray of the accused's vehicle, and left it outdoors in the grounds of the Hells Angels Clubhouse in Girraween Road.
- [16] As mentioned above, on 8 July 2011 police seized the shelving unit from where it was left on the Girraween Road property.<sup>6</sup> Rob wrapped the unit in

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<sup>5</sup> Item HA3k Shelving unit from grid 3 as seen in photographs 18, 19, 20, 27, 39, 45 and 46, referred to at p 26 of Rob's statement of 20 September, 2011, exh p2.

<sup>6</sup> Location shown on Photos 15 and 20, within annexure "D" to the statement of Rob, exh P2.

butchers paper and took it back to the Police Forensic Science Centre, to the vehicle examination bay.<sup>7</sup>

[17] On 18 July 2011, Brevet Sergeant Rory MacCarthy, of the Police Fingerprint Section, carried out a fingerprint examination of the shelving unit. He dusted the shelving unit with black fingerprint brush and black powder and developed a fingerprint (or latent fingerprint) on the bottom panel of the book case.<sup>8</sup> However, he had previously used the same black fingerprint brush (and black powder from the 'pot' used to dust the shelving unit) to dust various items belonging to the deceased or his mother, found in the deceased's wallet. It was possible that secondary transfer of the deceased's DNA from the wallet contents to the shelving unit could have occurred through the use of the same black fingerprint brush.<sup>9</sup> I discuss that possibility below.

[18] On 27 July 2011, Police forensic scientist Brooke Burke collected numerous swabs from the shelving unit, including two swabs taken from the inner head of the top of the two screws located in the top quadrant on the left side of the unit, one swab from each screw.<sup>10</sup> She pooled the two swab samples in a single vial and labelled the combined sample "M110267.67A1+A2".

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<sup>7</sup> See the statement of Rob, exh P2, pp. 22, 26, 28 and 29. The 'Hoist Vehicle Examination Bay' was shown on the plan, exh P4.

<sup>8</sup> Statement Rory MacCarthy dated 27 September 2011, exh P24, pp. 7 - 8; 16.

<sup>9</sup> Evidence Denise Grover, voir dire transcript pp. 631 - 639.

<sup>10</sup> The position of the two screws was clearly indicated in photograph 2 at page 2 of 3 in the Photographic Index annexed to the statement of Brooke Burke dated 12 December 2011.

[19] Although the combined sample was processed twice with Qiagen, to remove inhibitors and concentrate the DNA, and amplified twice by use of the method known as PCR (Polymerase Chain Reaction), Kate Cheong-Wing, forensic scientist, was able to conclude only that the DNA result for that sample was “DNA components from a male individual”, adding that it was “insufficient for identification purposes.”<sup>11</sup>

[20] Notwithstanding the insufficiency of the DNA, a decision was made to test for the presence of the deceased’s DNA by the Low Copy Number (LCN) method at the Institute of Environmental Science and Research (ESR) Laboratory in Auckland, New Zealand. The LCN methodology amplifies (or copies) a DNA sample 34 times (34 cycles), whereas the conventional process runs 28 amplification cycles. The additional six amplification cycles effectively increase the sensitivity of the test 50-fold.<sup>12</sup> Because the LCN testing process is far more sensitive than the conventional process, it has the potential to enable very small amounts of DNA in a sample to be detected. However, because of this sensitivity, the LCN testing process requires purpose-built and strictly managed laboratories and facilities, with special protocols.

[21] The stated result of the LCN DNA testing by ESR was that the DNA profile originated from one individual, a male, corresponding with the deceased’s reference profile. In the opinion of Susan Vintiner, forensic scientist and

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<sup>11</sup> Statement of Kate Frances Cheong-Wing dated 22 November 2011, exh P5, p 15, reference to “Shelving unit – Grid 3 cont.” The writer added: “sent to the ESR in New Zealand”.

<sup>12</sup> Statement of Susan Vintiner, 8 March 2013, exh P 39, p.2.

biochemist employed by ESR, the DNA evidence provided “very strong scientific support” for the proposition that the DNA originated from the deceased.<sup>13</sup>

[22] The Crown contended that, as a result of contact between the deceased and the shelving unit in the tray of the accused’s utility, some DNA of the deceased was deposited on the shelving unit. The Crown relied on the presence of the deceased’s DNA on the shelving unit as significant circumstantial evidence linking the deceased with the accused’s vehicle, and thereby with the accused:

“The Crown submits that the LCN DNA evidence is evidence that could rationally affect (directly or indirectly) the assessment of the probability of the existence of a fact in issue in the proceeding, namely that it was the accused’s vehicle that hit the victim, causing the victim to leave traces of DNA on ... the shelving unit situated in the rear tray of the accused’s vehicle.”<sup>14</sup>

### **Consideration**

[23] Evidence of the deceased’s DNA on the shelving unit was only relevant if the shelving unit had been on the accused’s vehicle at the time of the fatal impact with the deceased, or at any time after the fatal impact during which the deceased’s body was carried on the accused’s vehicle (in either of which situations there was a possibility of direct transfer), or if the shelving unit was on the accused’s vehicle after the time the deceased’s body had been placed at the secondary location (leaving open the

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<sup>13</sup> P38, report Susan Vintiner 27 October 2010, p 5 of 9.

<sup>14</sup> Crown Submissions on the LCN DNA Voir Dire, 11 June 2013, par 59.

possibility of secondary transfer between the bookcase and the deceased's DNA left on the vehicle).

