Public Prosecutor *v* Mohammad Ashik bin Aris
[2011] SGHC 111

Case Number : Criminal Case No. 25 of 2010

Decision Date : 03 May 2011

Tribunal/Court : High Court

Coram : Chan Seng Onn J

Counsel Name(s) : Mr Anandan Bala, Ms Stella Tan & Ms Peggy Pao (Deputy Public Prosecutors) for the Prosecution; Mr SK Kumar and Mr Bryan Campos (SK Kumar & Associates) for the Defence.

Parties : Public Prosecutor — Mohammad Ashik bin Aris

Criminal law – Statutory offences – Misuse of Drugs Act

3 May 2011 Judgment reserved.

Chan Seng Onn J:

The brief facts

1 Mohammad Ashik bin Aris ("the accused") is charged with one count of consumption of Methamphetamine, an offence under s 8(b)(ii) of the Misuse of Drugs Act ("MDA") and punishable under s 33(1) of the MDA.

2 At about 10.40am on 22 January 2010, the accused was arrested by a party of Narcotics Officers from the Central Narcotics Bureau ("CNB") at Kim Tian Hotel. The accused was found in room 202 with an improvised pipe-like instrument ("the pipe") and 18 packets of crystalline substance ("18 packets"). He was arrested and taken to the Bedok Police Headquarters where three specimens of urine were taken from him. One was subsequently tested to be positive for Amphetamines under an Instant Urine Test conducted at the police station. The remaining two specimens were delivered in a locked metal security box to the Health Sciences Authority ("HSA") on 25 January 2010. Subsequently, HSA issued two certificates on 28 January 2010, certifying that both urine specimens tested positive for Methamphetamine. On 3 February 2010, the pipe and the substance in the 18 packets were sent to HSA for testing. On 15 April 2010, HSA issued two further certificates certifying that the inside of the pipe was stained with Methamphetamine, and that the crystalline substance in the 18 packets contained Methamphetamine.

3 At trial, the Prosecution called the director in charge of the laboratory at HSA and all those HSA officers involved in the testing as witnesses to give detailed evidence on the testing methodology, the procedures adopted for the testing of the substances and materials in this case, and their analyses and findings thereto. An expert witness was called to give evidence on the common international practice and to comment on the methods and procedures used by HSA. CNB officers involved in the arrest of the accused, the seizure of evidence from the accused's room, the recording of the accused's statements and the collection of urine specimens from the accused were also called to testify.

4 The Prosecution further adduced three statements made by the accused ("the accused's statements") where he admitted that he had the intention of consuming "Ice" and pursuant to that

intention, did in fact smoke some substance using the pipe. The first statement was an oral contemporaneous statement made on 22 January 2010 at about 11.00am; the second was a statement made pursuant to s 121 of the Criminal Procedure Code on 22 January at 6.00pm; and the third was a cautioned statement made pursuant to s 122(6) of the Criminal Procedure Code on 22 January 2010 at 9.06pm.

5 As the Defence did not take the position that the accused had no case to answer, his defence was called. However, the accused chose to remain silent. The Defence called one expert witness to testify on the accused's behalf.

The section 8 MDA offence

6 Section 8 of the MDA reads:

> **Possession and consumption of controlled drugs**
>
> **8. Except as authorised by this Act, it shall be an offence for a person to —**
>
> (a) have in his possession a controlled drug; or
>
> (b) smoke, administer to himself or otherwise consume —
>
> (i) a controlled drug, other than a specified drug; or
>
> (ii) a specified drug.

7 Pursuant to s 8(b)(ii), the accused is charged with consumption of the specified controlled drug, "Methamphetamine". To secure a conviction, the Prosecution must prove beyond reasonable doubt that the accused intended to and did, in fact, consume Methamphetamine. Since the Defence conceded that there was the relevant intention and that the accused had in fact smoked some substance *via* an improvised pipe (as was admitted by the accused in his voluntary statements), the sole issue before me is whether it was Methamphetamine (and not something else) that the accused had smoked or consumed.

8 In this regard, I will now focus on three main ways by which the offence of consumption of Methamphetamine may be proven:

(a) Proof by relying *solely* on the accused's statements and other circumstantial evidence;

(b) Proof by relying on the evidence as in (a), the HSA certificates for the 18 packets, the pipe stains and the urine tests and the presumption in s 16 of the MDA; and

(c) Proof by relying *principally* on the two HSA certificates for the urine tests and the presumptions in both ss 16 and 22 of the MDA.

Proof by relying *solely* on the accused's statements and other circumstantial evidence

Mens rea

9 The accused admitted in his statements that at about 12.30am on 22 January 2010, he bought from his usual drug supplier, one "Kopi Kia", 2.4 grams of what he thought to be "Ice" [note: 1].

According to Assistant Superintendent of Police, Stanley Seah, and Investigation Officer, Staff Sergeant Nur, both of whom have served in CNB for many years, "Ice" is the well known street name amongst drug abusers for the controlled drug Methamphetamine. The Defence does not dispute this. Similarly, Analyst Stephanie Lim Hui Jia ("SL") from the Illicit Drugs laboratory of HSA also testified that "Ice" is the exclusive street name for Methamphetamine. The accused recalled in his statements that he brought the "Ice" back to his hotel room and repacked it into 24 packets each of 0.1 grams with the help of a digital weighing scale. In between 12.30am and his arrest at about 10.40am, he consumed 6 of these packets using the pipe that had been seized from his room, leaving a remainder of 18 packets. It was further recorded in his statement that the accused identified the crystalline substance in the 18 packets as "Ice". On his own admission, the accused clearly had the intention to consume Methamphetamine at the time he was using the pipe to smoke the "Ice" taken from the 6 packets.

Actus reus

10 The dispute in this case centres on the *actus reus* of consumption. More specifically, since it was not disputed that the accused had smoked something, the question was what he had *in fact* consumed. The Defence contended that though the accused *believed* he was consuming "Ice" or Methamphetamine, it was not proven that the substance he had been smoking was in fact Methamphetamine. In other words, the accused could have been mistaken or tricked as to the nature of the substance he had smoked. An analysis of the circumstantial evidence leads me inexorably to reject the Defence's contention.

11 The accused admitted in his statements that he was a heavy "Ice" smoker, smoking 5 to 6 packets of "Ice" each day. He admitted that he had, on 5 to 6 previous occasions, bought "Ice" from "Kopi Kia" and repacked it into smaller packets before selling them to his colleagues at the workplace, who imbibed the drug to stay alert while working tedious hours as cleaners. The accused said in his statements, "*I did sell to them 'Ice' as they need the energy for them to stay awake as smoking 'Ice' works for me to stay awake ...*". At a price of $50 for each 0.1 grams packet, the accused made a tidy profit each time.

12 Certain inferences may already be drawn from the accused's admissions not relating to the events of 22 January 2010 as recounted above at [11]. First, from the understanding that the accused was selling a substance known as "Ice" to his buyers, the high price charged for each packet containing merely 0.1 grams of that substance and the fact that the buyers were willing to pay those prices, it may be inferred that the substance sold each time was very likely an illicit drug. Second, from his heavy abuse of the drug and his sell-on trade, it is also likely that the "Ice" the accused was consuming and selling was in fact Methamphetamine which provided him and his buyers with the energy to stay awake. One drug abuser might be fooled, but it is very unlikely that the accused and his buyers were all duped as to the true nature of the substance they were abusing. It should be emphasised that the accused did not even suggest in his statements what other substance the so-called "Ice" could have been, if not Methamphetamine. Given the opportunity to testify in court, the accused chose to remain silent. From his refusal to give evidence, I am entitled to draw the adverse inference that the so-called "Ice" he sold prior to his arrest on 22 January 2010 must have been Methamphetamine. I regard this as an inference properly drawn in the light of what the accused had voluntarily stated in his statements.

13 Next, I refer specifically to the events of 22 January 2010 extracted from the accused's statements as described above at [9]. According to the accused, he bought "Ice" from "Kopi Kia" as he usually did and smoked 6 out of the 24 repacked packets of "Ice". The strength of his addiction and the fact that he habitually bought "Ice" from "Kopi Kia" meant it was highly probable that he

would have noticed any deviations in the appearance or effects of the "Ice" bought and smoked on 22 January 2010. However, he did not mention in any of his statements that the "Ice" he smoked that morning was any less potent, or that the effects of smoking the "Ice" felt different from normal, or that he had smoked a different substance from that he usually smoked. Indeed, it was his belief as recorded in both his long statement and cautioned statement that he had smoked "Ice" on the morning of his arrest. The necessary implication of his belief is that the substance smoked on 22 January 2010 and on previous occasions were the *same* substances. Since it is highly likely that the "Ice" smoked on *previous* occasions was indeed Methamphetamine as I found in the paragraph above, it follows that the "Ice" smoked on 22 January 2010 was also Methamphetamine and not some other type of illicit drug. As the accused refused to testify, I am further drawing an adverse inference that the so called "Ice" from the 6 packets that he smoked on 22 January 2010 was *i n fact* Methamphetamine. It is an inference that I can properly draw in the light of what the accused had disclosed in his statements.

14 On the totality of the evidence from the accused's voluntary and unchallenged statements (and without considering any of the HSA certificates), I find that both the *mens rea* and *actus reus* of the offence of consumption of Methamphetamine have been proved beyond a reasonable doubt by the Prosecution, and I accordingly find the accused guilty of the charge.

Proof by relying on the evidence as in (a), all the HSA certificates and s 16 of the MDA

15 It bears noting that all the HSA certificates, considered together with the rebuttable presumption under s 16 of the MDA, buttress the findings that I have reached based on the accused's statements and other circumstantial evidence. This is even without the Prosecution having the benefit of another rebuttable presumption under s 22 (see [28]) read with s 31(4)(b) (see [73]) of the MDA.

16 By way of explanation, the HSA analysts certified three "matters" in the various HSA certificates signed by them, namely that:

(a) Methamphetamine was found in both urine specimens taken from the accused;

(b) the inside of the pipe was stained with Methamphetamine; and

(c) the substance in the 18 packets was analysed and identified as Methamphetamine.

The s 16 MDA presumption

17 Section 16 of the MDA reads as follows:

> **Certificate of analyst, etc**.
>
> 16. A certificate purporting —
>
> (a) to be signed by —
>
> (i) an analyst employed by the Health Sciences Authority; or
>
> (ii) such other person as the Minister may, by notification in the *Gazette*, appoint; and
>
> (b) to relate to a controlled drug or controlled substance, shall be admitted in evidence, in any proceedings for an offence under this Act, on its production by the prosecution without proof of

signature and, *until the contrary is proved, shall be proof of all matters contained therein*.

(emphasis added)

18 I note that the Defence did not submit that the HSA certificates were not covered by s 16 MDA or that they were consequently not presumptive proof of the three "matters" listed above at [16]. As s 16 MDA applies to "all matters" stated in an appropriate certificate, the facts stated in the various HSA certificates are presumed to be in existence until the contrary is proved. In other words, if the certificate states, for instance, that upon scientific analysis or examination, (a) what the identity of a particular unknown substance is; or (b) what substance has been found in a specimen, sample or container; or (c) what matter or material has been discovered or detected at a certain location, then that certificate alone, by virtue of s 16, is sufficient proof of that fact until there is credible evidence to prove the contrary on a balance of probabilities that it is not the case. To successfully rebut what is stated in the certificate, the Defence is therefore required to prove the contrary facts. Merely raising theoretical, fanciful or remote possibilities or hypotheticals is hardly sufficient. If the contrary evidence produced by the accused is based on events, occurrences or circumstances that are rather unlikely, improbable or remote, then the accused would not have proved contrary to what is stated in the HSA certificates having regard to the plain language in s 16.

19 The nature of the s 16 presumption was also recently discussed by the Court of Appeal in *Tan Chin Hock v Public Prosecutor* [2010] SGCA 49. Chan Sek Keong CJ, delivering the decision of the court, said (at [26]):

> The effect of s 16 is that where a s 16 MDA certificate is admitted in evidence, the onus falls on the accused to prove that the matters contained in that certificate (*eg*, the type and the quantity of controlled drug in question) are, for whatever reasons, inaccurate and/or should not be relied upon. Given that a s 16 MDA certificate is presumptive proof (as opposed to conclusive proof) of all the matters stated therein, an accused who takes issue with the accuracy and/or the validity of a s 16 MDA certificate *must* cross-examine the authorised person who signed it if he (*ie*, the accused) wishes to take issue with the procedure or the circumstances surrounding the preparing, signing and issuance of the certificate.

20 Accordingly, until the accused manages to prove otherwise on a balance of probabilities, it is presumed under s 16 that Methamphetamine was in fact found in (a) the accused's two urine specimens, (b) the stains on the inside of the pipe, and (c) the crystalline substance contained in the 18 packets. I will now deal with the scientific evidence given by the HSA analysts on each of these three "matters" presumed under s 16.

HSA certificate for the pipe stains

21 Analyst SL from the Illicit Drugs Laboratory in HSA issued a certificate that the pipe was examined and found to be stained with Methamphetamine. Methamphetamine belongs to a class of drugs called "Amphetamines". Other controlled drugs under this class include Amphetamine, N, α-dimethyl-3,4-(methylenedioxy) phenethylamine ("MDMA") and α-Methyl-3,4-(methylenedioxy) phenethylamine ("Tenamfetamine"). The street name for the latter two controlled drugs is "ecstasy".

22 Burnt stain marks were seen on the pipe, showing that it had been used. A solvent was used to dissolve the stain which remained on the pipe and the solvent was subjected to a GC/MS (Gas Chromatography/ Mass Spectrometer) test. The resultant chromatogram produced by the GC/MS instrument showed three peaks for three different drugs. SL analysed and interpreted the main/highest peak at retention time of 4.26 minutes to be Methamphetamine and concluded that

Methamphetamine was the main drug found. Two very much smaller peaks flanked the main peak: one of them at retention time of 3.82 minutes was analysed to be Amphetamine and the other one at retention time of 4.68 minutes was analysed to be N,N- dimethylamphetamine.

23 SL testified that Amphetamine and N,N-dimethylamphetamine are the pyrolysis products (*i.e.* the products formed when a substance undergoes heating) of Methamphetamine. This is corroborated by the evidence of the Director of HSA's Illicit Drugs Laboratory, Dr Yap Tiong Whei Angeline ("Dr Yap"), Analyst Ong Rui Shen ("ORS") and Analyst Bellene Chung ("BC"). It is also supported by the findings in the article titled "Analysis of pyrolysis products of methamphetamine". The Defence did not dispute that these are pyrolysis products of Methamphetamine.

HSA certificate for the 18 packets

24 The 18 packets were sent for analysis by the Illicit Drugs Laboratory. Dr Yap testified that her analysis showed that the crystalline substance in the 18 packets contained only *one* compound, namely Methamphetamine, at a purity level of 79.7% (which Dr Yap said was very close to the maximum purity for Methamphetamine). There was no Amphetamine found in the 18 packets of crystalline substance. She further testified that the Methamphetamine in the 18 packets was in the *d*-form of Methamphetamine (the relevance of this will be addressed below at [280] under the heading "Peripheral Scientific Issue 4: *d* (dextro)- and *l* (levo)-form of Methamphetamine"). Dr Yap also stated that she had never come across "Ice" exhibits containing Amphetamine.

25 Dr Yap strongly disagreed that her laboratory would be unable to detect Amphetamine if it were in fact present in the 18 packets of crystalline substance because the operating parameters and conditions of the GC/MS instrument would allow it to pick up a wide spectrum of controlled drugs, including Amphetamine. This was not affected by whether or not an Amphetamine drug standard had been tested on the given day itself. Dr Yap also disagreed that the GC/MS instrument was not able to detect small amounts of Amphetamine and proceeded to show the court that even 0.2 milligrams per ml of Amphetamine would result in a clear peak in the chromatogram generated by the GC/MS instrument.

HSA certificates for the pipe stains and 18 packets not challenged

26 The Defence did not challenge the accuracy or validity of the facts or matters stated in the HSA certificates with respect to the identity or nature of the controlled substance found in the pipe stains and in the 18 packets. Accordingly it may be inferred that whoever used the pipe (most likely the accused from whom the pipe was seized) had in fact smoked Methamphetamine and not some other type of illicit drug. It is also proved by virtue of the HSA certificate read with s 16 that the crystalline substance in all the 18 packets was in fact Methamphetamine and not some other type of illicit drug.

HSA certificates for the two urine specimens

27 I will now examine the true nature of the challenge mounted by the Defence in relation to the two HSA certificates for the urine specimens admitted in evidence under s 16. The Defence raised the issue of contamination possibly occurring between the time the accused's room in the hotel was raided and the time his urine specimens (in two sealed bottles) were sent to HSA for analysis. By way of clarification, the Defence is not saying that an inaccurate or wrong analysis had been made because the urine specimens of the accused, as sent to HSA for analysis, did not *in fact* contain Methamphetamine. The Defence conceded that HSA had correctly detected the presence and analysed the nature of the controlled drug found in the urine specimens. Instead, what the Defence

contended was that the two urine tests were not conducted in compliance with the requirements set out in s 31(4)(b) of the MDA (see [73]).

28 In this regard, I note as a preliminary observation that non-compliance with s 31(4)(b) is relevant only when the presumption in s 22 is invoked. Section 31(4)(b) has nothing to do with s 16. S 22 states:

> **Presumption relating to urine test**
>
> 22. If any controlled drug is found in the urine of a person as a result of both urine tests conducted under section 31(4)(b), he shall be presumed, until the contrary is proved, to have consumed that controlled drug in contravention of section 8(b).

29 As a urine test though *not* carried out in compliance with the (largely procedural) requirements set out in s 31(4)(b) is, nevertheless, still factually a urine test, it follows that a certificate of the result of that urine test made in relation to a controlled drug or substance, signed by a HSA analyst or such person as appointed by the Minister, is "*proof of all matters contained therein*" pursuant to s 16 until such time that the contrary is proved. Accordingly, the two certificates for the urine tests, which were signed by the HSA certifying Analysts ORS and BC and carried out in accordance with international standards generally adhered to by other accredited laboratories (even if those standards do not strictly conform with the requirements in s 31(4)(b)), are nevertheless still certificates signed by the HSA analysts for which s 16 remains applicable for the purpose stated therein.

30 The nature of the presumption in s 16 is very different from that in s 22. The latter goes a further step to presume both the *mens rea* and the *actus reus* of consumption while the former only goes so far as to presume what has been stated in the certificate and no more. It may well be that the same facts adduced by the Defence are relevant to rebut both presumptions in ss 16 and 22 but it does not follow that the presumptions in ss 16 and 22 are both identical in their nature and scope, or that s 16 becomes inapplicable for urine test certificates simply because of the existence of s 22 or that s 22 has displaced s 16 specifically for urine tests. In my view, both sections exist separately and operate independently of the other, giving rise to different rebuttable presumptions stated therein in relation to urine tests carried out, provided the pre-requisites in the respective sections are complied with.

31 For example, if it were true, as was alleged by the Defence, that HSA was given urine specimens to analyse that were *pre-contaminated* with Methamphetamine, HSA cannot be said to have incorrectly or inaccurately analysed the contaminated specimens if its Analysts were to sign a certificate stating that Methamphetamine (being the contaminant) was in fact found in the urine specimens. HSA has correctly and accurately analysed the contaminants in the specimens. The HSA certificate simply states what substance is found in the urine specimens (which is the "*matter(s) contained therein*" as referred to in s 16) and does not state *why* that substance is found there or *how* that substance came to be in the specimens. From this analysis, it can be seen that the pre-contamination as alleged, while relevant to rebut the presumption in s 22, is irrelevant as far as s 16 is concerned because no rebuttable presumption can possibly arise under s 16 that the Methamphetamine found is the result of excretion from a person who had in fact smoked Methamphetamine since nothing of that sort has been stated by either ORS or BC in their respective HSA certificates.