[24] There was no direct evidence of the shelving unit being on the accused's vehicle at any time after the deceased's body had been placed at the secondary location.

[25] More significantly, the evidence of eyewitnesses cast considerable doubt as to whether the shelving unit was on the vehicle at any time after 8.27 pm on 3 June 2011 and up to the presumed time of the fatal impact at approximately 2.30 am on 4 June 2011.

[26] The shelving unit was 'large', in the Police description. One would expect that it would be obvious to anyone looking into the tray of the accused's utility that it contained a large shelving unit (or did not, as the case may have been).

[27] Whatever the images in the CCTV footage and stills might have shown as to the presence (or otherwise) of a large shelving unit on the tray of the accused's utility at 8.27 pm on 3 June 2011, the evidence of the three eye witnesses who observed the vehicle after that time does not assist the Crown case. I summarize their evidence below.

[28] Annika Ulrich was one of a group of four persons who were with the accused at various licensed premises in the evening of 3 June 2011. She said that she only vaguely remembered seeing the accused's utility in the

afternoon of 3 June 2011 at the Hidden Valley Tavern, but she was not sure.<sup>15</sup> She saw it later that evening; she described it as a grey/silver colour ute with an aluminium tray back. She got “a good look” at the accused’s utility in the car park of the Howard Springs Tavern, at about midnight, when she and others in a group were out in the car park for about 10 – 15 minutes deciding where to go, before then leaving for the Hells Angels Clubhouse.<sup>16</sup> She got in her car and the accused got into his vehicle and they left. She saw the accused leave in his car.

[29] After arriving at the Hells Angels Clubhouse grounds, she again saw the accused’s vehicle, but she “was not really paying attention to it”.<sup>17</sup>

[30] Annika Ulrich described seeing the deceased’s body at the back of the tray of the accused’s utility a short time after 2.37 am, but she did not mention seeing anything other than the body of the young man.<sup>18</sup>

[31] In summary, although she had several reasonable or even good opportunities to observe the rear of the accused’s utility, Ms Ulrich did not describe or even mention the presence of a large shelving unit on the tray of that vehicle at any time in the evening of 3 – 4 June 2011. In my assessment, Ms Ulrich was not affected by alcohol or any other substance which might have affected her ability to observe and recall.

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<sup>15</sup> Trial transcript T 1671.

<sup>16</sup> T 1676.5.

<sup>17</sup> T 1678.5.

<sup>18</sup> T 1685.3.

[32] Julia Shay was another of the group of four persons. She observed the accused's utility at the same time as Annika Ulrich, at or about midnight in the car park of the Howard Springs tavern, when she was standing outside waiting. She looked at the tray of the accused's utility and saw nothing.<sup>19</sup> When she gave a statement to police at a relatively early time, her words to police were either that the tray was "100% clear" or that she was "100% sure" it was clear.<sup>20</sup>

[33] Ms Shay was considerably affected by alcohol by the early morning of 4 June 2011. Nonetheless, her evidence was such as to exclude the presence of a large shelving unit on the tray of the accused's utility at or about midnight in the evening of 3 – 4 June 2011.

[34] The evidence of a third witness, Leighton Dial, related to the accused's utility after the fatal impact, at or about 2.40 am on 4 June 2011. At that time, he received a call from the accused and was driven by Annika Ulrich to a parking area in front of or very near to the Coolalinga Tattoo shop. Mr Dial got out of the car driven by Ms Ulrich and spoke to the accused. They spoke for about 5 – 10 minutes. Mr Dial said he did not specifically look in the accused's utility, which was just within his "peripheral vision". I extract part of his evidence below:<sup>21</sup>

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<sup>19</sup> T 1787-8.

<sup>20</sup> T 1895.6.

<sup>21</sup> T 2337-2338.

Was there anything in the tray of the ute? — No, might have had a bag or something at the front there, um, maybe a cupboard or something, I'm not sure. No, not really, no. ...

— Might have been a tool box, just behind the cabin there, you know. Nothing really, I didn't really take much notice, to tell you the truth. ...

You saw a tool box against the cabin, so to speak? — No, if that's what it was, yeah, as I said, I didn't take much, too much notice of it.

[35] Dial's evidence was thus vague and at best equivocal as to the presence of a large shelving unit on the tray of the accused's utility in the early morning of 4 June 2011 at the Coolalinga Tattoo shop.

[36] There was evidence that, when the shelving unit was found and seized on 8 July 2011 in the grounds of the Hells Angels Clubhouse in Girraween Road, fragments of glass were found near to and on the shelving unit, some small fragments embedded within the unit, on the back and shelves.<sup>22</sup> There was thus some evidence, independent of the DNA evidence sought to be led by the Crown (the subject of this voir dire), that the shelving unit may have been involved in an incident of such a kind as to cause glass fragments to be embedded within it.

[37] It would have been a question of fact for the jury as to whether the shelving unit was on the accused's vehicle at the time of the fatal impact, or at any relevant time after the fatal impact. For the purpose of the voir

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<sup>22</sup> Exh P2, statement of Rob, p.22, 28; annexure "D" photos 31 - 33; 38; 45 - 46; annexure 'F' photos 1 - 10.

dire, however, the question was whether the accused's vehicle came into contact with the deceased and vice versa.

[38] On my analysis, taking account of the reasoning explained in [23] above, the presence of the deceased's DNA on the shelving unit would have been evidence that the accused's vehicle came into contact with the deceased (and vice versa) *only if* the condition precedent were satisfied, that is, that the shelving unit was on the vehicle at the time of contact.

[39] However, the presence of the deceased's DNA on the shelving unit could not prove the condition precedent referred to in the previous paragraph because that would have assumed the fact in issue, namely that the accused's vehicle came into contact with the deceased when the shelving unit was on the accused's vehicle. It would therefore have been an impermissible use of evidence of the deceased's DNA on the shelving unit to prove that the shelving unit was on the accused's vehicle at time of contact or relevantly thereafter. Such use would be an example of evidence 'lifting itself up by its own bootstraps'.

[40] Properly analysed, the evidence of the deceased's DNA on the shelving unit was of limited probative value. However, there was real danger of unfair prejudice to the accused, as a result of misuse of the evidence, even with a direction to the jury that they must not use the evidence unless satisfied, by evidence independent of the DNA evidence, that the shelving unit was on the accused's vehicle at the time of the fatal impact with the

deceased (or at some relevant time thereafter, as explained in [23] and [38]).

[41] Moreover, there was a possibility – which could not be excluded – that the fingerprint dusting process referred to in [17] above caused the transfer of the deceased’s DNA from the deceased’s possessions to the shelving unit.

[42] As mentioned in [17], on 18 July 2011, Brevet Sergeant MacCarthy carried out a fingerprint examination of the shelving unit in the course of which he dusted the unit with the same black fingerprint brush and black powder he had used on 10 June 2011 to dust various items found in the deceased’s wallet.

[43] The wallet contents included the deceased’s Evidence of Age card (18+ card), Savings and Loans ATM card, and a Centrelink card in the name of the deceased’s mother. An examination carried out by the Police Forensic Biology Section on 20 June 2011 established that those cards all had some of the deceased’s DNA on them: one, two and five reportable alleles were obtained from the Evidence of Age, Savings and Loans, and Centrelink cards respectively.

[44] DNA analysis relies on the fact that different sites (or “loci”) contain repeated blocks of material known as “alleles”. The loci are given individual designations (“D3”, “D16”, “D19” etc.). The more sensitive LCN DNA analysis used by ESR focuses on 10 loci at which the alleles are

known to vary widely between individuals.<sup>23</sup> Although the loci at which the alleles are found are the same in everyone, the number of blocks making up the alleles at each locus differs from person to person. An allele formed of 14 blocks could be described as “a 14 allele”. At each locus there are two alleles, one inherited from the father and one from the mother, so, for example, a person might have alleles 14 and 17 at locus D3. That would normally be designated “D3 14, 17”.

[45] In the LCN DNA testing process utilized by ESR, a person’s DNA profile is built up by reference to the alleles present at the chosen 10 loci and the sex indicator. The identification of alleles is carried out by gel electrophoresis. This process uses an electric current to draw samples of DNA through a gel and separate the alleles. Following automated laser-induced fluorescence, the resulting data are fed into a computer which produces the results in the form of a graph, called an electropherogram (or EPG), in which a person’s DNA profiles are visualised as a pattern of peaks. The interpretation of an EPG requires a high degree of skill and experience and can give rise to differences of opinion.

[46] If a fresh sample of DNA from a single contributor is obtained the analysis will produce a complete profile for the person from whom it was taken. Such a profile will identify two alleles at each of the relevant 10 loci together with the sex indicator. The term “complete profile” means that it

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<sup>23</sup> Those loci are D3, vWA, D16, D2, D8, D21, D18, D19, THO1 and FGA. Standard DNA testing examines all those loci and five more. Both LCN DNA testing and standard DNA testing examine a sex indicator, amelogenin (“Amel”), ‘X,X’ in females and ‘X,Y’ in males.

is complete in relation to the 10 loci analysed, although many other loci exist in respect of which no analysis is undertaken. When testing material for a match with a particular individual, the first step is to obtain a complete profile of that person's DNA for the purposes of comparison. A profile of DNA obtained from swabs of samples found at a relevant location or on a relevant object can then be prepared in the same way and the two profiles compared. Data drawn from empirical research is used to enable analysts to calculate the statistical likelihood of any person within the population having a particular allele at a particular locus. Using that data it is possible to estimate the statistical likelihood that a particular sample of DNA originated from the person whose profile is being used for comparison. This is sometimes referred as the "match probability".<sup>24</sup>

[47] It may be seen that the DNA found on the cards in the deceased's wallet, which respectively had one, two and five reportable alleles, could not provide a "complete profile" of the deceased's DNA.

[48] Denise Grover, the Team Leader of the Forensic Biology Section, provided a report in response to what she described "a suggested DNA contamination caused by fingerprint examination of a wallet and a shelving unit seized for this matter."<sup>25</sup> She wrote as follows:

"The cards from within the wallet were examined within the Biology section for potential DNA evidence on 20 June 2011 at 1843hrs. ...

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<sup>24</sup> See the useful summary in the decision of the UK Court of Appeal (Moore-Bick LJ.) in *R v Richard Bates* [2006] EWCA Crim 1395 [11] to [13].

<sup>25</sup> Exhibit P45.

One, two and five reportable alleles ... were obtained from the 'Age Evidence', 'Savings' and 'Centrelink' cards respectively. Each of the alleles obtained matched those attributed to Levi GRIFFITHS, however due to the low level of DNA recovered from the samples these results are classified as insufficient for identification purposes as the match statistic would be very low. Furthermore, the chance of a randomly selected person also having these same alleles is relatively high.