32 On the other hand, if s 22 is engaged, then a separate rebuttable presumption arises, that the Methamphetamine found in the accused's urine specimens was not because of any external pre-contamination, but was the result of *excretion* of Methamphetamine in the urine discharged by a

person, who had earlier smoked or consumed Methamphetamine. In presuming the person "*to have consumed that controlled drug in contravention of section 8(b)*", s 22 read together with s 31(4)(b) necessarily presumes also the *actus reus* of factual consumption and excretion of Methamphetamine by the person providing the urine specimens, whereas s 16, which is independent of s 31(4)(b), does not. In contrast, s 16 alone simply presumes the factual existence of the controlled drug in the urine specimen as stated in the signed certificate of the Analyst until the contrary is proved, and goes no further than that. Even if pre-contamination by a controlled drug is shown to have occurred, the factual existence of that controlled drug in the urine specimen remains valid.

33 Hence, if pre-contamination is shown on a balance of probabilities to have accounted for *all* the Methamphetamine in the urine specimen, then that rebuts the presumption in s 22 of the commission of the offence of consumption of Methamphetamine. Therefore, even if s 31(4)(b) is satisfied and the s 22 presumption triggered, the accused must nevertheless be acquitted of the charge of consumption even though the presumption in s 16 itself (*i.e*. that Methamphetamine was in fact found in the urine specimens sent to HSA for testing) stands unrebutted. In other words, proof that *all* the Methamphetamine found in the urine specimens was caused by contamination does *not* rebut the rather "limited" presumption in s 16 that merely presumes the accuracy of the statement in the certificate that Methamphetamine is in the urine. Proof by the Defence of the existence of Methamphetamine contamination of both the urine specimens in fact supports what is presumed in s 16.

34 I turn now to consider all the evidence in the Prosecution's case together with the rebuttable presumption in s 16, which, as explained above, stands unrebutted by the contamination allegation. I assume for the moment that s 22 is inapplicable on account of non-compliance with s 31(4)(b). When s 22 is inapplicable, the burden on the accused in order to secure an acquittal is simply to cast a reasonable doubt on the Prosecution's case that he committed the consumption offence (although Methamphetamine may have been presumed under s 16 to have been found in his urine specimens that were sent to HSA for testing). The line taken by the Defence to cast that reasonable doubt was that though both his urine specimens sent to HSA were correctly analysed to contain Methamphetamine, *all* the Methamphetamine found in his urine specimens was the result of possible contamination by other sources during the urine collection stage, and not a result of Methamphetamine consumption and excretion through his urine. By way of contrast, if s 22 had been applicable, the Defence would have to go further to establish on a balance of probabilities that the accused had not in fact consumed Methamphetamine, as s 22 presumes the commission of the offence of consumption, until the contrary is proved.

35 I will now apply the "reasonable doubt" standard since I have assumed that s 22 is inapplicable. The Prosecution has to prove the offence of consumption beyond a reasonable doubt. It is the accused's evidence that he had repacked the "Ice" bought from "Kopi Kia" into 24 smaller packets from which he smoked 6. The 18 remaining packets were seized by the police and subsequently analysed and certified by HSA analyst, Dr Yap, to contain Methamphetamine. That fact stands unrebutted under s 16 and since the 6 packets of "Ice" admitted to be smoked by the accused came from the same batch of "Ice" as the 18 packets tested by HSA, the common sense conclusion is that the 6 packets of "Ice" contained as much Methamphetamine as the 18 packets were analysed to have. It was also the evidence of the Defence's expert witness, Dr John Douse ("Dr Douse") that "Ice" is prepared by allowing a concentrated solution of methamphetamine hydrochloride to form crystals. Since crystallisation occurs uniformly, it is extremely likely that the chemical composition of the same batch of "Ice" is uniform. As the Defence's submissions did not deal with any of these points, I am not prevented from inferring that the accused did in fact consume Methamphetamine by smoking that substance from those 6 packets with the aid of the pipe over a period of time on the morning of 22 January 2010. The fact that the stains on the inside of the pipe he admitted using to

smoke the "Ice" were subsequently analysed to contain Methamphetamine (a) corroborates his admission in his statements that he had believed that he was smoking "Ice" and not some other illicit drug by another street name; and (b) establishes beyond reasonable doubt that his belief was not wrong in fact. It bears repeating here that the HSA certificate for the pipe stains was not challenged and remains unrebutted under s 16.

36 Finally, the presumption under s 16 in relation to the two HSA certificates for the two urine specimens from the accused also stands unrebutted. Methamphetamine was in fact found in the accused's two urine specimens sent for analysis. I reiterate that these two certificates never stated *why* or *how* Methamphetamine came to be present in the urine specimens, or whether the Methamphetamine found was (a) entirely a contaminant; (b) entirely excreted from the accused's body; or (c) partly due to contamination and partly excreted. Given what is stated on these two certificates, s 16 cannot and did not presume that the accused had in fact ingested or consumed Methamphetamine.

37 In the light of the overwhelming evidence of the Prosecution (even without the aid of the presumption in s 22), I now consider if the Defence has succeeded in casting a reasonable doubt on the Prosecution's case on the basis that the presence of Methamphetamine detected in the urine was due entirely to pre-contamination, thus showing that the accused never consumed any Methamphetamine. Is surfacing a mere possibility of contamination through a variety of sources and pathways during the urine collection process enough to raise a reasonable doubt in the Prosecution's case that the consumption offence is committed?

38 In my view, it is insufficient for the accused to show that there was a mere possibility, a reasonable possibility or even a high probability that only *part* of the Methamphetamine found (at rather high concentration levels) in the two urine specimens came from contamination but the *rest of it* was due to excretion of the Methamphetamine by the accused in his urine. The charge is still made out as the offence of consumption is independent of whether a small or a large quantity of Methamphetamine has been consumed. For the accused to be acquitted of the charge of consumption, I reiterate that the Defence must raise a reasonable doubt in the Prosecution's case on the basis that *none* of the Methamphetamine found by HSA in both urine specimens was the result of excretion and that *all* of the Methamphetamine came from contamination, giving rise to the inference that the accused never smoked any Methamphetamine. In other words, the reasonable doubt must be in relation to the question whether *all* and not merely *some* of the Methamphetamine found at the very high concentration levels of 19,800 ng/ml and 23,300 ng/ml in his two urine specimens had been introduced into his urine specimens as a result of contamination from external sources. Thus, merely showing a possibility that only *some* Methamphetamine in the urine specimens originated from contamination does not, in my view, take the Defence very far in terms of casting a reasonable doubt on the Prosecution's case, having regard to the nature of the offence of consumption where the quantity of controlled drug consumed is totally irrelevant for the purpose of proving the offence, so long as the drug (albeit a small amount) is proved to have been consumed.

The details of the Defence's case on contamination of the urine specimens

39 Dr Douse explained in his testimony on behalf of the Defence that as the concentration of Methamphetamine in the two bottles of the accused's urine specimen were "*so close*", a "*constant drizzle of [drug] particles*" into the two urine bottles was needed to produce that result. Dr Douse conceded that it was just "*a hypothetical theory*" as to how such contamination could arise and he had no scientific proof on this aspect. Pertaining to contamination from the accused's clothing, Dr Douse referred to an article titled "Results of Methamphetamine-Contaminated Clothing Decontamination in an Experimental Trial", which concluded that smoking Methamphetamine could

result in airborne Methamphetamine particles contaminating the surface of clothing. Pertaining to contamination from the accused's hands, Dr Douse was unable to say with any certainty how much of the airborne 'Ice' particles could have adhered to the accused's hands.

40 Based on this, the Defence submitted that a real possibility of contamination exists due to insufficient precautions being taken against contamination during the collection of the accused's urine specimens at the Bedok Police Station. Hence, the urine test results could not conclusively establish that the accused had consumed Methamphetamine. The Defence argued that the burden on the defence was merely to show the occasion or means of contamination. It was not required to show the degree or amount of contamination. Further, the Defence contended that it was scientifically impossible to prove the extent of contamination for the following reasons:

(a) No steps were taken to guard against any form of contamination at the urine specimen collection stage.

(b) On the facts, the potential for contamination was large as the CNB officer who handled the bulk drugs seizure also conducted the accused's arrest and urine specimen collection.

(c) No controls were placed within the testing phase at HSA to -show the absence of contamination.

41 The Defence explored numerous possible sources and pathways of contamination at the trial and in its written submissions, much of which was based on the testimony of Dr Douse. These include:

(a) Contamination within the Gas Chromatography Mass Spectrometry instrumentation ("GC/MS"), whilst carrying out multiple sample analyses in sequence;

I note that this was abandoned in the Defence's submissions since the Prosecution's witnesses testified that the GC/MS instrument provides for internal automatic washes with clean solvent in between analyses of samples from other accused persons and from spiked urine used as controlled samples and calibration standards. The chromatograms rendered in between must return negative results for any form of controlled drugs including Methamphetamine, proving that the GC/MS instrument has washed itself clean, before the next urine sample placed on its autosampler tray is tested. The GC/MS instrument can cater for the automatic sequential analysis of 50 different samples placed in the autosampler tray at one go.

(b) Cross contamination by the pipette during the extraction of samples from the large number of urine specimens from various accused persons at the HSA laboratory;

This was also omitted from the Defence's submissions since HSA witnesses had testified that as part of HSA's laboratory protocol (which had been assiduously followed in this case), only disposable pipette tips are used. Further, the Laboratory Officers are trained to hold the pipette in such a manner that there is no backflow towards the non-disposable part of the pipette when performing the pipetting. Consequently, the abstracted urine in the pipette always remains within the disposable pipette tip.

(c) Possible contamination from the work benches;

I accept the evidence of the well trained HSA laboratory personnel that they keep their work benches clean and that most of the items used are disposable, so as to prevent contamination.

(d) Possible contamination from the material used to make the plastic containers that store the urine specimens collected from accused persons;

This was not referred to in the closing submissions of the Defence as evidence was adduced through the HSA officers that there were GC/MS tests previously conducted on this issue by HSA. Samples of plastic bottles provided by the manufacturer made of the same plastic material as the present plastic bottles were used to store pure urine for an extended period of time and no contamination with controlled drugs was detected subsequently in the pure urine.

(e) Possible contamination from very fine drug particles (with sizes ranging from those which cannot be seen and going up to 0.5 mm in diameter) rising into the air, and entering the urine bottles when the urine was being collected and prior to screwing on the bottle caps;

(f) Drug particulates on the unwashed clothes of the accused, the accused's hair and other exposed parts of his body from smears, vapour traces, condensation and smoke emitted from the pipe during pyrolysis. It is not disputed that the accused was wearing the same clothes that he wore when he was arrested, and that those were the clothes worn while he smoked "Ice" in his room;

(g) Drug particles adhering to the clothing of the accused or the CNB officers as a result of (i) inadvertent brushing of clothing with the walls, furniture surfaces or other items in the room that were coated with tiny drug particles; or (ii) direct contact with contaminated hands or the drugs themselves though drug handling, search, seizure, spillage, consumption or repacking activities;

(h) Possible transfer of drug particles from the gloves of the CNB officer (after having seized or touched the drugs) to the accused's hands, body or clothes when handcuffing the accused and manhandling him during the arrest;

(i) Possible contamination from drug particles "shedding" from the contaminated handcuffs or clothes of the accused into the bottles as a result of gravity. Drug particles would also shed from the clothes of CNB officer who was involved in the arrest of the accused and the drug seizure at Kim Tian Hotel. Should this CNB officer be present to accompany and closely supervise the accused during the urine specimen collection, Dr Douse testified that drug particles constantly "radiating" (*i.e.* detaching themselves from the CNB's officer's clothes) could also find their way into the urine bottles as they fell to the ground;

(j) Possible "radiation" of drug particles from the accused's hair or body finding their way into the urine bottles whilst the accused was providing his urine specimen;

(k) Drug particles on the skin, hands and those trapped under the fingernails of the accused could possibly fall into the bottles whilst the urine specimens were being collected. This could happen when his hands or fingers passed over the open mouth of the urine bottles during the opening and closing of the bottle caps or at the time of the urine collection;

(l) Real and obvious risk of contamination through splashing when the urine bottles were held with the accused's contaminated fingers near the mouth of the bottles during the urine collection. There could also be inadvertent splashing during urination onto his fingers and subsequent spilling of that urine into the bottles; and

(m) Contamination from handling the outside of the unused bottles by other accused persons who might have come into contact with large quantities of drugs and who were subsequently allowed to select the bottles freely from a large number of unused bottles kept in the CNB steel cabinet. If the accused persons' hands had been contaminated with drugs, allowing them to rummage through the cabinet drawer filled with unused bottles would have contaminated the exteriors of the bottles even before they were used. There was no individual wrapping for each unused bottle to minimise contamination. By touching the contaminated exteriors of the unused bottles during the bottle selection, drug contaminants smeared on or attached to the accused's hands could also fall inside the bottles in the same manner as described above.

42 The numerous possible sources and pathways of contamination alluded to by the Defence related principally to events taking place outside the HSA building (particularly at the Hotel room and Bedok Police Station) and not so much within the HSA itself. Having heard the Prosecution's evidence, Dr Douse in fact concluded, and quite rightly so, that the urine handling and testing procedures in the Analytical Toxicology Laboratory – Drug Abuse Testing Unit ("DAT laboratory") met with internationally accepted standards. Since that is the case, it is reasonable to infer that HSA must have put in place sufficient safeguards against contamination within the DAT laboratory. I therefore understand that the Defence is taking issue mainly with contamination occurring during the raid at the Hotel room and the actual urine collection process at the Bedok Police Station, and not contamination occurring within HSA.

Prosecution's response on the issue of contamination

43 The Prosecution submitted that the contamination posited by the Defence could be dismissed for the following reasons:

(a) Corporal Marc Goh ("Cpl Goh") testified that he did not see any loose "Ice" lying around the hotel room. Given that the accused could sell each packet of 0.1 grams of "Ice" for $50, he would not be so careless in his packing of the ice into smaller packets, such that loose quantities were left scattered around and wasted. More importantly, given that the accused remained silent during trial, there was no contrary evidence from him that loose quantities of "Ice" were lying around in the hotel room to enable such large scale adherence of drug particles to the body, hair, clothing and fingernails (whether of the CNB officers or the accused) to take place.

(b) Cpl Goh denied the suggestion of Defence counsel that the accused had put his fingers *inside* the three bottles when he was asked to select them. Cpl Goh testified that the unused bottles were originally capped including the three bottles selected by the accused. Further, Cpl Goh did not notice the accused ever putting his fingers into any of the three bottles when excreting urine into them. Cpl Goh further denied the suggestion of Defence counsel that the accused had put his fingers into his urine or had passed urine over his fingers when providing his urine. Cpl Goh also did not see the accused touch the inside of any of the bottle caps (as opposed to holding each cap on its outside) in the course of handling them.

44 I find that there is no reason to doubt the veracity of Cpl Goh's evidence.

45 As the Prosecution has meticulously and accurately set out the evidence of the Prosecution witnesses in relation to the urine collection process, I can do no better than to quote the

Prosecution's submission below:

D Procurement of urine from the accused

13 At about 11.50 am, together with Insp Deng and Cpl Goh, SSgt Rizal escorted the accused to the CNB office located at the Bedok Police Division Headquarters ("Bedok Police HQ") for further investigations. Cpl Goh testified that the accused was handcuffed to his back all the way from the hotel room to the Bedok Police HQ. The accused sat in a CNB vehicle with his hands touching the back seat (which was covered with a leather-like material) of the vehicle. After the accused arrived at the Bedok Police HQ and before the accused's urine was procured, a search of the accused's body was done by Cpl Goh. Cpl Goh also instructed the accused to strip to ensure nothing was hidden under his clothes, and after the check, Cpl Goh told the accused to put back his clothes.

14 Cpl Goh testified that at about 1.20 pm, he escorted the accused from the waiting area of CNB Office to the Instant Urine Test ("IUT") room located within the same office to commence the process of procuring the accused's urine specimen under s 31(1) of the MDA ("the accused's urine specimen"). Cpl Goh's evidence-in-chief was initially unchallenged by the Defence. However, the Defence later belatedly raised issues pertaining to the possible contamination of the accused's urine specimen at the procurement stage and thus Cpl Goh was recalled to give detailed evidence on this.

15 Upon recall, Cpl Goh testified that he was trained to be extra cautious during urine procurement. Crucially, he was required as part of standard operating procedure to observe the accused when the accused was providing his urine as to prevent the accused from tampering with his urine specimen.

16 Cpl Goh's evidence on what he observed in respect of how the accused's urine specimen was procured was as follows:

- The accused selected three unused empty plastic bottles ("the three bottles") from the first compartment of a plastic box containing more than 20 blue-coloured capped bottles, with reference to photos P93. The three bottles resembled the sample bottle tendered in court (P94), which when uncapped, has an opening at the top with diameter of approximately 2.3 cm.

- The three bottles were capped when the accused selected them from the box as the bottles had arrived capped from the vendor and were not uncapped up till the time the accused chose the bottles. Upon cross-examination, Cpl Goh disagreed that the accused had been asked to choose three uncapped bottles from one plastic bag and then three caps from another plastic bag.

- The accused's hands were cuffed in front for his selection of the three bottles. He selected the three bottles randomly (while still cuffed) and then cupped the bottles in his open palms. He did not open the caps at this juncture. Upon cross-examination, Cpl Goh disagreed that the accused's hands had been freed for the selection of the three bottles.

- It was not disputed that the accused was given a choice to wash the three bottles but he elected not to. The accused was escorted by Cpl Goh to a toilet with three urinals located just outside the IUT room. The accused chose one of the urinals.

- The accused placed the three bottles on a ledge and stood in front of the urinal. The

accused then uncapped all the three bottles for the first time and placed them back to the ledge. Cpl Goh observed that the accused did not insert his finger into any of the bottles during this process.

- The accused who was still handcuffed to his front, unzipped himself. Upon cross-examination, Cpl Goh disagreed that the accused was released from handcuffs at this point.

- The accused then commenced passing urine into one of the three bottles (in the presence of Cpl Goh who was an arm's length away beside him). After providing his urine into the first bottle, the accused held his urination for a brief period while he placed the first bottle on the ledge and retrieved the second bottle for him to provide his urine. The same sequence was repeated for the second and then the third bottle. For each bottle that the accused picked up, Cpl Goh observed that the accused put it very close to his penis and the spill was very minimal. When asked by the court whether the passage of the accused's urine passed over the accused's fingers before it went to the bottle, Cpl Goh answered a firm "no". This was the same for all the three bottles. Upon cross-examination, Cpl Goh disagreed that he had not observed the accused's actions and stated that he was escorting the accused solely at the time. Cpl Goh also disagreed that the accused had to "cup" the bottle while urinating into it as he had observed the accused holding the "bottom side" of the bottle.

- In the course of the accused's provision of the three bottles of urine, Cpl Goh did not notice him putting his finger into the bottles. He also did not notice any crystalline or powder-like substance on the accused's fingers and his clothing. Cpl Goh also did not see the accused touch the inside of any of the caps (as opposed to holding the cap on its outside) in the course of handling the caps.