Given the low levels of DNA detected on the wallet and the four cards contained within, then the potential for DNA contamination of the fingerprint brush and/or powder is minimal.

Brevet Sergeant MACCARTHY has subsequently used the same black fingerprint brush and powder to examine a camera; an insecticide can; and a bleach bottle over the period 26 – 27 June 2011. ... These exhibits were not sampled for DNA analysis.

On 30 June 2011, Brevet Sergeant MACCARTHY examined an alloy bull bar from a vehicle ... using the same black fingerprint brush and powder. This examination identified two latent fingerprints from unknown persons. The locations from where these latents were collected were sampled for DNA on 1 July 2011 with no reportable alleles obtained. .... A further four samples were subsequently collected from regions on the bull bar. No reportable alleles were identified. ... These findings indicate that DNA contamination of the black fingerprint brush and/or powder, specifically from DNA of Levi GRIFFITHS during examination of the wallet and cards, was unlikely. Had the black fingerprint brush and/or powder been contaminated and transferred DNA to the bull bar, I would expect to detect DNA consistent with that of Levi GRIFFITH (and/or Nicholas CASSIDY). These results indicate the black fingerprint brush and/or powder was not contaminated at this point.

On 18 July 2011 Brevet Sergeant MACCARTHY examined the shelving unit from Grid 3 (HA3K). It is during this examination that DNA from Levi GRIFFITHS was allegedly transferred from the black fingerprint brush and/or powder onto the shelving unit. As part of the biology examination of the shelving unit, twenty-six separate regions were sampled for DNA analysis. Of these, four samples generated DNA results. Three samples were partial mixed DNA profiles that were unsuitable for statistical interpretation; however both Levi GRIFFITHS and Nicholas CASSIDY could be excluded from contributing to these mixtures. The DNA profile obtained from the

remaining sample (M110267.67A1+A2) was insufficient for identification purposes within our reporting criterion but gave an indication of a DNA source from a single male person. Consequently, it was transferred to New Zealand for Low Copy Number (LCN) DNA analysis. ...

Brevet Sergeant MACCARTHY is unable to recall which section of the shelving unit was examined first. If the black fingerprint brush and/or powder had been contaminated with DNA, it could be evidenced by similar alleles detected from neighbouring samples. Furthermore, had the fingerprint brush/powder been contaminated with DNA, I would expect to obtain DNA results from that source. In this case, fingerprints from Nicholas CASSIDY (and an unknown source/s) were identified on exhibits examined in the period between the wallet and the shelving unit; however DNA matching that of Nicholas CASSIDY was not detected.

In response to this case, retention of DNA on fingerprint brushes was investigated. Samples were collected from seven fingerprint brushes (including the black fingerprint brush in question in this matter) and a magnetic fingerprint tool. A low level of DNA ... was detected on three of the brushes, including the one used by Brevet Sergeant MACCARTHY to examine the aforementioned exhibits. Each of these results are insufficient for identification purposes. No DNA was obtained from the remaining six brushes, nor the magnetic tool. These results indicate that whilst some DNA may be transferred from exhibits onto fingerprint brushes and/or powders, gross DNA contamination has not been identified.

In my opinion, the DNA obtained from the shelving unit was deposited in a manner independent of the black fingerprint brush.”

[49] It is apparent that Ms Grover’s opinion proceeded on the reasoning (at least by implication) that, if Sergeant McCarthy’s fingerprint brush had picked up the deceased’s DNA on 10 June 2011, he would have ‘shaken loose’ (my words) the DNA when he examined other objects (camera, insecticide can and bleach bottle) on 26 – 27 June 2011. Further, if there was any of the deceased’s DNA still left in the brush, Sergeant McCarthy would have

transferred such DNA to an alloy bull bar which he dusted on 30 June 2011, and in respect of which no reportable alleles were reported. On that basis, Ms Grover reasoned, it was unlikely that Sergeant McCarthy could have transferred any of the deceased's DNA to the shelving unit on 18 July 2011.

[50] When she gave evidence on the contamination issue at the voir dire,<sup>26</sup> Ms Grover confirmed that her investigation of retention of DNA on the fingerprint brushes took place on 27 June 2013, two years or thereabouts after the suggested contamination. The profile was then insufficient for identification purposes. Ms Grover conceded that it would not be possible to know what was on the brushes used by Brevet Sergeant MacCarthy at the time of the investigation (in June 2011).<sup>27</sup>

[51] Ms Grover also conceded the possibility that some of the DNA of the deceased had been retained somewhere in the brush and could have come out in the examination of the shelving unit.<sup>28</sup>

[52] The cross-examination of Ms Grover by defence counsel then proceeded as follows:

... it can't be excluded, can it? - - - It can't be excluded but I am using the evidence from previous examinations, like the bull bar, to demonstrate that it hadn't been transferred in that manner.

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<sup>26</sup> T 635.

<sup>27</sup> T 636.1.

<sup>28</sup> T 636.5.

No, the bull bar was hardly a demonstration is it, that it hadn't been transferred in that manner. As you say yourself, it might not have picked them out, but it depends on the technique; the brushing technique that he used, what he was looking for, what he found. What if a little bit of Mr Griffiths DNA, a couple of cells worth got up into the brush and through use – just physically worked its way down and found its way into HA3k, that's possible isn't it? - - - It is possible, just not as probable, I guess. ...

You are certainly not going to tell us that there was any science on the method of adherence of these particles, sorry, these cells to particular types of fingerprints process? - - - No, no there's not.

That's right, so I mean, again, the contamination that could have occurred, it can't be excluded? - - - It could have occurred but I can't rule it out. That is just my opinion. ... I am using the science from the intervening exhibit examinations.

[53] At the end of Ms Grover's cross-examination, she gave the following evidence in reply to a question by me:

Is there any reason scientifically why – I'm thinking of a broom or a toothbrush, any of those items – is there any reason scientifically why DNA couldn't be sort of wedged higher up in the hairs or bristles of the brush and descend randomly at some later time? - - - No, there's not, but that's something that we can't detect. Even the sampling that I did of the brushes, you can't actually – they're quite firmly attached at the bottom, so I was able to only sample around the outside lengths of the brush bristles and the very ends so I've got no idea and we're unable to ascertain how much DNA can actually get right up in the middle.

[54] Ms Grover's opinion in the second paragraph of the extract in [48] that, “given the low levels of DNA detected on the wallet and the four cards contained within, then the potential for DNA contamination of the fingerprint brush and/or powder is minimal” did not take into account the fact that the “low levels of DNA” she referred to were detected on the

wallet and the four cards on 20 June 2011, after the fingerprint dusting had been carried out on 10 June 2011. Ms Grover's opinion carried with it the implied assumption that the fingerprint dusting did not reduce the amount of the deceased's DNA on the wallet and the four cards by removing some of the DNA which may have been there.

[55] A finger print brush has fine hairs or fibres designed to hold powder, and deposit that powder on the fingerprint which is then revealed by the 'dusting', without damaging the possibly delicate residue of the fingerprint.

[56] Ms Grover acknowledged in her report and oral evidence that DNA may be transferred from exhibits onto fingerprint brushes (and powders). There is no apparent reason why a finger print brush could not pick up DNA from a surface being 'dusted' and retain such DNA somewhere within its brush fibres. The evidence at the voir dire did not disclose the extent to which tiny amounts of human DNA might attach to the fibres of a brush, and, if so, where they might attach to those fibres (whether at the ends of the fibres or 'higher up', that is, closer to the point where the fibres are attached to the brush handle); nor the force required to then dislodge the DNA from wherever it may be in the brush and deposit it elsewhere.

[57] Similarly, there is no apparent reason why a finger print brush could not pick up DNA from a surface being dusted and transfer such DNA to the pot of powder used for fingerprint dusting, from which pot the DNA could be

transferred at a subsequent dusting to another surface. The evidence at the voir dire did not disclose the ease with which tiny amounts of human DNA might attach to, and detach from, particles of finger print powder.

[58] The contamination issue became a significant controversy in its own right at the voir dire hearing. If evidence of the deceased's DNA on the shelving unit had been admitted, I would have had to give the jury a warning<sup>29</sup> as to the possible unreliability of that evidence, on account of the suggested contamination, in addition to the warning and direction, referred to in [40] above, as to the permitted use of the evidence (which might still not have been sufficient to eliminate the danger of unfair prejudice).

[59] Finally, I noted that admission of the evidence was heavily contested by defence counsel, for additional reasons to those referred to above, including that the sample may not have been from the deceased; alternatively that it was a mixture, that is, a sample to which more than one person had contributed. As to the first of those additional reasons, the deceased's reference sample indicated that he had a 12 allele and a 14 allele at the D18 site (D18 12, 14).<sup>30</sup> The deceased did not have a 13 allele at D18. If the DNA from the test sample contained a *true* 13 allele at D18, then it was not the deceased's DNA. An EPG from the ESR LCN DNA testing, derived using a software program called FaSTR Analysis,

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<sup>29</sup> See s 165(2) *Evidence (National Uniform Legislation) Act* 2011.

<sup>30</sup> Exhibit P26, EPG for sample M110267.01 A.

showed a 13 allele at D18. However, another software program used by ESR, Gene Mapper, interpreted the apparent 13 allele at D18 as a “stutter”.

[60] If the 13 allele (or 13 peak) was a true peak, defence argued that it could not have been the profile of Mr Griffiths. Ms Vintiner’s response<sup>31</sup> was that, if it were a true peak (she considered it was not), then that would still not exclude Mr Griffiths as being a contributor to the sample; she observed that if it were a true allelic peak and not a stutter then, then “it could be a mix or it could be a drop in event because it’s not been duplicated”.

[61] Notwithstanding that Ms Vintiner had an apparently reasonable expert explanation which would have rendered the presence of a 13 allele (if that is what it was) at D18 not inconsistent with her conclusions, the issue was a complicated one which I assessed would have involved complex evidence-in-chief and cross-examination at trial requiring a considerable effort on the part of the jury to understand and make a proper assessment of such evidence.

[62] The problems described in [59] to [61] would not of themselves have led to exclusion under s 137 or under s 135(b) or (c) of the *Evidence (National Uniform Legislation) Act 2011*, even though I assessed the evidentiary controversy relating to aspects of the LCN DNA results disclosed in the EPG as being productive of a considerable amount of pain for very little (or no) gain.

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<sup>31</sup> T 526.2.