- After the accused had urinated into the three bottles, the accused capped the three bottles tightly and left the urinal. He carried the three bottles back to the IUT room.

- The accused opened one of the three bottles and Cpl Goh siphoned out some of the accused's urine within it into a test tube labelled with his name and NRIC number for IUT. The bottle was then discarded.

17 Cpl Goh also testified that for the remaining two bottles of the accused's urine specimen, the accused placed them into a new plastic bag with a label stating his name and NRIC number. After the accused confirmed that his name and NRIC number were correctly stated on the label, Cpl Goh sealed the plastic bag with a heat-sealer and passed it to the accused. The accused was told to carry it at all times until further instructions were given by him. Cpl Goh then placed the test tube with the accused's urine from the first bottle into the IUT machine for the IUT to be performed.

18 Cpl Goh testified that after the IUT was performed, the accused's CNB urine test result slip was generated and this stated that the accused's urine was positive for Amphetamine (Exhibit P1). Cpl Goh wrote his name in the fields for "escorting officer" and "sealing officer" and signed on the accused's CNB IUT result slip. Cpl Goh conveyed the result to Insp Deng (PW 1), who instructed him to send the other two bottles of the accused's urine to the Analytical Toxicology Laboratory (ATL) of HSA to test for two types of drugs, namely amphetamine and ketamine (as ketamine was not screened for during the IUT). Insp Deng explained that whenever an accused person's urine sample is tested at the IUT stage to be positive for amphetamine, it is CNB's standard procedure to request for the ATL to test for the presence of amphetamine and ketamine as there is ground for reasonable belief that that accused person is a psychotropic drugs abuser.

19 Cpl Goh also testified that in the presence of the accused, he tore open the sealed plastic bag and retrieved the two bottles of the accused's urine specimen. He pasted a CNB Urine Barcode Label over each bottle. Each CNB Urine Barcode Label contained the following information: the drug types sought to be tested, name of subject (the accused person), NRIC number of subject, the date the urine specimen was taken and the marking number as provided by the CNB ("the CNB marking number"). One bottle was given the CNB marking number C-SG-10-00099-1 ("the first bottle of the accused's urine specimen") and another bottle was given the CNB marking number C-SG-10-00099-2 ("the second bottle of the accused's urine specimen"). Cpl Goh handed the two bottles of the accused's urine specimen to the accused and instructed him to place each of them into separate compartments of a locked metal security box ("the locked metal security box"). The accused deposited the first bottle of his urine specimen into the compartment marked "1" and the second bottle of his urine specimen into the compartment marked "2" on the locked metal security box (Photo P11). The locked metal security box was kept in a locked freezer in the Bedok Police HQ.

20 In the course of cross-examination, the Defence took the surprising position that Cpl Goh was not the officer who had procured the accused's urine specimen. Cpl Goh disagreed – he was certain that he was the officer involved in the accused's urine procurement, as he would not have penned his signature on the result slip otherwise. In fact, as the accused was listed as a "trafficking case" (which is also stated on the accused's CNB Test Request Form, Exhibit P3), he escorted the accused throughout the whole process of procuring his urine specimen and he did not handle any other accused persons at the same time as the accused. (Footnotes in original text are removed.)

46 I accept the evidence of the Prosecution witnesses as set out above, in particular that of Cpl Goh, as proof of what had in fact taken place during the urine collection process. There is no contrary factual evidence before me to contradict Cpl Goh's evidence or that of the other CNB officers since the accused remained silent.

47 While the Defence expert had postulated the existence of many sources of contamination and a multitude of pathways by which Methamphetamine contaminants could have gotten into the accused's urine specimens, I agree with the Prosecution's submissions that these are merely abstract possibilities (and indeed the Defence expert himself conceded that contamination was a mere "possibility" in the present case).

48 First, the postulated contamination would not, in my view, be able to account for the presence of Amphetamine in the relatively high quantities found in both the accused's urine specimens and in approximately the same Amphetamine to Methamphetamine weight ratios. The first bottle of the accused's urine specimen was analysed to contain 1,476.04 ng/ml of Amphetamine and 19,842.73 ng/ml of Methamphetamine giving a 7.438% weight ratio of Amphetamine to Methamphetamine. The second bottle of the accused's urine specimen was analysed to contain 1,772.20 ng/ml of Amphetamine and 23,327.80 ng/ml of Methamphetamine giving a 7.597% weight ratio of Amphetamine to Methamphetamine. I note that some deviation in the measured concentrations of the two different drugs in ng/ml of the two urine specimens from the same accused is apparently inevitable when testing for drugs in biological fluids. However, this deviation is in any event within the acceptable variation range of 20%.

49 It is accepted by Dr Douse and the Prosecution witnesses, namely Ms Shelley Jane Turner ("Ms Turner"), Dr Lui Chi Pang ("Dr Lui") and a few other HSA Analysts, that Amphetamine is a known metabolite (*i.e.* the product of metabolism) of the consumption of Methamphetamine and will be discharged in the urine together with the Methamphetamine. Scientific literature also attests to this.

As both Methamphetamine and its accompanying metabolite, Amphetamine, are normally discharged in the urine at the same time by the Methamphetamine drug abuser, it would not at all be surprising to find approximately the same weight ratios of the metabolite (*i.e*. Amphetamine) to the main drug consumed (*i.e*. Methamphetamine) in both the accused's urine specimens *only if* the accused had in fact consumed Methamphetamine earlier. In the present case, the weight ratio of **7**.438% for the first urine specimen is in fact nearly identical to the weight ratio of 7.597% established for the second urine specimen. Had it truly been the case that the accused had excreted entirely drug-free urine, and the presence of drug in the urine was wholly due to some possible randomly occurring contamination from fine "Ice" particles falling into the two urine bottles (from the hair, hands, fingernails or clothes), then I would expect (a) the HSA certificates for the urine specimens to show *only* the presence of Methamphetamine, without any Amphetamine; and (b) the weight ratios of Amphetamine to Methamphetamine for both specimens should also be very close to 0 % since "Ice", according to Dr Yap, is normally very pure Methamphetamine without any Amphetamine. The Defence did not challenge Dr Yap's evidence that in all her years of experience, she had not found Amphetamine in its pure form in "Ice" seized and sent to HSA for analysis, save for the general challenge on her laboratory's ability to detect Amphetamine, which was convincingly resisted by Dr Yap. In fact, there was no Amphetamine found in the 18 packets of "Ice" analysed by HSA, which disproves the Defence's hypothesis of contamination from the fine particles of pure "Ice" randomly shedding and falling into the urine bottles during the urine collection process.

50 In my judgment, the *joint* presence of Methamphetamine and Amphetamine, particularly at about the *same* weight ratios in the two urine specimens, strongly indicates that both must be attributed to Methamphetamine consumption, and not to some randomly occurring contamination. Random shedding into each bottle of Methamphetamine and Amphetamine particles – assuming Amphetamine was also seized (which was not the case here in any event) and assuming further that there was substantial spillage from the packets of crystalline Amphetamine present in the hotel room, thereby allowing wide spread additional Amphetamine contamination of clothing, body and hair to take place – is not likely to result in *almost identical* weight ratios in both urine specimens, separately collected. Such random shedding might possibly explain one factual aspect of why there was substantial Amphetamine contamination in the urine collected together with Methamphetamine contamination, but it does not explain the other factual aspect of why *both* bottles of urine were found to have *almost identical* weight ratios of Amphetamine to Methamphetamine.

51 Second, in an attempt to explain why Amphetamine was found in fairly substantial quantities in both urine specimens (which were way above trace or noise levels as could be seen in the chromatograms and the test results), the Defence mooted the next possibility that the accused could have inhaled or consumed Amphetamine instead as a pyrolysis product which led to the presence of Amphetamine in the urine. This also did not help the Defence because the Defence could not identify what other compound could have been burnt (apart from Methamphetamine) that led to Amphetamine as a pyrolysis product. If he was inhaling both Methamphetamine and Amphetamine (as the pyrolysis product of Methamphetamine) at the same time because he was burning the Methamphetamine to consume it, then I do not see how that assists the accused's defence that he had not been consuming Methamphetamine.

52 The next theory generated by the Defence attributed the fairly substantial amounts of Amphetamine found together with the Methamphetamine at about the *same* weight ratios in the urine specimens to the after-effects of smoking the Methamphetamine. The smoking produced Methamphetamine particles and other pyrolysis products in the form of Amphetamine particles in the air at about the same weight ratios, and these two types of particles separately settled onto the clothes, hair, hands or body of the accused and thereafter, found their way into each of the two urine bottles through the small mouth of the bottles (each of just 2.3 cm in diameter), uncapped for

just the brief few seconds to collect the urine. This possibility accounted for the dual presence of both controlled drugs in those high concentrations and in approximately the *same* weight ratios found in both bottles of urine specimens. However, this "smoking" theory of the Defence is a desperate attempt to find some way out to explain why the *same* weight ratios were found. This "smoking" theory is simply just too improbable for my serious consideration, quite apart from the fact that such a theory premised on smoking Methamphetamine, unless not by the accused, does not seem to me to provide a good defence to the charge.

53 Third, it is an irresistible deduction from my point of view that the fairly substantial quantity of Amphetamine found in the urine specimens must be the result of the accused's body metabolising a part of the large amount of Methamphetamine consumed by him prior to his provision of the urine specimens in question, which therefore accounts for their dual presence in those high concentrations at almost identical weight ratios in both urine specimens. There is no other tenable or credible explanation. That he had in fact consumed a substantial amount of Methamphetamine earlier is substantiated by the high concentrations of unmetabolised Methamphetamine found in the two urine samples (in different bottles), which were certified as 19,800 ng/ml and 23,300 ng/ml. These concentration levels are 40 times higher than the cut-off level set internally by HSA of 500ng/ml before HSA is prepared to render a positive report certifying that Methamphetamine is present in the urine specimen. HSA treats results less than 500ng/ml as negative for the presence of Methamphetamine.

54 Fourth, leaving aside the nearly identical weight ratios found, it is also rather improbable for the Methamphetamine particles to drop into each bottle in such a manner and at such a rate, such that the resultant concentration levels for the Methamphetamine were coincidentally within the normal analytical variation range (in this case 19,800 ng/ml in one bottle and 23,300 ng/ml in the other bottle), unless of course it is assumed that the shedding rate of Methamphetamine particles into both urine bottles was relatively constant and each bottle was opened for about the same amount of time to collect approximately the same quantity of urine from the accused. Dr Douse admitted in cross-examination that the likelihood of roughly an equal amount of "Ice" falling into each of the two urine bottles was statistically "remote". More importantly, he also conceded, and in my view rightly so, that such contamination (if any) would not in any case have contributed "significantly" to the concentration of Methamphetamine found in the urine. The implication of this concession is that the Methamphetamine concentration found must have come from excretion, which in turn necessarily implicates the accused of having committed the offence of consumption of Methamphetamine.

55 It only remains for me to conclude that the significant amount of Methamphetamine found in both the urine specimens must be through excretion from the body of the accused and from no other possible sources. I have no reasonable doubt that contamination in the manner as set out by the Defence is a highly unlikely possibility. To confirm that the possibility is indeed very remote, some numeral estimates with certain rational assumptions could be made to find an answer to the question of what extent or amount of contamination through all the various pathways imaginable is needed to account for the actual concentrations of Methamphetamine found in the urine samples. To give a sense of the likelihood of the contamination, Dr Douse himself volunteered some calculations and testified as follows:

A: All one needs is the dislodging or contamination of some of the particles trapped at or under the fingernails. It would only need 5 of the 0.5mm diameter particles to dislodge from the fingers to bring the contamination to 20,000 ng/ml.

A: "I have revisited the calculations for a 0.05 mm diameter particle which is just visible against the contrasting background. My calculations indicate you need 115 of these particles to

make 500 nanograms per ml in a 15ml sample. If you had a particle of 0.5mm diameter, I believe this is the largest size that is easily transferred by air currents. Each one would transfer 65.4 micrograms. It would require 300-- 300 micrograms to make 20,000 nanograms per-- per ml. That would be about approximately five…of those particles traces formed."

56 I checked Dr Douse's calculations and found them to be correct based on the following assumptions: that the density of the crystalline Methamphetamine is the same as that of water at 1 milligram or 1000 micrograms per mm3 and that each particle is a perfect sphere with the different diameters as indicated. I can accept that these are not unreasonable assumptions for the purpose of the calculations performed by Dr Douse. In summary, Dr Douse's calculations show that 5 spherical Methamphetamine particles, each of 0.5 mm in diameter, falling into the urine bottle containing 15 ml or 15 cc of pure or drug-free urine will be sufficient to contaminate the urine to a concentration level of 20,000 ng/ml of Methamphetamine. If the spherical Methamphetamine particles were smaller at 0.05 mm in diameter, then 4,600 particles will be needed to give a contamination level of 20,000 ng/ml. If the contamination is found at the lowest cut-off threshold of 500ng/ml needed for the certification of the presence of Methamphetamine, then a correspondingly lower number of particles is needed to achieve that lower level of contamination (*i.e*.115 spherical Methamphetamine particles of 0.05 mm in diameter are required to give a contamination level of 500 ng/ml).

57 However, these calculations merely show the amount of particles needed to be shed into each bottle to achieve the concentration levels found. In my view, they mask the fact that the large quantities of Methamphetamine particles (*i.e*. 4,600 spherical Methamphetamine particles of 0.05mm diameter or 5 spherical Methamphetamine particles of 0.5 mm diameter) have to enter each bottle within a very short space of time, indicating that the rate of shedding must be very high. It takes perhaps less than 5 seconds to fill a bottle with 15 ml of urine and the window period for the shedding of Methamphetamine into the bottles is not much longer than the time spent urinating into each bottle. The more important question that springs immediately to mind is what total quantity or weight of Methamphetamine the accused's body, hand, hair and clothes must be carrying for that rate of continuous shedding to last throughout the long hours that passed between his arrest and his urine collection. Shedding could not possibly take place only when the accused was urinating and not at other times. Hence, shedding must necessarily be continuous, and the rate of shedding must obviously decrease with time.

58 The simple calculation below will show that it is highly improbable to sustain the high rate of shedding postulated by Dr Douse which is necessary to attain the contamination concentration levels matching that found in the urine specimens, which therefore assures me that the contamination from shedding (as a cause for the high concentration of Methamphetamine found in both urine specimens) is indeed very remote, if not, impossible.

59 It was Dr Douse's evidence that a transfer of 0.3 mg (equivalent of 300,000 ng) of Methamphetamine into 15 ml of urine specimen (about half the size of the urine specimen bottle) was required to obtain a Methamphetamine concentration of 20,000 ng/ml. I agree with that as it is mathematically correct. Assuming a constant rate of shedding or a constant drizzle of Methamphetamine particles (as Dr Douse himself had postulated), and a very generous time window of 15 seconds to provide each urine specimen, that means 0.3 mg of Methamphetamine particles must fall continuously from a "small area" of the accused's clothes, hair and body that is immediately above and near the vicinity of the mouth of the bottle every 15 seconds during the urine collection process. I am also very generous to assume for the moment that all the 0.3 mg of Methamphetamine particles that were shedding from that "small area" during that 15 seconds somehow managed to find their way into the bottle through its small opening, with no wastage of particles falling to the floor (which in my view is also highly unlikely). Since the accused was arrested at about 10.40am and the urine

specimens were provided shortly after 1.20pm on the same day, the accused had been shedding particles over (at least) a continuous period of 2 hours and 40 minutes. A rate of shedding of 1.2 mg every minute (0.3mg/15 sec) over the elapsed period of 160 minutes (2 hours 40 minutes) works out to a total shedding of 192 mg of particles. This means that 0.192 grams of Methamphetamine, or *almost two packets of the "Ice"* (as each packet of "Ice" packed by the accused contained 0.1 gms of Methamphetamine assuming the "Ice" to be pure Methamphetamine) were condensed on that "small area" of the accused's body, hand, hair and clothes. As Dr Douse accepted, that was not remotely possible.

60 If one adopts a more realistic assumption that the collection of each 15 ml urine (approximately half a bottle of urine) would not take as long as 15 seconds, and is more likely to be in the order of 5 seconds, then that "small area" of body, hand, hair and clothing of the accused would be carrying not two but six packets of drugs. If one takes further account of the fact that it is unlikely for the deposit of Methamphetamine particles to be solely concentrated on the "small area" immediately above where the urine bottle will be held during urine collection, and that it is far more likely for the Methamphetamine particles to be distributed also randomly over other parts of the accused's body, hair and clothes, and if we conservatively assume the contaminated area to be *three* times larger than the "small area", then the total quantity of Methamphetamine particles clinging onto the entire area of the clothing, head and body of the accused will amount to a total of 18 packets of drugs. If one further considers that the rate of shedding would not have been uniform but would have been much higher initially at the time of the accused's arrest and thereafter taper off gradually over 160 minutes till the time of urine specimen collection, then the 18 packets worth of Methamphetamine contaminant particles deposited on the accused's clothing, hair and body would in fact be a serious underestimation. This simple rough analysis shows that the contamination hypothesis of the Defence is entering the realm of science fiction. Basically, all the Methamphetamine in the 18 packets would have to be clinging to his clothes, hair and body as contaminants to be gradually shed over 160 minutes to achieve the concentration levels found in the urine specimens. If that were the case, we will not be finding 18 packets of Methamphetamine each containing 0.1 grams of the drug still lying around to be seized by the CNB officers at the time of the arrest. With the equivalent of 18 packets of Methamphetamine on his clothing, hair and body, Cpl Goh would have to be blind not to have immediately noticed such a large quantity of crystalline substance on the accused's clothes, hair and body. In fact, Cpl Goh's evidence was that he had done a body search on the accused at the time of his arrest and he did not notice any part of the accused's body coated with powdery or crystalline substances. Cpl Goh also did not see any tears on the 18 packets of crystalline substances seized from a table in the hotel room, which would then not give any cause for concern that a large part of the crystalline substance from these packets might somehow have spilled out and found its way onto the accused's body, hair or clothing. Gpl Goh testified that he did not use his bare hands as he wore gloves to handle the seized exhibits. This also minimises the likelihood of contamination stemming from Cpl Goh's bare hands. I have no reason to doubt Cpl Goh's evidence.

61 The discussion above demonstrates quite convincingly that it is rather fanciful, if not incredible, to hypothesise that *all* or even a significant part of the Methamphetamine found in the two urine samples came *exclusively* from contamination.

62 The following dicta of Denning J in *Miller v Minister of Pensions* [1947] 2 All ER 372 at 373, which has been accepted as correctly stating the law in Singapore (see *Took Leng How v PP* [2006] 2 SLR(R) 70 at [28]; see also *Jagatheesan s/o Krishnasamy v PP* [2006] 4 SLR(R) 45 at [49]), is apposite here:

> That degree [which the Prosecution must reach] is well settled. It need not reach certainty, but it must carry a high degree of probability. Proof beyond a reasonable doubt does not mean proof

beyond the shadow of a doubt. The law would fail to protect the community if it admitted fanciful possibilities to deflect the course of justice. *If the evidence is so strong against a man as to leave only a remote possibility in his favour which can be dismissed with the sentence "of course it is possible but not in the least probable," the case is proved beyond reasonable doubt, but nothing short of that will suffice*.

[emphasis added]

63 The Court of Appeal in *Took Leng How* also endorsed the following statement of leading academic Tan Yock Lin at [29]:

A mere doubt, as opposed to a reasonable doubt, must frequently be conceded in the nature of things but because *it cannot yet concretely be articulated in relation to the evidence in the case*, it remains *an untested hypothesis* and may be rejected.

[emphasis in original]

64 While it is of course possible that there can be contamination, however on the facts of the present case it was most improbable that contamination accounted for the high concentrations of Methamphetamine found in both urine specimens. The Defence's theory of contamination remains as a "mere doubt" that cannot be "concretely articulated in relation to the evidence in the case" and I reject it outright. The Defence has not succeeded in casting a reasonable doubt on the Prosecution's case that the accused had consumed Methamphetamine and then discharged it subsequently (together with the metabolite, Amphetamine) via his urine into the urine bottles that were sent to HSA for analysis.

65 On the totality of evidence, I therefore find that it was the accused's consumption of Methamphetamine that accounted for the bulk of (if not all) the Methamphetamine and Amphetamine in both his urine specimens. Even if a small proportion of the Methamphetamine and/or Amphetamine in his urine had been due to the consumption of pyrolysis products but a much larger portion came from contamination, this still does not affect the accused's liability for the offence as he would still have consumed Methamphetamine and committed the offence.

Lack of safeguards against contamination during the urine specimen collection

66 The Defence zealously submitted that no effective steps were in place to guard against contamination during the urine specimen collection, especially when bulk drugs (as in this case) were seized and the associated risk of contamination was necessarily greater. As such, this gives rise to the probability that some of the means of contamination had indeed brought about contamination, though the amount of contamination was not ascertainable.

67 Dr. Douse suggested that having controls to prevent contamination was a crucial procedure to provide some measure of certainty to the court of the absence of contamination. He said:

This is the only certainty that you can actually have, is if you have taken all possible measures to prevent, ensure quality controls are clear, you can say for instance to a Court that contamination is either extremely unlikely or impossible.

68 According to Dr. Douse, forensic laboratories in the United Kingdom make it a point to ensure that a *different* police officer conducts the arrest and supervision of urine collection so that the potential for cross-contamination is negligible. However, Dr Douse was extremely forthright to say

that it was implausible in this case for the contamination to have contributed significantly to the high concentration of Methamphetamine detected in the urine specimens, and I have to agree with him. It is true that the precise extent of contamination, if any, in this case is an area of some uncertainty, but on the facts of this case, I am fairly certain that there is only a very remote possibility that contamination alone can explain such high concentration levels of Methamphetamine found. As the possibility of contamination can never be entirely discounted, I can accept that there is always room for improving the safeguards against the possibility of contamination during the urine collection process. For example, the following processes could be implemented:

(a) Mandatory washing of the accused's hands prior to touching any clean unused specimen urine bottles in the CNB cabinet and prior to the provision of the urine samples, so as to prevent contamination coming from the accused's hands and fingers.

(b) Mandatory washing of the urine bottles by the accused prior to provision of the urine specimens (as opposed to the present optional washing of the bottles at the election of the accused).

(c) The accused to be totally undressed during the urine collection process to prevent contamination from the accused's unwashed clothing.

(d) Mandatory bathing of the entire body (including washing of hair) by the accused prior to the urine collection process. During bathing, the bottles can also be washed by the accused. Immediately after bathing and drying up with disposable paper towels, the accused provides specimens of his urine and thereafter, caps the bottles before putting on his clothes and leaving the bathroom.

(e) To cease the practice of allowing accused persons to rummage through the cabinet of unused urine bottles to select their bottles so as to remove any likelihood of their hands contaminating the exterior of the unused clean urine bottles stored in the CNB steel cabinet at the Police Station.

(f) To have supervision of the urine collection process remotely supervised via a camera, or alternatively, to have a transparent glass partition separating the accused from the supervising CNB officer instead of having the CNB officer physically present next to the officer whilst the accused provides his urine specimen in order to minimise any cross-contamination from the CNB officer himself.

69 Of course, there could be other better and more cost efficient safeguards other than those listed above to improve the urine collection process and further minimise any possibility of contamination. Dr Douse suggested that the accused could wear a paper suit and rubber gloves to avoid contamination from his clothing and hands, and the police or CNB officer responsible for seizing the actual bulk drug exhibits could be excluded from the process of procuring the urine specimens from the accused. Whether or not to introduce more safeguards to improve on those already present is, however, a policy matter for the CNB and police. If they wish to implement any of them, they would have to consider the various constraints, the cost-effectiveness, advantages and

disadvantages of the different anti-contamination measures and the impact on their operational efficiency. I make no comment on whether or not more anti-contamination measures should be introduced (over and above those existing measures taken) as it is clearly a policy and operational matter for the police and CNB to decide. I am aware that contamination can still occur even with the best of safeguards. It is not totally preventable but the risk and degree of contamination can of course be further minimised with more reliable safeguards put in place, if that is deemed necessary.

70 All said and done, the Defence has not succeeded in casting a reasonable doubt on the Prosecution's case proving that the accused had in fact consumed Methamphetamine, and consequently, that he had committed the offence as charged. In my view, the Prosecution's evidence, coupled with adverse inferences drawn by me and the unrebutted presumptions available to the Prosecution under s 16 arising from the four HSA certificates, is in fact overwhelming. The Prosecution need not rely on the s 22 presumption at all to prove the charge against the accused beyond a reasonable doubt. I have no hesitation whatsoever in finding the accused guilty as charged.

Proof by relying on the two HSA certificates for the urine tests plus the presumptions under ss 16 and 22

71 The evidence considered so far amply justifies convicting the accused. But consumption of Methamphetamine can also be *independently* proven by utilising s 22 of the MDA, which presumes both the *mens rea* and *actus reus* of consumption (*Vadugaiah Mahendran v PP* [1996] 1 SLR 289).

72 For the purpose of the following analysis, I will assume that the main evidence available to the Prosecution are the two HSA certificates stating that the accused's urine specimens contained Methamphetamine. I further assume that no drug exhibits or drug paraphernalia were seized from the accused and that he did not make any admissions in his statements to the CNB officers. The Defence remains unchanged in that there is the possibility of contamination from various sources and pathways, and that the s 22 presumption (see above at [28]) is inapplicable because the necessary requirements in s 31(4)(b) (see below at [73]) are not satisfied. I will now consider whether the Prosecution is able to prove the offence of consumption under these artificially modified factual circumstances.

73 The operation of the s 22 presumption depends on fulfilment of the requirements set out in s 31(4)(b) in relation to urine tests. Section 31(4)(b) states:

> **Urine tests**
>
> **31**. -
>
> ...
>
> (4) A specimen of urine provided under this section shall be divided into 3 parts and dealt with, in such manner and in accordance with such procedure as may be prescribed, as follows:
>
> (a) a preliminary test shall be conducted on one part of the urine specimen; and
>
> (b) each of the remaining 2 parts of the urine specimen shall be marked and sealed and a urine test shall be conducted on each part by a different person, being either an analyst employed by the Health Sciences Authority or any person as the Minister may, by notification in the *Gazette*, appoint for such purpose.

74 In order to determine whether the charge of consumption against the accused is proved under the assumed circumstances, four separate questions must be addressed:

(a) How should the requirements in s 31(4)(b) be interpreted?

(b) Do the urine test procedures at the DAT laboratory in HSA comply with the requirements of s 31(4)(b)?

(c) Was there factual compliance with the urine test procedures by the HSA personnel assigned to conduct the urine tests on the accused's urine specimens?

(d) Has the Defence successfully rebutted the presumption in s 22 on a balance of probabilities, if s 31(4)(b) has indeed been complied with?

75 With respect to the above, the Defence asserted that:

(a) the analysts who issued the certificates ("the certifying Analysts") did not "conduct" the urine tests as required by s 31(4)(b) as they did not physically supervise (in the sense of watching or checking in real time) the work of the Laboratory Officers;

(b) the requirement of independence by having two "different" persons perform the two urine tests separately as laid down by s 31(4)(b) was not satisfied due to the fact that various steps were carried out by the *same* person in respect of both bottles of the accused's urine specimens; and therefore

(c) the presumption in s 22 did not arise.

76 During the trial, references were made to dicta in *Lim Boon Keong v Public Prosecutor* [2010] 4 SLR 451 ("*Lim Boon Keong*") where Steven Chong J made several observations on the interpretation of s 31(4)(b), particularly on whether the standard procedures adopted by HSA for the urine tests had satisfied the legal requirements set out. Much of defence counsel's cross-examination was premised on the learned judge's observations in *Lim Boon Keong*. Although I am not bound by those observations, their persuasiveness compels me to record in some detail the reasons for my conclusions here, which in some aspects differ from the learned judge, who was, unfortunately, not given the benefit of all the evidence that was before me.

The Prosecution's evidence

77 Voluminous evidence was led during the trial on the HSA standard operating procedures, the administrative tasks at HSA prior to the urine tests, the urine test protocols themselves, the maintenance and operation of the various test instruments, and more importantly, the internal controls, supervisory mechanisms and various checks carried out by the certifying Analysts through

the analysis and interpretation of data and chromatograms produced by the test instruments used at the DAT laboratory to analyse the urine specimens. I turn now to the first question in the analytical framework that I have set out in [74].

78 It is necessary to trace how urine specimens contained in urine bottles are first received at HSA, what administrative steps follow to process the urine bottles, how small quantities of urine samples are first extracted from the urine specimens in the urine bottles and placed into test tubes in preparation for the different tests, how the actual urine samples are physically and chemically treated thereafter, what quality control samples and calibration standards are introduced, how the various tests are subsequently conducted in the laboratory to screen and analyse the urine samples using the different laboratory equipment and test instruments, and what analytical work for the urine tests are performed by the certifying Analysts before they issue the certificates.

79 I am particularly grateful to the Prosecution for carefully setting out this part of the largely uncontroversial evidence in a clear and methodical fashion in their written submissions, which I shall conveniently adopt in full with only minor amendments. With this detailed evidence, there can then be a fuller appreciation of:

(a) the various roles played by the different HSA officers;

(b) the parts which, as a matter of fact, are to be considered as constituent parts of the urine test and the parts that would not be;

(c) the multiple checks as part of the standard laboratory protocol in the DAT laboratory in HSA to guard against errors and mix-ups along the way, be it during the administrative processes, the screening processes or during the actual urine test processes; and

(d) the whole factual backdrop against which the important question must be addressed — whether or not the urine testing procedure adopted by the HSA in January 2010 (when the urine specimens of the accused were tested) conformed with all the requirements set out in s 31(4)(b).

80 Without the detailed evidence, it would be much more difficult to identify factually where the precise commencement point for the "urine test" should be and why it should be so, and whether in fact "different" persons had been engaged to perform the "urine test" from the time it commenced, and whether the certifying Analyst can then be said to have "conducted" that "urine test" within the meaning of s 31(4)(b).

(1) Submission of the accused's urine specimens to HSA

81 On 25 January 2010, thirty eight bottles of urine specimens were transported in a locked security box to the Analytical Toxicology Laboratory ("ATL") of HSA by police officer Staff Sergeant Sanjit Singh Bal s/o Manjit Singh ("SSgt Singh"). Of the thirty eight bottles, two bottles contained the accused's urine specimens. The Corporate Support Officer ("CSO") of the ATL, Siti Norhayati B M Raji ("SN") unlocked the locked metal security box with a key kept at the registration counter. In his presence, another CSO Kamisah Bte Amat ("KBA") retrieved the first bottle of the accused's urine specimen and SN retrieved the second bottle of the accused's urine specimen. Both of them checked

the details on the CNB Urine Barcode label against the CNB Request Form for the accused before accepting the two bottles of the accused's urine specimens together with the other urine bottles containing the urine specimens of other accused persons.

(2) The handling of urine specimens by HSA

82 Dr Lui Chi Pang ("Dr Lui"), the Director of the Illicit Drugs and Toxicology Division of HSA and the Director of the ATL laboratory (in which one of the units is the DAT laboratory) since June 2003, gave detailed evidence on how HSA handles the urine specimens submitted to it, from the point of receipt up until the point of time when the certificates under s 16 of the MDA are issued. In short, this entire process will be referred to as "the handling" of the urine specimens.

83 Notably, Dr Lui produced a detailed report, which gives a step-by-step description of the various steps carried out by the various DAT laboratory personnel during the handling of the urine specimens. The detailed report also gives a complete picture of the DAT laboratory's procedures in handling urine specimens. According to Dr Lui, such detailed evidence has never been led in any previous cases of drug consumption, including the recent case of *Lim Boon Keong v PP* [2010] 4 SLR 451 ("*Lim Boon Keong*").

(3) The DAT laboratory's protocols

84 Dr Lui's evidence is that DAT laboratory's protocol for the testing of Amphetamines is contained in the DAT Laboratory Manual ("the Laboratory Manual"). The purpose of the Laboratory Manual is to provide a standard operating procedure for laboratory officers and analysts to follow strictly in the course of their work.

85 Dr Lui stated that the procedures in the Laboratory Manual are based on an internationally accepted methodology, *viz*, the methodology contained in the United Nations Manual, "Recommended Methods for the Detection and Assay of Heroin, Cannabinoids, Cocaine, Amphetamine, Methamphetamine, and Ring-Substituted Amphetamine Derivatives in Biological Specimens" ("the UN Manual"). He stated that the DAT laboratory's protocol for the testing of Amphetamines conforms to the UN Manual in the following respects:

(a) A screening test based on immunoassay techniques is first performed to establish potential positive samples and this is followed by a confirmatory test on such presumptive positive samples.

(b) Properly trained and skilled personnel are employed and there is adherence to good laboratory procedures, practices and standard operation procedures with regular retraining of staff.

(c) The precision of the laboratory's analyses can be assessed by the inclusion of a sufficient number of quality control specimens (containing different concentrations of the drug or metabolite), thus enabling the analyst to ensure the validity of testing.

(d) There is participation in external proficiency programmes. In particular, the DAT laboratory undergoes accreditation every five years by the American Society of Crime Laboratory Directors ("ASCLD"), which accredits many overseas laboratories including in the United

States, New Zealand, Hong Kong, Malaysia and Singapore. During the last on-site inspection of the DAT laboratory by ASCLD in 2006, there were no adverse comments by the assessors on the use of laboratory officers to carry out work in the DAT laboratory (as per the typical workflow shown in Table 1 at [94]).

86 Dr Lui stated that apart from the testing protocol, the procedures for other aspects of the handling of urine specimens (*e.g.*, screening, sampling) are also found in the DAT Laboratory Manual (Urine Specimen Handling) while the general principles of laboratory management followed by the DAT laboratory are found in the DAT Laboratory Manual (Laboratory Management). The substance of these two manuals is reflected in his report.

(4) Division of labour between analysts and laboratory officers

87 Crucially, the UN Manual does not stipulate which laboratory personnel should handle particular parts of the handling of urine specimens. Instead, reference is made to the need for "adequately trained and skilled personnel", "an authorised person" and "properly trained and skilled personnel".

88 In the DAT laboratory, the two main categories of laboratory personnel are "Laboratory Officers" and "Analysts". Laboratory Officers provide technical support to the Analysts. Dr Lui testified that far as he was aware from the archived manuals and records of the DAT laboratory, there were always these two categories of laboratory personnel involved in the handling of the urine specimens. Dr Lui himself had worked in the DAT laboratory of the Department of Scientific Services, as HSA was then known, since 1994 before being appointed as head of the DAT laboratory in 2003. Analysts were previously known as "Government Chemists" (as far as from 1977) and thereafter "Scientific Officers", before the nomenclature was changed to "Analyst" in 2001 when HSA was formed.

89 The criterion for appointment as an Analyst in HSA is a 2nd upper honours degree in Chemistry or a related field. On the other hand, Laboratory Officers can be graduates with 2nd lower honours degrees, graduates without an honours degree or diploma holders.

90 Dr Lui testified that he allocated certain tasks to the Analysts and others to the Laboratory Officers on the following basis:

> In my opinion, this is the best way of utilizing the manpower and manage the laboratory activities. Certain activities are simple and could be sometimes laborious nonetheless they can be carried out by trained personnel.

91 Dr Lui elaborated that the general division of labour at the material time (when the accused's specimens were sent to the DAT laboratory) was as follows:

(a) Laboratory Officers did the screening, preparation of urine samples for physical testing by the instruments, and operated the instruments but they did not do any scientific analysis leading to the conclusions in the certificates under s 16 of the MDA;

(b) The instruments did the actual physical testing (*viz*, the chemical determination of the presence, if any, of controlled drugs) of the urine samples and generated raw data as well as calculations based on the raw data; and

(c) The certifying Analysts interpreted the data to arrive at their conclusions in the certificates under s 16 of the MDA.

92 According to Dr Lui, it would not be the best way of managing the DAT laboratory to have Analysts perform all the tasks carried out by the Laboratory Officers because those tasks can be performed by persons without university degrees. The Laboratory Officers are given training to perform sample preparation and to operate the instruments. They have to pass annual proficiency tests to demonstrate their competency. All instructions relating to the various tests are readily available and found in the Laboratory Manual. A duty Analyst is nevertheless always available to answer any queries that a Laboratory Officer might have. Any anomaly or error observed during the urine test by the Laboratory Officer will be brought to the duty Analyst's attention.

93 Dr Lui also testified that the division of labour between Laboratory Officers and Analysts is not unique to the DAT laboratory alone. Other laboratories that use laboratory technicians or technical support in the handling of urine specimens for drug abuse testing include the Hong Kong Government Laboratory and the US Navy Drug Screening Laboratory.

(5) Typical workflow – general

94 In his report, Dr Lui tabulated the typical workflow applicable to the handling and testing of urine specimens (of the accused) in the DAT laboratory. The table is as follows:

Table 1 – A typical workflow of urine testing for Amphetamines

[LawNet Admin Note: Table 1 is viewable only to LawNet subscribers via the PDF in the Case View Tools.]

95 Exhibit P67 attached to this judgment at Annex A identifies the different laboratory personnel at HSA, who performed the various tasks as described above in "Table 1 – A typical workflow of urine testing for Amphetamines" in relation to the accused's two urine specimens that were sent to HSA for testing.

96 Two aspects of the typical workflow may be noted. First, at the stage of "Sampling" under "Sample preparation" ("the sampling stage"), the first bottle of urine specimen of the accused was handled by a different person and separately from the second bottle of urine specimen from the same accused. This was keeping with the spirit of independence in s 31(4)(b), which requires that the testing of two specimens of the accused's urine be done by different analysts. Dr Lui said that it was not necessary for administrative purposes to have different personnel at an even earlier stage, such as the specimen unsealing stage and especially not at the "Screening" stage ("the screening stage") as only one of the bottles of the accused person's urine specimen is screened. In the course of cross-examination, Dr Lui explained his reasons:

(a) specimen verification by a duty analyst does not form part of testing. His role here is to check that the particulars on each bottle tally with the particulars on the CNB Request Form. It is only a clerical task and does not involve any scientific knowledge. Specimen verification can be done by anyone who is competent in reading and careful in reading details. In fact, the CSOs who received the bottles of urine had already carefully checked and tallied the particulars and the duty Analyst is merely in place as a second layer of check.

(b) specimen unsealing by a Health Support Office ("HSO") is not part of the testing and therefore, there is no need to have two independent persons to perform this task. In any case, the HSO uses a pen-knife to make a break on the seal of the bottle and he does not open the bottle.

(c) the screening stage is only a preliminary testing procedure.