[63] For the reasons explained in [38] – [40] above, pursuant to s 137 *Evidence (National Uniform Legislation) Act 2011*, I refused to admit the evidence of DNA obtained from the shelving unit HA3k, because I considered that its probative value was outweighed by the danger of unfair prejudice to the accused. Moreover, for a combination of the reasons explained in [38] – [40] and [57] above, in the exercise of my discretion under s 135(a) and (c) of the *Evidence (National Uniform Legislation) Act 2011*, I would have refused to admit the evidence not only because its probative value was substantially outweighed by the danger that the evidence might be unfairly prejudicial to the accused but also because I was concerned that the evidence and the related controversies referred to would have caused or resulted in an undue waste of time in the context of a long-running trial, in which over 100 witnesses ultimately gave evidence.

### **The air vent/grille**

[64] The Crown also alleged that some of the deceased's DNA was deposited on or within an air vent situated on the driver's side of the accused's vehicle, between the rear tray and the cab of the vehicle, evidenced by a sample of the deceased's DNA obtained from the plastic and rubber surfaces of the outward facing part of the air vent/grille S5W5. The mechanism of deposit was unclear. Swabs of the vent/grille were taken by Brooke Burke, forensic scientist, on 13 August 2011.<sup>32</sup> Kate Cheong-Wing, forensic scientist, described the DNA testing for that sample in the Northern Territory as

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<sup>32</sup> Statement of Brooke Burke dated 12 December 2011, exh P18; see also photograph 3.

“insufficient for identification purposes”.<sup>33</sup> However, as in the case of the combined sample taken from HA3k, the sample from S5W5 was sent to the ESR Laboratory in Auckland, New Zealand to test for the presence of the DNA of the deceased by the LCN method.

[65] The results of such testing indicated the presence of DNA from more than one person, but with the majority attributed to a single male. A partial male profile was obtained from what was determined to be the major component of DNA in the sample. This partial male profile, comprising 12 out of a possible 20 DNA results, was compared with and found to correspond to the deceased’s profile at the DNA sites where results were available for comparison. This meant that the DNA in this sample could have originated from Mr Griffiths or from another male who shared the same DNA profile as Mr Griffiths at the sites referred to.<sup>34</sup>

[66] A statistical assessment of the DNA results for S5W5 was then undertaken using frequency data for the Northern Territory Caucasian and Northern Territory Pure Aboriginal population groups, each population assessed separately. It was determined by reference to such frequency data that the likelihood of obtaining the DNA results obtained was at least 3 million times more likely (greater) if the DNA originated from Mr Griffiths rather than from someone else unrelated to Mr Griffiths selected at random from

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<sup>33</sup> Statement of Kate Frances Cheong-Wing dated 22 November 2011, exh P5, page 11; statement dated 13 November 2012, exh P7, page 13, reference in both statements to “S5W5 (74)”. The later statement added: “sent to the ESR in New Zealand for examination”.

<sup>34</sup> P38, report Susan Vintiner 27 October 2010, p.5.

the Northern Territory Caucasian population.<sup>35</sup> This statistic was said by Ms Vintiner to mean that the DNA evidence provided extremely strong scientific support for the proposition that the DNA from S5W5 had originated from the deceased.<sup>36</sup> It was also determined that the likelihood of obtaining the DNA results was at least 190,000 times more likely if the DNA originated from Mr Griffiths rather than from someone else unrelated to Mr Griffiths selected at random from the Northern Territory Pure Aboriginal population. This was said by Ms Vintiner to mean that the DNA evidence provided very strong scientific support for the proposition that the DNA from S5W5 originated from the deceased.<sup>37</sup>

[67] Ms Vintiner cautioned that it was not possible to identify the type of cells from which the DNA has originated, nor to state when the cells were deposited. She added:-

The relevance of these results requires careful consideration in the context of this case given that the sensitivity of the techniques employed and the possibility that the DNA tested is unconnected with the offence under investigation.

[68] Defence counsel argued that evidence of the DNA obtained from the air vent/grille S5W5 should be excluded, contending that it had no probative value and it was therefore inadmissible; that it was unreliable; and that, if it were admissible (and admitted as circumstantial evidence), the probative

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<sup>35</sup> The software program used to determine the likelihood was 'Statistical Probability Using Re-Sampling' (SPURS). The "verbal equivalent" of various "likelihood ratios" was set out in Appendix II to exhibit P 38.

<sup>36</sup> At trial, Ms Vintiner explained that one could convert a likelihood ratio to a probability by inverting it, such that "a likelihood ratio of three million times is about a probability of one in three million of another individual sharing that particular combination of characteristics." – see Trial transcript p 3738.

<sup>37</sup> P38, report Susan Vintiner 27 October 2010, p.6.

value of the evidence was outweighed by the danger of unfair prejudice to the accused. There was no challenge to the expertise of Ms Vintiner and no submission that her opinions were not wholly or substantially based on specialised knowledge based on her training, study or experience.<sup>38</sup> There was no challenge to the use by Ms Vintiner of the population databases referred to in [66] above, nor as to the opinions she provided, in reliance upon the software program ‘SPURS’, as to the statistical likelihood of the DNA having come from someone other than the deceased.

[69] The defence contention that evidence of the DNA obtained from the air vent/grille had no probative value was based on a combination of (1) the very small quantity of genetic material obtained, (2) the absence of evidence as to mechanism of deposit, and the possibility of an innocent association by the deceased with the accused’s vehicle, leading to adventitious transfer or secondary transfer. It was suggested in cross-examination at the voir dire that the deceased may have been in close proximity to the accused’s vehicle, and touched it or sneezed onto it. However, there was no evidence to indicate that that had happened or even that it was a reasonable possibility.