97 Dr Lui also testified that use of the same personnel to carry out the "Checked by" function (see Table 1 at [94]) at various stages (*e.g.*, Laboratory Officer B checked the receiving of both bottles of urine specimen) did not compromise the independence of the handling of the urine specimens. For instance, at the "GC/MS instrumental testing" stage, when the same Laboratory Officer checked the GC/MS test queue sequence for both the first and second set, this did not affect independence as she was not carrying out any test and was only checking the sequence. This Laboratory Officer was neither the one who placed the GC/MS glass vial into the instrument nor the one who set up the GC/MS test sequence using the computer. The actual sample preparation, placement of the GC/MS glass vials and keying of the particulars into the computer attached to the GC/MS instrument were done by different Laboratory Officers for each set. (At this juncture, it must be noted that the term "Checked by" used in the typical workflow has to be read in context of the Laboratory Manual to give meaning to the term. For instance, at the "GC/MS instrumental test" stage, when it is said that the certifying Analyst C carried out the "Checked by" function, it means Analyst C checked the results of the GC/MS chromatograms *after* they had been printed out by the GC/MS instrument and not in real time.)

98 Second, the certifying Analyst did not physically supervise the steps carried out by the Laboratory Officers (in the sense of watching them carry out the steps or performing the "Checked by" function in real time at each stage). Dr Lui stated that there was no need for the certifying Analyst to physically supervise the earlier stages because they could tell whether the various steps at the earlier stages were carried out properly by looking at the entire chain of documentation for the relevant bottle of urine specimen. This includes the analysis of the data from the instrumental testing of quality control samples to see if the sampling stage was properly done and whether the instruments were functioning properly. The certifying Analyst can also verify the details that appear on the chromatograms. The detailed checks carried out by the certifying Analysts are set out at [170] and [171]. Dr Lui's evidence that it was not necessary for the certifying Analyst to physically supervise the steps carried out by the Laboratory Officers was echoed by the certifying Analysts for the accused's urine specimen in the present case.

(6) Typical workflow – detailed

99 The detailed steps carried out at the various stages of the typical workflow are summarised as follows.

(a) Receiving of urine specimens

100 The locked metal security box sent to the DAT laboratory from the enforcement agency is received by CSO A1 who empties the contents of each compartment separately onto a different tray. CSO A1 then carries out a series of checks in respect of all the first bottles of urine specimens ("the first set of urine bottles") and CSO A2 does the same checks in respect of all the second bottles ("the second set of urine bottles"). The checks are as follows:

(i) That the details in the CNB Urine Barcode Label (*viz*, the subject's name, the subject's NRIC, the date that the urine specimen was taken, and the CNB marking number) tally with those stated in the CNB Request Form for the subject;

(ii) That the CNB Urine Barcode Label (which also acts as a seal) on the bottle is intact;

(iii) That the signature on each bottle tallies with that on the other bottle in the pair being checked by the other person.

101 In the present case, the CSOs responsible for receiving the accused's urine specimens (KBA and SN) testified that they had carried out these checks before accepting the accused's urine specimens and returning the emptied locked metal security box to SSgt Singh. Both bottles containing the accused's urine specimen passed the checks, as evidenced by the fact that KBA and SN signed on the CNB Request Form.

102 Notably, before the bottles are sent for further handling, more steps are carried out under the typical workflow to ensure that each bottle is identified by a unique sample number and not by the accused's name. The steps are as follows:

(i) Each CSO arranges his/her set of urine bottles according to the sequence of the CNB marking number in a 30-hole specimen rack ("a specimen rack"). The bottles on the first specimen rack are labelled, in sequence, by CSO A1 with white labels bearing sample numbers ending in "-001" (*e.g.*, 1033-00927-001, 1033-00928-001 and so on). At the same time, an identical white label is pasted on the corresponding CNB Request Form. Next, CSO A2 labels, in sequence, the bottles in the second specimen rack with yellow labels bearing sample numbers ending in "-002" but does not stick an identical yellow label on the CNB Request Form.

(ii) The sample numbers on the white and yellow labels (see (i) above) are already pre-programmed into the Laboratory Information Management System ("LIMS"). One of the CSOs then scans the CNB Urine Barcode Labels into the LIMS. By scanning the CNB urine barcode labels on the two bottles, the information on the labels is automatically updated into the LIMS and tied to the sample numbers in the system (*i.e.*, no typing in of information is required by the CSO).

(iii) New labels with the header "Analytical Toxicology Laboratory, HSA" ("ATL labels") containing the sample number, CNB marking number and date received of the relevant bottle are printed out by LIMS. One ATL label is pasted on the relevant bottle and the other is pasted on the CNB Request Form. In addition, a "case number label" bearing the header "Analytical Toxicology Laboratory, HSA" and containing the case number, *viz*, the sample number sans the "-001" or "-002", as well as the date received is generated and pasted on the CNB Request Form but this is not material.

103 In the present case, KBA and SN confirmed that they had carried out the arranging and labelling of the two bottles of the accused's urine specimen in accordance with the typical workflow. Crucially, KBA had checked to make sure that both the white labels she pasted on the CNB Request Form and the first bottle of the accused's urine specimen bore the same sample number "1033-00927-

001". Both CSOs had also checked that ATL labels were pasted on the correct bottles and the CNB Request Form (by making sure that the CNB Marking Number and sample numbers on the labels, the bottles and the CNB Request Form all tallied). Indeed, as can be seen from the CNB Request Form in the present case, all the details in the ATL labels do tally with that on the CNB Request Form, indicating that the bottles of the accused's urine specimen had been correctly labelled. Both CSOs signed off on the respective DAT Forms for the processing of specimens.

104 During the specimen receiving, bottles of "open" quality control ("QC") samples ("Open QC samples") are also inserted into each specimen rack of bottles by a CSO under the supervision of a Senior Laboratory Officer (Lab Officer B in Table 1). These Open QC samples are prepared from urine specimens provided by the DAT laboratory personnel and they have been screened to ensure that no controlled drugs are present. The Open QC samples follow a different sample number sequence from the actual bottles. The types of Open QC samples in each specimen rack are:

(i) Two positive Open QC samples (sample numbers beginning with "10CP"): each of these are pre-spiked with 1000 ng/ml of Methamphetamine, Amphetamine and MDMA by a Senior Laboratory Officer (thus making up a total of 3000 ng/ml of spiked drugs in each of the positive Open QC samples);

(ii) Two negative Open QC samples (sample numbers beginning with "10CN"): these samples are not spiked with any controlled drugs.

105 The Senior Laboratory Officer also inserts "blind" QC samples ("Blind QC samples") at random. These are in sequence with the sample numbers of the actual bottles and are indistinguishable on their face from actual bottles of urine from accused persons. The Blind QC samples in each specimen rack of bottles consist of:

(i) One positive Blind QC sample pre-spiked with 1000 ng/ml of Methamphetamine, Amphetamine and MDMA by a Senior Laboratory Officer (thus making up a total of 3000 ng/ml of spiked drugs in the positive Blind QC sample);

(ii) One negative Blind QC sample which is not spiked with any controlled drugs.

106 The Senior Laboratory Officer records the sample numbers of the Open and Blind QC samples ("QC samples") which will subsequently be made known to the certifying Analyst, and these QC samples go through the entire handling process like the other actual bottles of urine.

107 QC samples form part of the quality assurance system in the laboratory. The QC samples allow the certifying Analysts to (a) check subsequently whether the GC/MS instrument is functioning properly; (b) determine whether the negative Blind QC sample has been correctly screened out; and (c) detect whether there is any contamination during the instrumental testing or any mix-up in the sequence of the samples (see [170]).

108 In the present case, Senior Laboratory Officer Tan Moy Eng ("TME") supervised KBA in the placement of the Open QC samples. TME also placed Blind QC Samples in the two specimen racks, each containing one bottle of the accused's specimen. She then signed off on the DAT Forms for the Processing of Specimens (both sets) to show that she had done so.

109 After all the bottles in a given batch are registered in the LIMS, a consolidated ATL Test Request Form ("the ATL Test Request Form") is generated from the LIMS. The ATL Test Request Form contains a sequential list of the HSA case numbers for the specimens in the batch, and the drug type(s) to be tested for each specimen ("the requested controlled drugs").

(b) Verification of urine specimens

110 Under the typical workflow, the two specimen racks are then transferred to a duty analyst (analyst C) who visually inspects that the CNB Urine Barcode Label on each bottle of urine is intact and the information corresponds to the CNB Request Form. Analyst C also checks the accuracy of the information in the ATL Test Request Form.

111 The duty analyst in the present case was ORS, who has been an Analyst with the DAT laboratory for about 1½ years. Crucially, ORS testified that the duty analyst must do the following:

(i) Check that the CNB Urine barcode labels on the bottles are intact;

(ii) Check that a signature is present on each CNB barcode label;

(iii) Check that the information stated on the CNB urine barcode labels of each bottle corresponds with the information on the CNB Request Form, *viz*, subject name, NRIC and CNB marking number;

(iv) Check the ATL Test Request Form to ensure that the drug test is the same as what is stated on the CNB Request Form (*e.g*. amphetamine and ketamine);

(v) Verify that the Open QC samples were placed in the correct position on the specimen rack; and

(vi) Verify that the Blind QC samples were placed in the correct position on the specimen rack.

112 In the present case, ORS carried out the above checks and did not detect any errors. ORS initialled and dated the DAT forms for Processing of Specimens in the "Specimen verification field" for both sets of bottles.

(c) Breaking of specimen seals

113 Under the typical workflow, after Analyst C has completed his/her verification, the specimen racks will be transferred to a Healthcare Support Officer (HSO D) who breaks the seals on the bottles with a cutter in the presence of a duty screening Laboratory Officer (Lab Officer E). After breaking the seals, the HSO D will transfer the bottles to Laboratory Officer E.

114 In the present case, the specimen racks containing the bottles of the accused's urine specimen were transferred to HSO Mohd Yusoff bin Osman ("MYO"). For the unsealing, MYO testified that he would hold one bottle in his left hand and make a cut around the cap of the bottle to unseal the bottle with a cutter in his right hand, *without* opening the cap of the bottle. MYO stated that the protocol was to wear gloves while unsealing the bottles, which he did. He further testified that the protocol in event of any spillage from a bottle was for him to inform the duty Laboratory Officer and change into a new pair of gloves before continuing to unseal the remaining bottles.

115 The cutting of the seals in the present case was done in the presence of the duty Laboratory Officer Lee Wee Soon ("LWS"), who checked to ensure that the seals on the bottles had been properly cut and that there was no leakage from the bottles. After MYO had unsealed the bottles on each specimen rack, he passed the specimen racks to LWS. MYO initialled and dated the DAT forms for Processing of Specimens in the "Specimen unsealing" field for both sets of bottles.

(d) Screening

116 Under the typical workflow, Laboratory Officer E then carries out a screening test on samples drawn from the *first* set of bottles. However, this screening test is only a presumptive test which then has to be followed by confirmatory tests on fresh samples drawn from *both* sets of urine bottles. Dr Lui's evidence was that the screening is done to increase administrative efficiency by screening out only those bottles above the 500 ng/ml cut-off (*i.e.*, screened positive) for further confirmatory tests by the GC/MS instrument.

117 It is the evidence of LWS that he was assigned to be the screening officer on 25 January 2010. His role was essentially to draw the respective samples from the *first* set of bottles for the screening test, which was a presumptive test for the presence of the requested controlled drugs.

118 The following steps were carried out by LWS. He referred to the ATL Test Request Form and marked the respective sample numbers as listed in the ATL Test Request Form on each new disposable cup. The marked cups were placed in a 5-hole rack. LWS then picked up one marked cup at a time and read out the sample number on the cup while another Laboratory Officer Loh Mun Foong Esther ("LMF") sat beside him and helped to open the corresponding bottle from the 30-hole rack. Crucially, LWS checked that the sample number marked on each cup matched the sample number on the bottle before using a pipette with a disposable tip to draw out a sample from the bottle and place it in the corresponding disposable cup.

119 The actual screening was done by an instrument known as a COBAS Integra 800 chemistry auto-analyser ("the screening instrument") with serial number 39-5666. Service Engineer Lee Ju Guang from Roche Diagnostics Asia Pacific Private Limited testified that the screening instrument used Kinetic Interaction of Microparticles in Solutions ("KIMS") for the automated testing of urine samples and that there were reasonable grounds to believe that the screening instrument was operating properly between 25 and 28 January 2010.

120 For each disposable cup, LWS keyed in the sample number and rack cup position into the computer, and selected the appropriate test (based on the type of drug listed in the ATL Test Request Form). The selection of the appropriate test was done by simply clicking on the relevant icon representing a pre-programmed test on the computer screen (*e.g.*, the icon "AMPSX" for an Amphetamines test). He then loaded the 5-hole rack containing the disposable cups into the screening instrument. The screening was then carried out automatically. No human intervention was required unless the instrument detected that a given sample was of a concentration of more than 2,000 ng/ml, in which case the computer system would offer the option to dilute the sample by

five times, by simply selecting the option "Dilute [1/5.00]" and clicking "ok". LWS testified that the ATL Manual specifies that when a given sample is of a concentration exceeding 2000 ng/ml, a dilution of five times must be carried out. The Laboratory Officer who operates the screening instrument has no discretion not to dilute such a sample or to choose a different dilution factor.

121 After the automated screening test, the instrument generated the consolidated screening results ("the ATL Screening Test Results"). LWS then filled in the sample numbers of those samples that had screened positive in the DAT Worksheet (one for each set of specimens), and wrote down the dilution factor to be used during the Solid Phase Extraction ("SPE"). LWS testified that the Laboratory Manual specifies the dilution factor to be used and the Laboratory Officer has no discretion to determine what dilution factor to use. As the accused's urine sample had a concentration of more than 10,000 ng/ml, the dilution factor was fixed as 25.

122 LWS handed the ATL Screening Test Results to Senior Laboratory Officer, TME. TME checked the ATL Screening Test Results to ensure that the results for the Blind and Open QC samples were as expected (*i.e.*, the positive QC samples had more than 2000 ng/ml of amphetamines and the negative QC samples had less than 500 ng/ml of amphetamines). TME subsequently handed the ATL Screening Test Results to Laboratory Officer Lee Mei Lan ("ML") to prepare the samples for the GC/MS Instrumental Tests.

(e) Sample preparation for GC/MS test (sorting, sampling, solid phase extraction and derivatisation)

(I) Sorting

123 At the end of the screening, the screening result for each sample is printed out ("the ATL Screening Test Results"). If a given sample from the *first* bottle of urine specimen from accused "A" is screened positive for the requested controlled drug types, then each of the original *two* bottles of urine specimens provided by accused "A" (*i.e.* both *first* and *second* sets of bottles of urine specimens obtained from accused "A") will be sorted out to be independently sampled afresh and accurately tested for both the presence and concentration of the controlled drug by a confirmatory GC/MS test (see [130] to [168]). However, the controlled drug must be extracted from the urine before it can be tested by the GC/MS instrument.

124 Under the typical workflow, Laboratory Officer G1 checks against the ATL Screening Test Results and places the bottles in the *first* set of urine specimens which have been screened positive into a new 30-hole post-screening specimen rack according to the sequence in the ATL Test Request Form (this is known as "sorting"). The same Laboratory Officer also sorts out all the corresponding bottles in the *second* set of urine specimens of those accused persons whose *first* set of urine specimens had been screened positive and he then places them into a separate 30-hole post-screening specimen rack in sequence. Bottles of urine specimens in the *first* set which have been screened negative (together with the corresponding bottles in the *second* set) are kept aside (in the refrigerator). At the same time, Laboratory Officer G1 also sorts the bottles of Open QC Samples into the post-screening specimen racks for both the *first* and *second* sets according to the sequence in the ATL Test Request Form. Laboratory Officer B then checks the bottles in the post-screening specimen racks against the ATL Screening Test Results to ensure that only those bottles in the *first* set for which the samples were screened positive and the correct corresponding bottles in the *second* set have been sorted out for further testing by the GC/MS instrument.

125 In the present case, the sorting was done by Laboratory Officer ML. Her evidence was that she had sorted the *first* bottle of the accused's urine specimen out for extraction as it had screened positive with a concentration greater than 10,000 ng/ml. The *second* bottle of the accused's urine

specimen was therefore also sorted out for extraction in a separate post-screening specimen rack. ML also testified that she had sorted the bottles of Open QC Samples into the post screening specimen racks for both the *first* and *second* sets. TME gave evidence that she had checked and was satisfied that ML had carried out the sorting correctly. ML and TME then signed and initialled in the field for "Sorting" in the DAT Worksheet for Amphetamines.

126 It is very important at this juncture to note that at this "sorting" stage, the accused's urine specimens *inside* the two urine bottles had not been physically touched or extracted yet to provide the necessary samples for proper testing by the GC/MS instrument. Where then is the precise point along the multifarious processes in HSA, the ATL Laboratory and more specifically, the DAT laboratory unit within the ATL laboratory, that represents the factual commencement point for the "urine test" for the purpose of s 31(4)(b) of the MDA? From the natural and ordinary meaning of the words "urine test" in s 31(4)(b), it is my view that the commencement point starts from the moment fresh samples are physically extracted from the two urine bottles containing an accused's urine specimen for use or analysis by the GC/MS instrument, which generates the results that are eventually relied upon by the certifying Analyst to certify whatever conclusions, facts or opinions that are stated on the certificate.

127 From the nature of the work of physically "sorting" the various urine bottles in preparation for the actual sampling, it is clear that no extraction of fresh urine samples from the bottles for the GC/MS testing has taken place as yet. Accordingly, this "sorting" process in my judgment is totally administrative in nature. It is not much different from the physical sorting of the urine bottles into urine specimens 1 and urine specimens 2 at the police station by the CNB officers before putting them into the two separate compartments within the metal security box for transportation to HSA. Essentially, this process of sorting both urine specimens 1 and 2 by ML (which was checked by TME) is to physically arrange the many urine bottles of several accused persons in an orderly fashion and then place them in sequence on two separate 30-hole post-screening specimen racks, one rack to hold the *first* set of urine bottles and the other rack to hold the *second* set of urine bottles containing the urine specimens obtained from the various accused persons, of which the accused is merely one of them. The systematically sorted bottles arranged in sequence on the two specimen racks will make it much easier for the Laboratory Officers, who are to perform the actual fresh sampling from these bottles for the actual GC/MS test later.

128 To construe this administrative act or step of "sorting" to be part of a "urine test" *per se* is, in my judgment, stretching the natural and ordinary meaning of the words "urine test" to their breaking point. If the Defence is contending that the "urine test" must begin from the point of urine excretion by an accused into the two bottles, then all the administrative processes at the police station or at CNB to prepare, label, seal and sort the two urine bottles (together with those of other accused persons) before sending to HSA must also be regarded as part of this "urine test", which in my view would then be an absurd interpretation of the words "urine test" for reasons so obvious that it would not be necessary to elucidate.

(II) Sampling

129 From the factual details provided below, it can be seen why this "sampling" stage (as described hereafter) is the correct stage at which the "urine test" can logically and factually be said to begin (contrary to what the Prosecution has submitted), and why it can then be reasonably construed that this "sampling" stage together with all the subsequent stages fall within the natural and ordinary meaning of the words "urine test" in s 31(4)(b), but all the other stages *prior* to the "sampling" stage do not. As can be seen, not only is there physical extraction of fresh urine samples from the two sets of urine bottles by way of pipetting during this "sampling" stage, there are also chemicals (and de-

ionised water) added to the extracted urine samples, in direct preparation for the separate testing of these freshly extracted samples by two GC/MS instruments. A different GC/MS instrument is used to test each sample separately drawn from each of the two bottles containing the urine specimens provided by the same accused person.

130 From the *first* bottle of urine specimen (and the QC samples) sorted out and placed on the *first* post screening specimen rack, Laboratory Officer G1 prepares *two* samples specifically for the GC/MS tests as follows:

(a) Qualitative sample: Laboratory Officer G1 pipettes 1ml of urine from the bottle into a 9-ml test tube containing de-ionised water. This 9-ml test tube is labelled with the same sample number as on the bottle using a black-coloured ink pen.

(b) Quantitative sample: The same process is carried out except that the 9-ml test tube into which the urine is pipetted is labelled with the sample number in differently coloured ink and contains "internal standards" in addition to de-ionised water. "Internal standards" are isotopic analogues of the requested controlled drug that have similar chemical properties to the requested controlled drug but can be distinguished during the GC/MS test due to their different mass. Furthermore, if the screening result exceeded a certain limit, the urine will be diluted by a certain factor in the method set out in the Laboratory Manual before being sampled into the test tube. There is no room for discretion as all the dilutions required are stipulated in the Laboratory Manual.

131 Laboratory Officer G1 also prepares samples of calibration standards ("calibration standards") at the same time. Calibration standards are urine samples containing known concentrations of drugs (in the present case, they were pre-spiked with 500 ng/ml of each of the controlled Amphetamines.) These are sampled in the same way as actual urine specimens from accused persons (*i.e.*, a qualitative sample and a quantitative sample are prepared; the quantitative sample contains internal standards).

132 Laboratory Officer G1's sampling is checked by another Laboratory Officer G2 who sits beside Laboratory Officer G1 to ensure that the correct urine specimen is being sampled. Laboratory Officer G2 does this by reading out the sample number on the bottle while G1 checks the sample number on the white label on the bottle cap against the sample number on the test tube.

133 For the *second* bottle of each urine specimen, the same steps are carried out, except that Laboratory Officer G2 does the actual sampling while Laboratory Officer G1 does the checking.

134 In the present case, the role of Laboratory Officer G1 was played by ML while the role of Laboratory Officer G2 was played by Yvonne Teo Gee Yan ("YT"). The evidence of ML and YT was that they had prepared samples (including from the first and second bottles of the accused's urine specimen ("the accused's urine samples")) as per the typical workflow.

135 ML testified that after TME confirmed that the bottles were correctly sorted out, she proceeded to prepare the samples from the *first* set of bottles (those with sample number ending with -001) for the GC/MS Instrumental Test. YT testified that she has been with the Analytical Toxicology Laboratory for 2 years and on 25 January 2010, she was assigned to prepare the samples from the *second* set of bottles (those with sample number ending with -002) for the GC/MS Instrumental Test. YT testified that her duty was to handle the *second* set of bottles and she would not let ML do sampling of her *second* set. Likewise, she would not cross over to help ML with the sampling of the

first set. YT saw no need for an analyst to stand beside her when she was preparing the samples as she has passed all her annual proficiency tests and has been trained to extract and process samples for the GC/MS Instrumental Tests.

136 ML followed the Laboratory Manual and performed a 25 times dilution ("25X dilution") of the accused's urine specimen in the *first* bottle labelled with sample number 1033-927-001. ML explained that in order to perform a 25X dilution, she drew out 1ml of the accused's urine specimen using a pipette with a disposable pipette tip from the *first* bottle into a 25ml volumetric flask and added de-ionised water to the 25ml mark in the flask before mixing the contents in the flask. This is known as "sampling". It is the evidence of both ML and YT that before ML performed sampling, YT, who was seated beside ML, read out the sample number labelled on the accused's *first* bottle of urine and opened the cap of the bottle.

137 When YT read out the sample number, ML compared it with sample number printed on the white label pasted on the cap against the sample number which was marked on the volumetric flask. ML had to ensure that the sample number marked on the volumetric flask corresponded to the sample number on the cap.

138 At the ATL Laboratory, two types of tests are carried out using the GC/MS, that being the quantitative test and the qualitative test. The quantitative test reveals the concentration or the amount of drugs present in the urine whereas the qualitative test reveals what types of drugs are present in the urine. ML testified that she followed the Laboratory Manual, and for the quantitative test, 1ml of the 25X diluted urine sample was drawn out from the volumetric flask using a pipette with a disposable tip and added to a test tube marked sample number 1033-00927-001 in blue-coloured ink containing internal standards and de-ionised water. These internal standards are deuterated internal standards and they are used by the analysts to monitor the extraction efficiency as well as to monitor if the sample preparation has been carried out properly. As for the qualitative test, ML drew out 1ml of the accused's urine from the *first* bottle with a pipette and transferred it into another test tube marked sample number 1033-00927-001 in black-coloured ink containing de-ionised water only. ML testified that the role of YT at this stage was limited to reading aloud the sample number on the *first* bottle of urine while ML transferred the urine. The sample number 1033-00927-001 is the marking identifying samples taken from the *first* bottle of urine specimen from the accused.

139 After the whole batch of the *first* set of specimens were sampled by ML, all the *first* bottles of urine specimens were kept in the refrigerator. ML also sampled from the bottles of Open QC for both positive and negative controls and from the bottles containing "calibration standards" and they were placed alongside the test tubes containing urine samples from the *first* set of specimens. "Calibration standards" are urine specimens containing known concentrations of drugs. These go through the entire sample preparation process and are injected into the instruments to calibrate the instruments before the actual testing of urine samples.

140 After ML finished preparing the samples from the *first* set of bottles, YT then proceeded separately to physically prepare the samples from the *second* set of bottles. It must be emphasised here that YT (and not ML) was physically preparing the samples from the *second* set of bottles and such preparation of the *second* set could no longer, in my view, be said to be done by the same person, ML, who had in fact physically prepared the samples for the first set.

141 Similarly, YT followed the laboratory manual and performed a 25X dilution on the accused's urine specimen in the *second* bottle. ML sat beside her to open and close the cap of the *second* bottle and read out the sample number labelled on the bottle. YT would check that the sample number which was read out corresponded to the sample number marked on the volumetric flask. YT

also sampled the accused's urine specimen from the *second* set of bottles into two test tubes, one for qualitative GC/MS test (sample number marked in red-coloured ink) and one for quantitative GC/MS test (sample number marked in black-coloured ink). ML's role was limited to (a) reading out the sample number labelled on the *second* bottle of urine while YT sampled the urine; and (b) opening and closing the cap of the *second* bottle.

142 For the quantitative samples, a set of internal standards was added to the accused's urine, the QC samples as well as the calibration standards. The presence of internal standards in the GC/MS tests is useful as it allows the analysts to tell whether the sampling stage has been done accurately (see [170] and [171].

143 Consistent with Dr Lui's evidence on independence (see [96] and [97]), YT testified that her duty was to handle the *second* set of bottles and she would not let ML do sampling of her *second* set. Likewise, she would not cross over to help ML with the sampling of the *first* set. Each of them signed on their respective DAT Worksheet for Amphetamines.

144 From the totality of the evidence, I find as a fact that each of the sample preparations from the two sets of urine bottles pertaining to the same accused had been separately carried out by a "different" person *i.e.* ML prepared all the required samples from the *first* urine specimen bottle and YT prepared all the required samples from the *second* urine specimen bottle of the accused. In my judgment, the entire sampling stage for the two sets of urine bottles pertaining to the accused had been independently carried out in compliance with s 34(4)(b).

(III) Solid Phase Extraction

145 Under the typical workflow, once the sampling stage is complete, the samples are sent through the Solid Phase Extraction ("SPE") instrument. The process of SPE is carried out automatically by the SPE instrument. The controlled drugs in the samples are retained in the column of the SPE instrument and rinsed out by solvent, resulting in the collection of the solvent containing the controlled drug (known as the "eluate") in collection test tubes. Human intervention in the process is minimal:

(a) Laboratory Officer G1 merely has to prepare empty collection test tubes labelled with sample numbers that correspond to the sample numbers on her set of 9 ml test tubes containing the samples and load them into the SPE instrument). Laboratory Officer G2 does the same with another SPE instrument. Analyst H then checks the sample numbers on the 9 ml test tubes against the collection test tubes prepared by both Laboratory Officers to ensure that they correspond.

(b) To start the SPE process, the Laboratory Officers merely have to select the pre-set programme file specific to the extraction of the requested controlled drug and press the "start" button.

146 In the present case, Analyst Leong Huey Sze ("LHS") checked that the markings on the empty collection test tubes matched the labels on the 9 ml test tubes before they were loaded into the SPE instrument. After checking, LHS initialled and dated the DAT Worksheet for Amphetamines for both sets of bottles. During cross-examination, LHS was asked if she had spotted any mix-ups before when she was checking the markings and she testified that it was so "very rare" that she could not remember any incident of mix-up.

147 After the eluates had been produced, ML and YT transferred their respective eluates from each

collection test tube into a clean evaporation test tube (marked with the corresponding sample number in blue (first set of bottles) and red (second set) for the quantitative GC/MS test and black for the qualitative GC/MS test) before adding hydrochloric acid and using a sample concentrator to evaporate the eluate to dryness.

(IV) Derivatisation

148 Next, under the typical workflow, the dried drug extracted from the urine is subjected to a chemical reaction, known as derivatisation, to form a derivative of the drug which becomes amenable to the final detection of the drug in the GC/MS instrument. Derivatisation is common in preparing controlled drugs for GC/MS testing. This step improves the chromatographic behaviour of the controlled drug and enhances the uniqueness of the mass spectrum corresponding to the controlled drug.

149 The derivatisation was performed by Laboratory Officers G1 and G2 on their respective samples. The Laboratory Officers added a fixed amount of solvent (ethyl acetate) and a chemical reagent (trifluoroacetic anhydride, known as "TFA" or "TFAA") ("derivatising agent") to the evaporation test tubes containing the dried extracts from the urine. These are then heated and the drug undergoes a chemical reaction to become a derivative of the drug (*i.e.*, analyte). If no drug is present, no derivative of the drug will be produced.

150 After the derivatisation, the Laboratory Officers G1 and G2 followed the same Laboratory Manual and evaporated the solvent in the respective evaporation test tubes to dryness using sample concentrators. The process dries the analytes in the evaporation test tubes.

151 In the present case, ML and YT's evidence showed that they had carried out the derivatisation of all their respective samples including the accused's urine samples as per the typical workflow. Importantly, at all times from the SPE to the derivatisation, ML would only handle the samples from the *first* set of urine specimens and never touch the samples from the *second* set of urine specimens. Likewise, YT would only handle the samples from the *second* set of urine specimens and never touch the samples from the *first* set of urine specimens.

152 Under the typical workflow, Laboratory Officer K1 prepares new and empty GC/MS glass vials marked with samples numbers that correspond to the evaporation test tubes, *i.e.*, one for quantitative GC/MS test (marked in blue ink) and one for qualitative GC/MS test (marked in black ink). Laboratory Officer K2 also prepares similar GC/MS vials (marked in red ink for the quantitative GC/MS test and black ink for the qualitative GC/MS test). Analyst J will check that all the labels on the GC/MS glass vials against the labels on the respective evaporation test tubes to ensure that they are labelled correctly.

153 Laboratory Officers G1 and G2 follow the Laboratory Manual and dissolve the dried analyte in their respective evaporation test tubes with a fixed amount of solvent (ethyl acetate). They then transfer the solutions from their respective evaporation test tubes containing the analytes and solvent into the corresponding GC/MS glass vials and cap the GC/MS glass vials. Laboratory Officer G1 then hands her capped GC/MS glass vials to Laboratory Officer K1 while Laboratory Officer G2 hands hers to Laboratory Officer K2.

154 In the present case, Senior Laboratory Officer Fathiyah Abdul Latiff ("FAL") performed the role of Laboratory Officer K1 and Laboratory Officer Muhierah Bte Mohd Rashid ("MH") performed the role of Laboratory Officer K2. Their evidence was that they had marked their respective GC/MS glass vials separately and placed them in separate racks.

155 Analyst Fong Ching Yee ("FCY") stated that she had checked the labelling as per the typical workflow and was satisfied that the markings and sequence of the GC/MS glass vials in both sets of racks corresponded with the evaporation test tubes in the present case. She signed off on the DAT Worksheet for amphetamines in the field for "Checked by" at "Sample Derivatisation/Reconstitution".

156 In my view, mere checking by the *same* Analyst (*viz* FCY) of the correctness of the markings and sequence of the GC/MS glass vials in *both* sets of racks does not compromise the independence of ML and YT in the performance of the actual derivatisation of their respective samples, nor the independence of FAL and MH in the actual physical work of marking the GC/MS glass vials separately and placing them in separate racks. I conclude that factually all such work on the samples from *each* of the two bottles of urine specimens from the accused during the derivatisation phase has been separately done by a "different" person within the meaning of s 31(4)(b).

157 After FCY had completed the checking, ML and YT then separately prepared the solutions in the GC/MS glass vials for their respective samples. ML handed her capped GC/MS glass vials to FAL while YT handed hers to MH.

(f) GC/MS instrumental test

(I) How the GC/MS instrument does the testing

158 The GC/MS instrument draws an aliquot of the sample in each GC/MS glass vial placed in the queue on its autosampler (see [162] to [164]) by injecting the glass vial with a needle and introducing it into a column. This process is operated by a robotic system.

159 The GC/MS instrument enables the separation of different analytes in the sample by Gas Chromatography ("GC"), as the aliquot of the sample is carried through the column and different analytes interact with the column material differently. Each analyte then enters the Mass Spectrometer ("MS") and is bombarded by electrons (this is known as "electron-impact ionization"), resulting in the fragmentisation of the analyte into different ions having different mass or abundance.

160 The MS, operating in full scan [SCAN] mode for the qualitative test, produces a "total ion chromatogram" which shows peaks representing the various analytes separated by the GC. The x-axis of this chromatogram shows the time at which each peak appears (which corresponds to the time required for the analyte to pass through the GC and be detected by the MS, or the "retention time"). The y-axis shows the abundance of the analyte. The MS also produces a mass spectrum which shows the fragmentation pattern of each analyte. The fragmentation pattern for each analyte is unique and thus can be used as a "fingerprint" to identify the analyte.

161 The MS can also operate in the selected ion monitoring ("SIM") mode for the quantitative test. This produces a chromatogram of only selected analytes. Based on a formula (which involves, inter alia, the abundance of the same analytes in the internal standards and a response factor that is also automatically calculated based on the abundance of the same analytes in the calibration standards), the MS automatically calculates the concentration of these selected analytes. [note: 2]

(II) The GC/MS test queue

162 Under the typical workflow, Laboratory Officer K1 enters the sample numbers on the GC/MS glass vials containing the samples she has prepared into the computer attached to the GC/MS instrument, as well as the dilution factors for the sample (where relevant) and selects one of the pre-programmed methods for testing. Laboratory Officer K2 does the same for her GC/MS glass vials on

another GC/MS instrument. The order in which the information is entered (*i.e*., in which the GC/MS glass vials are queued) is as follows: first, a solvent wash to show that the instrument is clean before the testing of the GC/MS glass vials containing the analytes; followed by the quantitative sample for each accused person; and then the qualitative sample for that accused person. Another vial of solvent wash is queued before the quantitative and qualitative samples for the next accused person, and so on. As the positive and negative QC samples had been sampled together with the urine from the accused persons, these are also queued accordingly (with a solvent wash before the quantitative and qualitative samples).

163 The information for various other vials is also entered into the computer, in the following order:

Table 2: Typical GC/MS test queue for samples used in the certifying Analysts' checks

[LawNet Admin Note: Table 2 is viewable only to LawNet subscribers via the PDF in the Case View Tools.]

164 The Laboratory Officers then print out their respective GC/MS test queues and place the GC/MS glass vials on the autosampler trays of their respective GC/MS instruments in the sequence shown on the test queues. Another Laboratory Officer then checks that the physical positions of the GC/MS glass vials in the autosampler trays match the vial position numbers in the GC/MS test sequence printouts.

165 In the present case, FAL's evidence was that she had entered the information and arranged the GC/MS glass vials in GC/MS Instrument #11 as per the typical workflow. The GC/MS test sequence printout for her GC/MS glass vials (from the first set of bottles) is at P59 of the Agreed Bundle. MH had done the same for her GC/MS glass vials in GC/MS Instrument #13. The GC/MS test sequence printout for her GC/MS glass vials (from the second set of bottles) is at P52 of the Agreed Bundle.

166 Senior Laboratory Officer Lee Ngak Lee ("LNL") testified that she had checked the physical positions of the GC/MS glass vials in the autosampler trays for GC/MS Instruments #11 and #13 against the respective GC/MS test sequence printouts. LNL testified that in her more than 20 years of experience, she had only come across one error where the sequence of the GC/MS glass vials was wrong. LNL clarified during re-examination that the error was that instead of one solvent wash in a GC/MS vial (*e.g*. marked as 967_W1) placed before the sample in the GC/MS vial for quantitative GC/MS test (*e.g*. marked as 967_1), the GC/MS vials were swapped in their physical position whereby the GC/MS vial containing the sample was placed before the GC/MS vial containing solvent wash. LNL would then ensure that the error was rectified by the Laboratory Officer who had placed the GC/MS vials wrongly.

167 After the GC/MS instrument completes the testing, Laboratory Officer K1 prints the various chromatograms. The chromatograms will show the details she had earlier entered for each sample, *viz*, method file name, the sample number, dilution factor and date of test. Laboratory Officer K2 also prints the chromatograms for the GC/MS instrument she operated. Both laboratory officers K1 and K2 upload the electronic results into LIMS.

168 Subsequently, all the printouts from the GC/MS instruments for the *first* set of urine specimens are handed over to Analyst C, the certifying Analyst for the *first* set of urine specimens, and similarly all the printouts from the GC/MS instruments for the *second* set of urine specimens are handed over to Analyst L, the certifying Analyst for the *second* set of urine specimens.

(III) Analysis and interpretation of the GC/MS test results

(iii) Analysis and interpretation of the GC/MS test results

169 In order to reliably conclude that a given controlled drug is present in a urine sample, both the certifying Analysts must go through several steps for their respective sets of urine specimens that they are separately tasked to check and analyse. These include a series of checks on specific aspects of the test results (or "parameters") to ensure that they are within the acceptance criteria stipulated in the various protocols of the DAT laboratory.

170 For ease of reference, the steps required to be carried out by the certifying Analysts in respect of the test for Amphetamines are tabulated as follows:

Table 3: Steps carried out by the certifying Analysts

[LawNet Admin Note: Table 3 is viewable only to LawNet subscribers via the PDF in the Case View Tools.]

171 For the quantitative and qualitative results of the actual samples of accused persons, the certifying Analysts do the following:

(a) check that the details on the chromatograms match those on the DAT Worksheet and that the correct test method has been selected (*viz*, "AMPSCAN" for the qualitative test for Amphetamines and "AMPSIM4" for the quantitative test);

(b) check that the retention times of the analytes are within the acceptable range for the same analytes in the calibration standards (*viz*, +/- 1 minute of that from the calibration standard);

(c) check that the analytes have the correct fragmentation pattern;

(d) check that the peak shapes of the analytes in the sample and in the internal standards are acceptable; and

(e) analyse the appearance of the peaks to ensure that there are no abnormalities in the form of split peaks or floating peaks.