[70] In my assessment the evidence of the DNA obtained from the air vent/grille had considerable probative value in establishing that the accused’s vehicle came into contact with the deceased (and vice versa). The evidence could rationally affect (directly or indirectly) the assessment of the probability of

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<sup>38</sup> *Evidence (National Uniform Legislation) Act 2011* s 79(1).

the existence of a fact in issue in the proceeding, namely that the accused's vehicle struck the deceased. Even in the absence of specific evidence as to mechanism of deposit, the evidence was important circumstantial evidence because there was no evidence of any contact between the deceased and the accused, or between the deceased and the accused's vehicle, at any time before 4 June 2011, such as would explain adventitious transfer or secondary transfer of the deceased's DNA to the accused's vehicle.<sup>39</sup>

[71] I turn to consider the contention that the evidence of the DNA obtained from the air vent/grille was unreliable.

[72] Defence counsel argued that the evidence was unreliable because of the possibility of contamination of the sample taken from S5W5 at the time of collection. The argument was similar to that in relation to HA3k, namely that there was "a real risk of the swabs being contaminated by the non-sterile fingerprint powder, and/or fingerprint brush, which was applied ... to motor vehicle S5 before analyst Burke took the swabs that were later subject to DNA analysis".<sup>40</sup> However, there was no evidence on the voir dire that the plastic and rubber surfaces of the outward facing part of the air vent/grille had been dusted for fingerprints (unlike the area in the vicinity of the two screws of the shelving unit HA3k from swabs had been taken). I did not consider that there was any "real risk" of contamination of

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<sup>39</sup> cf *R v Joyce* (2002) 173 FLR 322 at 324 - 325 [8] - [9].

<sup>40</sup> Defence submissions 29 July 2013, paragraph 12 a.

the swabs in the manner contended for. In any event, issues of the kind raised were factual matters for the jury to consider and determine.

[73] Defence counsel also argued that the evidence was unreliable because of the risk of contamination during testing, as evidenced by the (detected) contamination of some unrelated samples: the DNA of Forensic Biologist Anna Axell and a hair of Crime Scene Examiner Gary Hunt were found where they should not have been.<sup>41</sup> However, that contamination had no direct bearing on the reliability of the S5W5 sample. Moreover, because the contamination of the unrelated samples had been detected, I could not see that their contamination had indirect bearing on the reliability of the S5W5 sample (eg, as a result of imputed general unreliability of the procedures used by the Police Forensic Biology Section). I accepted the Crown submission that the fact of detection demonstrated that the Police Forensic Biology Section had procedures in place to check for and detect contamination events. Ms Vintiner wrote in a further statement<sup>42</sup> that:

“... the transfer of personnel or operator DNA, at the time of evidence recovery or processing, can sometimes occur and most laboratories have systems in place to detect this. This type of contamination, although not ideal, should not cause undue concern.”

[74] This observation provides reassurance that contamination of the kind sought to be emphasized by defence counsel is not regarded by specialist laboratories as significant, particularly when detected.

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<sup>41</sup> M110267.45D + DQ swab from the tray of the accused's vehicle (Axell's DNA); M110267.47AQ from the accused's vehicle (Hunt's hair).

<sup>42</sup> P40, Statement Susan Vintiner 15 March 2013, p.5.5.

[75] Defence counsel made a further submission that “contamination incidents are not isolated”, based on the evidence of Daniel Turner, forensic biologist, that contamination events can occur notwithstanding the taking of precautions (use of face mask, hairnet, gloves and lab coat).<sup>43</sup> However, there was no evidence as to the frequency of such contamination events, nor as to the extent to which they were not detected. Finally, there was no evidence of actual contamination of the S5W5 sample. I took the view that issues of the kind raised were factual matters for the jury to consider and determine.

[76] Defence counsel next argued that the very small quantity of DNA in the S5W5 sample adversely affected the reliability of any results as a result of stochastic effect. Counsel submitted that the DNA sample, which was “clearly a mixture, suffered from subjective interpretational analysis that is not referable to accepted scientific norms, because of the presence of stochastic effect”.

[77] Ms Vintiner was well aware that profiles generated using the very sensitive LCN technique had to be interpreted with reference to the circumstances of the case and in particular to the possibility of detecting trace amounts of DNA from unknown sources.<sup>44</sup> In relation to mixtures generally, Ms Vintiner explained in her supplementary statement<sup>45</sup> that, from 2006 to 2011, ESR successfully participated in an external blind Quality Assurance

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<sup>43</sup> T 144 - 145.

<sup>44</sup> P38, report Susan Vintiner 27 October 2010, p.3.

<sup>45</sup> P40, Statement Susan Vintiner 15 March 2013, p.4 - 5.

(QA) trial, which included the interpretation of mixed LCN profiling results. She said that ESR was able to demonstrate that their LCN reporting scientists were proficient at interpreting both unmixed and mixed LCN profiles. Moreover, ESR had stringent laboratory protocols in place to minimise “background DNA”, including an Elimination Database, which contained reference DNA profiles from staff, contractors and visitors to the ESR laboratory. A check of the Elimination Database was undertaken for the LCN DNA profile obtained from the apparent major profile in the sample from item S5W5. No correspondences were identified.<sup>46</sup> Finally, for comparison purposes in this case, ESR received the deceased’s reference DNA profile as a paper copy only, not as a biological sample, thus further minimizing the possibility of contamination.