172 In the present case, the evidence of the certifying Analysts, ORS and BC, show that they carried out the above checks and were satisfied that all the parameters fulfilled the requisite acceptance criteria. I am satisfied from their testimony that they had performed their duties professionally, responsibly and independently, and that they were able to separately conclude based on the test results generated from their respective GC/MS instrument, that the first bottle of the accused's urine specimen contained 19,842.73 ng/ml of Methamphetamine and 1,476.04 ng/ml of Amphetamine, while the second bottle of the accused's urine specimen contained 23,327.80 ng/ml of Methamphetamine and 1,772.20 ng/ml of Amphetamine.

173 The certifying Analysts verified that the details in LIMS matched those in the chromatograms and printed out the certificates under s 16 of the MDA from LIMS. They signed on their respective

certificate after checking that the details on the certificate (*viz*, the accused's name and the CNB marking number) matched those on the CNB request form. They also ensured that the concentration of Methamphetamine was correctly printed on the certificate.

174 Echoing Dr Lui's evidence (see [98]), ORS and BC testified that they were able to claim responsibility for the accuracy of the test results even without having physically supervised and observed the Laboratory Officers as they carried out the various steps in real time. Based on the checks detailed at [170] and [171] above, they would have been able to detect if (a) the instruments were not functioning properly or operated correctly; (b) the samples had not been prepared correctly by the Laboratory Officers; or (c) the proper procedures had not been followed. I have no reason to doubt their evidence.

175 As for the possibility of human error in the form of specimen or sample mix-ups, the Prosecution comprehensively canvassed various hypothetical scenarios at trial, focusing on those scenarios which might result in prejudice to the accused. In other words, hypothetical scenarios that would result in favourable results for the accused were omitted from consideration for the purpose of this theoretical exercise, *e.g.*, if a urine specimen that was screened positive was not sorted out for further sampling and analysis by the GC/MS instrument, with the result that no certificate for a positive presence of a controlled drug would have been issued against the accused, although the preliminary screening test was positive for the presence of a controlled drug. Indeed, in the course of the cross-examination of BC, defence counsel was invited to suggest one such error to ask the witness but he was not able to do so.

176 The evidence was that mix-ups even in respect of only one sample were not likely to occur. If they occurred, they would be picked up by the various persons performing the checking functions in the typical workflow. Indeed, ORS testified that for such mix-ups to be missed entirely, there would have to be systemic error by many trained and competent personnel and the possibility of such systemic error was very remote, unless it was, if I may add, collusion by a number of such laboratory personnel to frame a particular accused person, which the Defence, very wisely, never attempted to suggest.

177 In respect of independence, the certifying Analysts testified that they did not refer to the results of the other set of bottles in interpreting the results for their own set of bottles. This was not only disallowed by the protocol but also impossible as the results for each sample could only be arrived at by the interpretation of the GC/MS data pertaining to that sample. The certifying Analysts could not alter any of the instrument-generated chromatograms and raw data from the GC/MS instrument's analysis of the urine samples.

(g) Administrative and technical review

178 It was Dr Lui's evidence that the administrative and technical review at the very end, as part of the DAT Laboratory protocol, involved him scrutinising the case notes and test results. For the first bottle of the accused's urine specimen, Dr Lui looked at the DAT Worksheets for Amphetamines, the ATL Test Request Forms, the ATL Screening Test Results, the quantitative and qualitative chromatograms, the GC/MS test queue sequence, as well as the chromatograms of the QC samples and calibration standards. Similarly, Dr Lui also looked at the corresponding case notes and reviewed the test results for the second bottle of the accused's urine specimen.

179 At this stage of the administrative and technical review, Dr Lui looked out for "outliers", namely analytical values that deviate significantly and spuriously from the true value, by checking that the difference between each result and the mean was within 20% of the mean.

180 This final check of the administrative and technical review essentially allowed the DAT laboratory to detect if the quantitative and qualitative samples for one bottle of a given accused's specimen had been mixed up with the quantitative and qualitative samples for a bottle of another accused's specimen (because the results for one accused's specimen would likely differ from the results of another accused's specimen). The likelihood that the quantitative and qualitative samples for both bottles of the accused's specimen had been mixed up with the quantitative and qualitative samples for both bottles of another accused's specimen so as to escape detection at the administrative and technical review stage was so remote that it could only occur if there was deliberate swapping according to ORS and BC.

Evidence of Prosecution's expert

181 Ms Turner, who is the Programme Manager for Medical Laboratory Accreditation at Internal Accreditation New Zealand ("IANZ"), was invited by Dr Lui to visit the DAT laboratory for the purpose of putting up a report on its procedures. IANZ is the only accreditation body in New Zealand and is responsible for granting accreditation to a variety of laboratories and industry groups in recognition of their compliance with relevant international standards.

182 Ms Turner put up a report on the DAT laboratory after studying all the steps and processes involved in the handling of urine specimens at the DAT laboratory whilst on-site for two complete days. She gave expert evidence that the DAT laboratory's procedures not only followed, but in a number of aspects exceeded, internationally accepted best practice procedures for the handling and testing of drugs in urine.

183 Ms Turner also observed the DAT laboratory staffing structure which consisted of Laboratory Officers (which she also referred to as "Technical Assistants") and Analysts (also referred to as "Scientists"). She stated in her report that in her experience, the use of Laboratory Officers to carry out the routine bench work is common practice internationally. She had seen various laboratories use Laboratory Officers to carry out the bench work and Analysts to interpret the test results, and these included the laboratories in US, Australia, NZ and Canada. In all these laboratories, she has never come across an Analyst watching over a trained Laboratory Officer when the latter was doing his bench work.

184 It was also Ms Turner's evidence that even though the certifying Analysts were not involved in the bench work, they would still be able to identify any mistakes made at the preparatory stage. Ms Turner had the opportunity to go through the whole case file relating to the accused's urine test with the certifying Analyst BC. In her view, the function performed by the Analyst is the most crucial part as the Analyst is able to determine whether the procedure has been performed correctly, whether instrumentation has been operating correctly and therefore, whether the result is valid. When asked whether there would be any kinds of errors which could go undetected by the Analyst who went through the test results and did not participate in the bench work, Ms Turner testified that she could not think of any error that the certifying Analyst would not detect. Crucially, in response to the Court's question whether (a) a physical observation by the certifying Analyst on the Laboratory Officers or (b) the actual review of results (including for the QC samples) by the certifying Analyst would be a better way to supervise the bench work/legwork done by the Laboratory Officer, Ms Turner testified that the review of the results and data would be a better way of supervision. Observing a Laboratory Officer pipetting or putting a sample in the Instrument would not be any more advantageous.

185 Ms Turner was shown s 31(4)(b) of the MDA. She testified that in her view, there was independence in the typical workflow because two different Laboratory Officers carried out the

sampling, extraction using the SPE, derivatisation and GC/MS test, and also because two separate certifying Analysts analysed the data. She observed that the testing of the two bottles of an accused person's urine specimen was not done in parallel, but rather in separate work streams. In relation to the court's question on whether the *checks* done by a single Analyst on both the accused's specimens adversely affect the independence of the two separate tests, Ms Turner testified that as the checking by the same Analyst was confined to "checking transcription" to ensure labelling has been done correctly, independence would not be adversely affected.

The Defence's case

186 At the close of the Prosecution's case, I found that the Prosecution had made out a case against the accused on the charge on which he was being tried and the accused was called upon to enter his defence. The standard allocution was read to the accused. The accused elected to remain silent.

187 The first and only defence witness called was the defence's expert witness, Dr Douse. Dr Douse agreed with the Prosecution on the following:

(a) Both urine samples of the accused indicated the presence of Methamphetamine and Amphetamine;

(b) The presence of Methamphetamine and Amphetamine in both samples is consistent with the accused having consumed "Ice";

(c) Even if there was any contributing factor to the amount of Methamphetamine and Amphetamine in the accused's urine (*e.g.*, contamination), a significant proportion of the Methamphetamine and Amphetamine in the accused's urine would be due to the consumption by way of smoking "Ice", and certainly be at a level above the cut-off range of 500 ng/ml;

(d) In any event, the proposition that there was contamination was merely a postulation based on "possibility";

(e) The concentration of Methamphetamine in the accused's urine (19,800 ng/ml to 23,300 ng/ml) is fairly high;

(f) The concentration of Amphetamine in the accused's urine (1,476 ng/ml to 1,772 ng/ml) is not a trace amount and is "reasonable";

(g) The amount of Amphetamine in the accused's urine is consistent with it being a metabolite of Methamphetamine after it is consumed;

(h) The 18 packets of 'Ice' seized from the accused were tested and found to contain the *d*-form

of Methamphetamine;

(i) The purity level of the 18 packets of "Ice" is 79.7%, which is very pure as the amount of Methamphetamine in pure Methamphetamine hydrochloride is calculated to be about 80.3%;

(j) Based on the accused's statement, because the six packets of "Ice" which the accused consumed came from the same consignment as the 18 packets of "Ice" seized from the accused, the six packets of "Ice" consumed would be the *d*-form of Methamphetamine as well. This is because "Ice" is prepared by allowing a concentrated solution of methamphetamine hydrochloride to form the "Ice" crystals. The composition of the "Ice" is expected to be uniform throughout the entire crystallisation process; and

(k) The improvised pipe which the accused used to consume "Ice" was found to contain both Amphetamine and Methamphetamine, which is consistent with the smoking of Methamphetamine.

188 Dr Douse put up a report but it was his evidence in Court that there were some paragraphs in the report which had been affected by developments during the trial, in particular:

(a) pg 5 at paragraph 6, which observed that the bottles which were used to contain urine had never been analysed to eliminate the possibility that traces of forensically significant analytes of interest were present prior to the sampling process. However, ORS had adduced a report showing that on 20 May 2009, fifty empty urine bottles were received from the CNB and a blank urine test was conducted. The result showed that there were no traces of drugs of interest, thus eliminating the possibility raised by Dr Douse.

(b) pg 6 at paragraph 9, which stated that there was a possibility of contamination from the accused's hands when he selected the three bottles and their caps (apparently loosely contained within a bag) using his bare hands. Dr Douse testified that this paragraph was irrelevant in light of the evidence of Cpl Goh that the bottles were capped when the accused selected them. If the bottles were capped, the chances of contamination entering into the bottle would be dramatically reduced.

The purposive approach to statutory interpretation

189 It is useful to briefly outline some of the applicable principles of interpretation before interpreting s 34(1)(b) of the MDA and applying it to the evidenced proffered by the Prosecution as above (see [77] to [185]). A court must give effect to the legislative purpose when interpreting an Act of Parliament. Section 9A of the Interpretation Act (Cap 1, 2002 Rev Ed) requires that a purposive approach be adopted when interpreting a provision in a written law. It states:

Purposive interpretation of written law and use of extrinsic materials

9A.—(1) In the interpretation of a provision of a written law, an interpretation that would promote the purpose or object underlying the written law (whether that purpose or object is expressly stated in the written law or not) shall be preferred to an interpretation that would not

promote that purpose or object.

(2) Subject to subsection (4), in the interpretation of a provision of a written law, if any material not forming part of the written law is capable of assisting in the ascertainment of the meaning of the provision, consideration may be given to that material –

(a) to confirm that the meaning of the provision is the ordinary meaning conveyed by the text of the provision taking into account its context in the written law and the purpose of object underlying the written law; or

(b) to ascertain the meaning of the provision when –

(i) the provision is ambiguous or obscure; or

(ii) the ordinary meaning conveyed by the text of the provision taking into account its context in the written law and the purpose or object underlying the written law leads to a result that is manifestly absurd or unreasonable.

190 In *PP v Low Kok Heng* [2007] 4 SLR(R) 183 ("*Low Kok Heng*"), VK Rajah JA stated that (at [41]):

> Section 9A(1) of the Interpretation Act requires the construction of written law to promote the purpose or object underlying the statute. *In fact, it mandates that a construction promoting legislative purpose be preferred over one that does not promote such purpose or object*: see Brady Coleman, "The Effect of Section 9A of the Interpretation Act on Statutory Interpretation in Singapore" [2000] Sing JLS 152 at 154. *Accordingly, any common law principle of interpretation, such as the plain meaning rule and the strict construction rule, must yield to the purposive interpretation approach stipulated by s 9A(1) of the Interpretation Act. All written law (penal or otherwise) must be interpreted purposively*. Other common law principles come into play only when their application coincides with the purpose underlying the written law in question, or alternatively, when ambiguity in that written law persists even after an attempt at purposive interpretation has been properly made.
>
> [emphasis added]

Justice Rajah explained the purposive approach in *Low Kok Heng* as follows (at [30]):

> The purposive approach allows the judge the latitude to look beyond the four corners of the statute, should he find it necessary to ascribe a wider or narrower interpretation to its words; the judge's role pursuant to this approach is one of "active co-operation with the policy of the statute": see John Bell and Sir George Engle, *Cross on Statutory Interpretation* (Butterworths, 2nd ed, 1987) at p 18. These first two principles apply without exception to the interpretation of *all* statutes and constitute settled and established principles of construction.

191 I agree with the Prosecution that neither ambiguity nor inconsistency must first exist in a statutory provision before reference to the extrinsic material adverted to in s 9A(2) can be made: see *Low Kok Heng* at [45]; see also *Planmarine AG v Maritime and Port Authority of Singapore* [1999] 1 SLR(R) 669 at [22]. The court will have regard to all relevant matters when it considers the weight and relevancy of the extrinsic materials that may be of assistance in determining the meaning of a particular provision: s 9A(4) of the Interpretation Act. In this regard, a consideration of the purpose or object underlying the written law, as well as the relevant extrinsic materials pertaining thereto,

may well result in wider or narrower meaning than the literal meaning normally or ordinarily ascribed to a given word or words in the provision, so that it furthers the purpose or object of the written law and does not detract from it. The underlying rationale of the purposive approach to interpretation is to have the courts construe statutory provisions, as far as it is reasonably possible to do so, in a manner that enables the statutory provision to work effectively having regard to its purpose.

192 I find the comments of Professor John Burrows in "Interpretation of Legislation: The Changing Approach to the Interpretation of Statutes" (2002) 33 Victoria U Wellington L Rev 561 at 564–65 to be relevant for our purpose:

> [M]any cases on interpretation do not just involve deciding what the words of the Act mean; they also involve deciding how they should be applied to the facts of the case in question. A large number of cases on interpretation involve a set of facts that the drafter simply did not anticipate, and the question is whether that set of facts is covered by the statutory provision in question. The strongest contribution of the purposive approach has been to allow words to be given strained or unusual meanings so that they can be held to extend to the facts in question when the purpose of the legislation makes that desirable. Such an approach has enabled courts recently to hold that a container of sweets resembling a baby's bottle was a "toy"; and that "logs" (of timber) included cut and partly-processed timber. Proponents of a "natural meaning" theory of interpretation may find some difficulty with these cases.
>
> For myself, I do not find a "natural meaning" rule particularly helpful in cases like this. These cases are not about "primary" and "secondary" meaning: they are about the areas of vagueness at the edges of all words. What a purposive approach does is to cope with the difficulty that however careful drafting may be, no drafter can ever foresee and provide exactly for everything that is going to happen in the world of fact. Drafters need a little help from the courts in making sure that the Act works effectively.

193 As Professor Burrows suggests, many words do have a penumbra of vagueness at the edges even if the "primary" and "secondary" meanings may be clear, and this vagueness may be compounded where the words themselves have several alternative or different literal meanings. Accordingly, a purposive approach towards the interpretation and construction of a provision is needed to facilitate the effective operation of the written law at the application level.

194 However, it must also be borne in mind that the purposive approach is not a licence to rewrite the written law by adopting an interpretation that is totally inconsonant with the literal wording of the provision itself. As stated in *Low Kok Heng* at [52]:

> More importantly, it is crucial that statutory provisions are not construed, in the name of a purposive approach, in a manner that goes against all possible and reasonable interpretation of the express literal wording of the provision. This much is clear from the decision of Dawson J of the High Court of Australia in *Mills v Meeking* (1990) 91 ALR 16. In that case, Dawson J explained the effect of s 35(a) of the Interpretation of Legislation Act 1984 of Victoria (which is based on s 15AA of the Australian Act and corresponds to s 9A(1) of the Interpretation Act). He stated at pp 30–31:
>
> > The approach required by s 35 needs no ambiguity or inconsistency; it allows a court to consider the purposes of an Act in determining whether there is more than one possible construction. Reference to the purposes may reveal that the draftsman has inadvertently overlooked something which he would have dealt with had his attention been drawn to it and if it is possible as a matter of construction to repair the defect, then this must be done.

> However, if the literal meaning of a provision is to be modified by reference to the purposes of the Act, the modification must be precisely identifiable as that which is necessary to effectuate those purposes *and it must be consistent with the wording otherwise adopted by the draftsman. Section 35 requires a court to construe an Act, not to rewrite it, in the light of its purposes*.
>
> Courts must be cautious to observe the limitations on their power and to confine themselves to administering the law. "Purposive construction often requires a sophisticated analysis to determine the legislative purpose and a discriminating judgment as to where the boundary of construction ends and legislation begins" (per McHugh JA in *Kingston v Keprose Pty Ltd* (1987) 11 NSWLR 404 at 423). Section 9A of the Interpretation Act should not be viewed as a means or licence by which judges adopt new roles as legislators; the separation of powers between the judicial branch and the legislative branch of government must be respected and preserved.
>
> [emphasis added]

With the above principles in mind, I will now construe s 31(4)(b) of the MDA.

The terms "analyst", "conduct" and "urine test" in s 31(4)(b)

Definition of "analyst"

195 There is no definition of "analyst" in the MDA or related legislation such as the Health Sciences Authority Act (Cap 122C, 2002 Rev Ed). There is also no definition of the term in any related subsidiary legislation.

196 For the purposes of this trial, the Prosecution and Defence have accepted that the term "analyst" in the MDA refers to the present day "Analyst", *i.e.*, the class of laboratory personnel that have a 2nd upper honours degree in Chemistry or a related field (previously known as "Scientific Officers" and prior even to that as "Government Chemists"). I have no reason to disagree that HSA has appointed such personnel with suitable educational qualifications as Analysts.

Definition of "conduct"

197 Likewise, the term "conduct" is not defined in the MDA or any related subsidiary legislation.

198 I am grateful for the diligent research conducted by the Prosecution on the meaning of "conduct" and I reproduce in full from their written submissions the references to the dictionaries and the decided cases on the meaning of "conduct" in other contexts that clearly show the protean nature of the word changing depending on exactly what is being conducted.

199 In *The Oxford English Dictionary* (Oxford, Clarendon Press, 2nd ed, 1989), the word "conduct" is defined as follows (at pg 691):

> **II**. To lead, command, direct, manage.4. To lead, command, act as a commander of (an army, etc)…
>
> 5. a. To direct (an orchestra, or a musical performance)…
>
> b. To lead, take the leading part in, preside over and direct (a meeting, divine service, etc.)…
>
> c. To act as conductor of (an omnibus, etc.)

6. To direct, manage, carry on (a transaction, process, business, institution, legal case, etc). The notion of direction or leadership is often obscured or lost; *e.g* . an investigation is conducted by all those who take part in it...

[emphasis original; bold added]

200 I agree with the Prosecution that the bold paragraph in the quotation directly above is more relevant for our present purposes as a "urine test" is more aptly described as a "process" rather than having any resemblance to an army, orchestra, meeting or omnibus.