[78] In relation to stochastic effect, Ms Vintiner said that each individual DNA profiling result was required to be replicated before it could be confirmed and used for comparison purposes. As she explained:<sup>47</sup>

“Imbalance is likely to be a consequence of stochastic effects. That is, when a less than optimal amount of DNA is tested, regardless of the testing system being used, an aliquot of that sample, from which a replicate profile is generated, may not contain a representative sample of all of the DNA molecules present. This can result in imbalanced pairs of peaks in a profile, and can lead to drop out of one or both of the peaks. However, the replicate testing approach enables an opportunity to address the effect from stochastic variation as any alleles not adequately represented, or not represented at all, in the first aliquot have an opportunity to be present and detected in subsequent aliquots.”

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<sup>46</sup> There were insufficient DNA results in the apparent partial minor profile from the S5W5 sample to satisfy the submission criteria for undertaking a search of these profiling results – see P40, page 5.9 - 6.1.

<sup>47</sup> P40, page 6.

[79] According to Ms Vintiner, the identification of a mixed LCN profile was based on the appearance of more than two DNA results in the consensus profile and from a review of the DNA results in the replicate profiles. On the basis of the consensus profile and the review, she was able to conclude in relation to S5W5 that there was DNA present from more than one person, with the majority of the DNA originating from a single male. She considered that the major peaks identified by her could be confidently attributed to a major component as they were repeatedly observed as major peaks in all replicates. They were subsequently found to be shared with the deceased's profile.

[80] In my assessment, Ms Vintiner gave her evidence in a way which made clear the facts on which her expert opinion or opinions were based, including the processes carried out at the ESR Laboratory which produced results demonstrated on EPG. She then exposed the reasoning which led her to the conclusions stated in her evidence. I considered that the assessment of her evidence, technically complex though it was, should be left to the jury.

[81] It was argued that there was great unfairness to the accused because the testing of S5W5 used up the total amount of genetic material obtained. It is true that the total amount of genetic material obtained in the Northern Territory was consumed in the testing of the sample carried out by ESA. However, the result or results of all tests, including repeat or replicate tests, together with the protocols of the ESA LCN Laboratory, were made

available and provided to an expert engaged by solicitors for the accused. Moreover, the issues raised on the voir dire were not to do with the scientific adequacy or sufficiency of testing, but rather with the interpretation of results. I concluded that there was no unfairness to the accused in those circumstances.

### **Postscript**

[82] On the voir dire, as mentioned in [68], there was no challenge to the use by Ms Vintiner of the population databases referred to in [66], nor as to the opinions she provided, in reliance upon the software program ‘SPURS’, as to the statistical likelihood of the DNA having come from someone other than the deceased. At trial, however, during the evidence of Ms Vintiner, defence counsel formally objected, submitting that the witness was not able to give the statistical evidence she purported to give, because the validity of the databases on which she relied had not been proven.<sup>48</sup>

[83] In *Latcha v The Queen*,<sup>49</sup> the Northern Territory Court of Appeal provided some general guidelines for cases where the Crown proposed to lead DNA evidence. I extract below guidelines (6) and (7): –

(6) It is not necessary for the Crown to lead evidence from an expert in population genetics or from another scientific expert as to the statistical validity of the databases kept by the forensic section of the Northern Territory Police where the defence notifies the Crown that this is not in issue, or where objection is not taken at the trial.

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<sup>48</sup> Trial transcript 3/10/2013, p 3650 - 51.

<sup>49</sup> *Latcha v The Queen* (1998) 8 NTLR 122 at [23].

(7) A scientist other than a population geneticist or an expert in a statistical discipline may have sufficient qualifications derived from professional experience and personal familiarity with the data on the relevant database and published population statistics to be permitted to give evidence of the likelihood ratios in the relevant population. If the Crown proposes to adduce evidence of this kind from such a scientist, the Crown should serve on the defence ... a statement of the scientist's qualifications and experience.

[84] Ms Vintiner was not a population geneticist or expert statistician, and the Crown was not able to establish that she had professional experience and personal familiarity with the data in the two specified population databases to be permitted to give evidence of the likelihood ratios for the relevant populations. Accordingly, I directed the jury to disregard and exclude from consideration (1) the statistical evidence given by Ms Vintiner as to the likelihood ratio (the reference to 3 million times and 190,000 times more likely respectively for the Caucasian and Pure Aboriginal populations of the Northern Territory) and (2) Ms Vintiner's assertion as to strong scientific support in relation to that statistical evidence. The effect of my direction was that the only conclusion the jury could draw from the evidence of Ms Vintiner (if the jury accepted her evidence at all) was that the deceased could not be excluded as the contributor of the major component of DNA identified by Ms Vintiner.

[85] The defence objection in [82] should have been raised during the very lengthy voir dire relating to the DNA evidence, and determined before trial.<sup>50</sup> In future, such objections should be taken and determined before

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<sup>50</sup> *Latcha v The Queen* (1998) 8 NTLR 122 at [23], par (8).

trial. If there is any doubt, the Crown should seek formal admissions and, if they are not forthcoming, take steps to prove matters not admitted, whether DNA evidence or statistical evidence.

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