201 In *Chambers Twentieth Century Dictionary* (A.M. Macdonald (ed.), Edinburgh: W&R Chambers, 1972), the word "conduct" is also defined in myriad ways by reference to the thing being conducted, as follows (at pg 271):

v.t. to lead or guide: to convey (water, blood, sap, etc): to direct: to manage: to behave: to carry or transmit [electricity]: to beat time for and coordinate [music].

202 The *Longman Dictionary of the English Language* (Longman, 2nd edition, 1991) defines the word "conduct" in the context of "an experiment" as "*to carry on or out, usu from a position of command or control*" (at pg 333):

203 The subtle distinctions between conducting, directing and managing are captured by Dr Anandan Krishnan in *Words, Phrases & Maxims – Legally and Judicially Defined* (LexisNexis 2008) at Volume 4 C(II), paragraph C1132:

Conducting requires most wisdom and knowledge; managing most action; direction most authority ... A conductor conceives, plans, arranges and disposes; a manager acts or executes; a director commands ... When a general undertakes to conduct a campaign, he will entrust the management of minor concerns to persons on whom he can rely; but he will direct in person whatever is likely to have any serious influence on his success.

2 0 4 *Black's Law Dictionary* (Thomson West, 8th edition) does not contain any definition of "conduct" in its verb form. The legal dictionaries define the word "conduct" by reference to a few decided cases: see *Stroud's Judicial Dictionary of Words and Phrases* vol 1 (Sweet & Maxwell, 7th ed, 2009) at pgs 497–99; and *Words and Phrases Legally Defined* (LexisNexis Butterworths, 4th ed, 2007) at pg 450.

205 In *Council of the Pharmaceutical Society of Great Britain v Fuller* [1932] 96 J.P. 422 ("*Council of the Pharmaceutical Society of Great Britain*), the appellate court had to interpret s 3(1) of the Poisons and Pharmacy Act, 1908 (UK). The respondent had a chemist's shop which belonged to him and of which he took all the profits. However, he had other engagements which took him away from the shop for at least 42 hours a week, during which periods he left an unqualified assistant in charge of the shop. The assistant sold Lysol to an inspector employed by the appellant on three occasions. The issue was whether the respondent had "*bona fide* conducted" the business of a pharmaceutical chemist such that no offence was committed. Section 3(1) of the Poisons and Pharmacy Act, 1908 (UK) stated:

Any person who, being a duly registered pharmaceutical chemist or chemist and druggist, carries on the business of pharmaceutical chemist or chemist and druggist shall, unless in every premises where the business is carried on the business is *bona fide conducted by himself* or by some other

> duly registered pharmaceutical chemist or chemist and druggist, as the case may be, and unless the name and certificate of qualification of the person by whom the business is so conducted in any premises is conspicuously exhibited in the premises, be guilty of an offence under s 15 of the Pharmacy Act, 1868.
>
> [emphasis added]

In finding that the judge below had not erred in finding that the respondent had *bona fide* conducted the business of a pharmaceutical chemist, Scrutton LJ, with whom Lawrence LJ agreed, gave a liberal interpretation to the word "conduct". He stated (at 424):

> I am of opinion (1) that the words "*bona fide* conducted" are wider than the words "carries on the business" and involve some further elements than merely being the owner of the business and taking the profits of it; and (2) I am of the opinion that the words mean that the business is conducted, not that the sales which form the business are each conducted; in other words, I do not think it is sufficient to make it an offence under this section that you prove one sale not conducted by the registered person. How many sales you must prove appears to me to be a question of degree. *In my view "conduct" means something very like "control" or "manage", so that a man may conduct the business without personally undertaking or carrying out every item that is done in the business*. I notice that when Parliament wants to say "personally conducted" it knows how to do it because it says so in sub-s (4); it does not say it in s 3(1), and *in my view the business may conducted by a man who does not himself perform every act which forms part of the business, it is enough that he controls it, regulates it and has the power which he exercises of giving orders as to how it shall be carried on*.
>
> [emphasis added]

Greer LJ however dissented on the basis that if the person carrying on the business cannot conduct it himself, he must conduct it through some person equally qualified as the Poisons and Pharmacy Act, 1908 (UK) stipulates that the business must be conducted "by some other duly registered pharmaceutical chemist or chemist and druggist". The respondent had not provided for a qualified chemist to take his place and therefore must be viewed to have infringed s 3(1) of the said Act.

206 Although the above case may not be directly on point because it pertains to the conduct of a business of a pharmaceutical chemist, chemist or druggist, nevertheless it does show that the word "conduct" is capable of bearing a meaning that does not entail *personal* carrying on of the thing being conducted. Whether the relevant acts in question taken as a whole are sufficient to constitute "conduct" is very much an issue of fact to be determined in the context of the particular circumstances of the case: see, *e.g.*, *Council of the Pharmaceutical Society of Great Britain* at pp 424–425.

207 I thus agree with the Prosecution's submission that:

(a) The word "conduct" appears to be a chameleon that takes its colour and definition from the context in which it is used, in particular the nature of the thing which is being conducted. It has a wide spectrum of meanings.

(b) The plain and ordinary meaning of the word "conduct" does not necessarily entail that the person who "conducts" has to personally carry out every act which forms part of the thing being conducted.

(c) Rather, the focus is on having control where at least one well-established English dictionary has defined the word "conduct" specifically in relation to an "experiment" in this manner.

(d) The question of what amounts to "conduct" is an issue of fact to be determined in the context of the particular circumstances of the case.

208 Given that the word "conduct" takes its colour and definition from the context in which it is used, in particular the nature of the "thing" which is being conducted, I shall now consider the meaning of "urine test" in s 31(4)(b) of the MDA (and which also appears in s 22 of the MDA), which is the "thing" that the HSA analysts, ORS and BC, are supposed to have conducted.

Definition of "urine test"

209 Although the term "urine test" appears in s 31(4)(b) and s 22 of the MDA, it is not defined in the MDA or any related subsidiary legislation.

210 The word "test" bears an even wider range of meanings than the word "conduct". However, the definition of "test" (noun form) given in the Oxford English Dictionary that is relevant for our purpose is at pg 827:

> *Chem*. *The action or process of examining a substance under known conditions in order to determine its identity or that of one of its constituents*; also, a substance by means of which this may be done.
>
> [emphasis added]

211 A similar definition is found in *Longman Dictionary of the English Language* at pg 1671:

> a chemical or physical procedure or reaction, or a chemical reagent used to identify or test for the presence of a substance or constituent.

212 On the particular facts of this case, the "test" carried out at HSA indisputably involves some kind of scientific analysis and determination to identify the presence of Methamphetamine in a specimen of biological fluid, namely, urine. If present, it then involves quantifying the concentration of the Methamphetamine that is dissolved in the urine. As such, the "test" that was conducted at HSA closely mirrors the dictionary meanings set out above. As an integral part of the urine testing at HSA, a scanning qualitative "test" is also performed to identify the possible presence of other specific types of controlled drugs of interest, which are also chemical compounds.

The legislative history of s 31(4)(b) of the MDA

213 The Prosecution has very helpfully and comprehensively set out in their written submissions the legislative history of s 31(4)(b), which I fully adopt below. The Misuse of Drugs Act was first enacted as Act No. 5 of 1973, as "an Act to provide for the control of dangerous or otherwise harmful drugs and for purposes connected therewith". The said Act consolidated the Dangerous Drugs Act of 1951 and the Drugs (Prevention of Misuse) Act of 1969. Those Acts did not contain any provision similar to the present ss 16, 22 and 31(4)(b) and therefore do not shed any light on the present case.

214 At the time Act No. 5 of 1973 was introduced, Parliament was keenly aware of the need to curb drug consumption and the attendant problem of drug addiction. The then Minister for Home Affairs and Education, Mr Chua Sian Chin ("Mr Chua Sian Chin") said in his Second Reading speech on the 1973 bill (*Singapore Parliamentary Debates, Official Report*, 16 February 1973, vol 32 at cols 416–17) that:

> Drug addiction is a problem increasing in size daily. What was once smoking opium and marijuana (the dried plant which is known locally as ganja) or the consumption of opium pills amongst a comparatively small group of middle-aged or elderly people has developed into the taking of methaqualone (known popularly as MX pills) or the smoking of marijuana amongst the younger age group in their teens or early 20's who can be found not only in the street or coffee-shop but also in the school and the university.
>
> The young person falls under the influence of such a drug in a variety of ways. It might be the result of boredom, sense of adventure to know how it feels by taking it or he might be inducted to it before being accepted as one of the circle of so-called "friends". The danger is that when he finds that the effects of such a drug are not too upsetting but rather pleasant in the transient light-headed feeling it induces, he continues to take it.
>
> After this, he so very easily progresses to more potent drugs that will give him that same feeling of euphoria after failing to get it with those drugs which he first used, even in increasing quantities. Once he becomes "hooked" On a hard drug, e.g, morphine or heroin, his path to ruination and disaster is certain. He will not be able to stop taking such a drug as the physical and mental symptoms known as "withdrawal symptoms" following will be unbearable. It is known that once a person is hooked to a hard drug, he will lie, cheat, steal or even kill just to get the drugs.

215 Although s 28 of Act No. 5 of 1973 provided for urine tests, it did not prescribe any procedures for such urine tests. Section 28 merely stated:

> **Urine test**
>
> **28**. —(1) An officer of the Bureau or an immigration officer may, if he reasonably suspects that any person has any controlled drug in his body, require that person to provide a specimen of his urine for a urine test.
>
> (2) A person who, without reasonable excuse, fails to provide a specimen of his urine within such time as may be required by an officer of the Bureau or an immigration officer shall be guilty of an offence.
>
> (3) Any person (other than a Singapore citizen or a permanent resident) arriving in Singapore by land, sea or air who —
>
> (a) fails to comply with the requirement of an immigration officer under this section; or
>
> (b) is found as a result of a urine test to have consumed a controlled drug,
>
> may be prohibited from entering or remaining in Singapore.

216 An optional second urine test was first introduced in Act No. 12 of 1977, by the insertion of the following new sub-sections (4) and (5) to s 28, replicated below:

(4) Any person who has been required to provide a specimen of his urine for a urine test under subsection (1) of this section may, within such time and in such manner as may be prescribed, apply for a second test of the specimen of his urine which is kept for that purpose in accordance with any regulations made under this Act; but except as provided by subsection (5) of this section no such application shall affect any order made by the Director or the Deputy Director of the Central Narcotics Bureau under Section 33 of this Act.

(5) If as a result of any second test which has been conducted on the application of any person under subsection (4) of this section it is found that there is no controlled drug in the specimen of his urine, he shall be immediately discharged from any approved institution in which he is detained.

217 In the Second Reading speech for the amendment bill (Singapore Parliamentary Debates, Official Report, 9 November 1977, vol 37 at col 171), Mr Chua Sian Chin stated that:

Following the tabling of the Bill for First Reading, a further study of the Bill was made *with a view to providing safeguards for any possible abuse or errors by enforcement and other officers in the taking and handling of urine samples and in their analysis. As a result, further amendments have been proposed to build in these safeguards*. These amendments are contained in the Notice of Amendments which I shall move at the Committee Stage of the Bill.

The further amendment…will enable any person whose urine specimen is found to contain a controlled drug and who is dissatisfied with the result the right to apply for a second test of the specimen which will be stored for the purpose. This is to give the person a recourse if there is a mix-up of his urine specimen in the course of its taking, transportation and testing. Detailed procedures for the taking, collection, delivery and storage of urine specimens from suspected drug addicts will be promulgated in the form of regulations after the Bill has been passed. It also provides for the immediate release of such a person if the second test of his urine specimen is found to be negative.

[emphasis added]

218 Mr Chua Sian Chin further elaborated (at cols 175–176):

Now, in the amendments to the Bill, which are being proposed, we are providing for the possibility of an application for a second urine test. In other words, *if there has been an error or a mix-up in the first urine test, then a second urine test will be done to prove it one way or the other*. As I have said in my speech, what we are proposing to do, as soon as the Bill is passed, is to promulgate detailed regulations to enable such a procedure to be implemented. In other words, instead of taking one urine specimen, we are proposing to take two urine specimens. The first urine specimen will be sent for analysis *by the Department of Scientific Services*, while the second specimen will be stored under lock and key. *If there is claim of a mix-up in the first specimen, then we can fall back on the second specimen. In that way, we can ensure that any possibility of a mix-up is reduced to the minimum*.

[emphasis added]

219 Basically, the aim of having a second urine test is to confirm the results of the first urine test and to minimise the possibility of an error or a mix-up. Hence if the second test turns out to be negative, the accused is released even though the first test may have been positive. The benefit of doubt is given to the accused in that the second test is assumed to correct and an error or some

mix-up is assumed to have occurred in the first test. Logically, the alternative possibility exists, *i.e.*, that no error or mix-up occurred in the first test but it happened in the second test. The accused has the benefit of doubt nevertheless.

220 It should be noted that although the Parliamentary Report refers to "two urine specimens", the regulations which were subsequently promulgated in the Misuse of Drugs (Urine Specimens and Urine Tests) Regulations 1977 ("MDR 1977") provided for the urine specimen of the accused to be taken in two separate containers. The MDR 1977 provided for a Urine Bank for the storage of the second container of urine specimen, and allowed the person from whom the two containers of urine specimen were taken to apply for a second test of his urine specimen (*viz*, by testing the second container of urine). The pertinent provisions to note are Regulation 6 and paragraph 3 of the Fourth Schedule, replicated below:

> 6. —(1) Any person who wishes to have a second test of his urine specimen shall apply in writing to the Permanent Secretary, Ministry of Home Affairs within twenty-one days after he has been notified of the result of the first test of his urine specimen.
>
> (2) The second urine test shall be carried out in accordance with the provisions of the Fourth Schedule.
>
> **FOURTH SCHEDULE**
>
> **Procedure for second test of urine specimens**.
>
> …
>
> 3. The Director of Scientific Services shall arrange for an officer who was not involved in the first test of the person's urine specimen to carry out the second test. The result of the second test shall be sent to the Permanent Secretary, Ministry of Home Affairs who shall inform the person and his solicitor of the result.

221 The 1977 amendments to the MDA and the promulgation of the MDR 1977 were therefore the genesis of the "two-test regime" (*i.e.* the collection of two containers of urine to be independently tested by two different officers).

222 The next development in the two-test regime took place in 1989. Act No. 38 of 1989 deleted ss 28(4) and (5) and provided for a new urine testing procedure (renumbered as ss 31(4) and (5)), as follows:

> **Urine tests**
>
> **31**. …(4) A specimen of urine provided under this section shall be divided into two parts and each part shall be marked and sealed in such manner and in accordance with such procedure as may be prescribed.
>
> (5) A urine test shall be conducted by a Government chemist on one part of a specimen of urine provided under this section and, at the same time or soon thereafter, a second urine test shall be conducted on the other part of the specimen of urine by another Government chemist.

223 In the Second Reading of the Bill, then Minister for Home Affairs Prof S Jayakumar said (*Singapore Parliamentary Debates*, Official Report, 30 November 1989, vol 54 at col 865) that:

Then I come to the question of urine testing. Clauses 3 and 4 amend sections 22 and 31 with regard to the testing of urine samples. Drug suspects are now required to provide two urine samples. One to be tested by the Department of Scientific Services and the other to be stored in what is known as the Urine Bank for a second test upon application by the addict. The suspected addict is detained in a DRC if the first specimen is tested positive for controlled drugs. He can then apply for a second sample to be tested. If the second test is negative, he will be released from the DRC. But by then he might have been detained for as long as six or seven weeks. *With the availability now of more advanced urine testing equipment, it is now practicable to analyse the second urine sample immediately if the first sample is tested positive. Both samples will be tested by different chemists with the necessary safeguards*.

[emphasis added]

224 The MDR 1977 was repealed and replaced by the Misuse of Drugs (Urine Specimens and Urine Tests) Regulations (1990 Rev Ed), which was not materially amended up till the current Misuse of Drugs (Urine Specimens and Urine Tests) Regulations (1999 Rev Ed) ("the current MDR"). The relevant provision is Regulation 5, which states:

Urine test

5. –(1) Urine tests shall be carried out in accordance with paragraph (2).

(2) The Chief Executive of the Health Sciences Authority shall arrange for each of the 2 urine specimens to be tested by a different officer and the results of the 2 urine tests shall be sent to the enforcement officer in charge of the case.

225 Finally, Act No. 2 of 2006 introduced a preliminary urine test in s 31(4)(b). After the enactment of the 2006 amendments, s 31(4) reached its present form in the current MDA. It now reads:

(4) A specimen of urine provided under this section shall be divided into 3 parts and dealt with, in such manner and in accordance with such procedure as may be prescribed, as follows:

(a) a preliminary urine test shall be conducted on one part of the urine specimen; and

(b) each of the remaining 2 parts of the urine specimen shall be marked and sealed and a urine test shall be conducted on each part by a different person, being either an analyst employed by the Health Sciences Authority or any person as the Minister may, by notification in the Gazette, appoint for such purpose.

226 From the foregoing, I agree with the Prosecution that the specific legislative purpose of s 31(4)(b) of the MDA is to ensure better protection for an accused person by enhancing the reliability and accuracy of the urine test results. In other words, it is to increase the confidence level of the correctness of the test results. This is done by providing for two independent urine tests to be conducted on the accused's urine specimens. The second urine test was conducted only on the request of the accused after 1977 and automatically after 1989. Section 31(4)(b) therefore requires double confirmation from two urine tests, each conducted independently by different persons, for the presence of the same controlled drug in the two specimens of urine taken from the accused before the accused can be presumed under s 22 to have committed the offence of consumption of that controlled drug. If any one of the two urine tests were to give a negative result for the presence of that controlled drug, the presumption under s 22 would not arise, even if the other urine test were to give a positive result.

227 I note here that s 31(4)(b) does not expressly require that each of the two independent urine tests to be done on a *different* GC/MS instrument or that there be a *second layer of checks* on top of having two different persons conduct the two tests separately. However, HSA has taken upon itself to implement such additional measures over and above the s 31(4)(b) requirements to further improve the accuracy and reliability of its urine test results.

The larger legislative purpose of the MDA and the legislative history of s 22

228 The legislative purpose of s 31(4)(b) must also be seen in the context of the larger legislative purpose of the MDA, as well as the presumption of consumption in s 22 of the MDA.

229 As stated in *Bennion on Statutory Interpretation* (Francis Bennion, LexisNexis, 5th ed, 2008) at pg 947:

> [T]he concept of legislative purpose is not straightforward. In statutory interpretation the unit of inquiry is usually a single proposition (an 'enactment'). Each enactment has its own limited purpose, to be understood within the larger purpose of the Act containing it – or sometimes within a broader purpose still, when the subject is dealt with by several Acts. Beyond this again is the general purpose of the law as an instrument serving the public welfare.

230 It is thus useful to briefly trace the legislative history behind the enactment of s 22. Parliament had expressed its strong abhorrence of drug consumption and made clear its determination to fight the problem of drug abuse in 1973. To this end, the presumption in s 22 was introduced as s 19A in Act No. 49 of 1975. The presumption arose on the basis of only *one* urine test. Section 19A read:

> **Presumption relating to urine test**
>
> **19A**. If any controlled drug is found in the urine of a person as a result of *a urine test*, he shall be presumed, until the contrary is proved, to have consumed that controlled drug.
>
> [emphasis added]

231 It is clear that s 19A was introduced as part of Parliament's move to take a firm stance against drug addiction. Indeed, Mr Chua Sian Chin explained in his Second Reading speech on the amendment bill that (*Singapore Parliamentary Debates, Official* Report, 20 November 1975, vol 34 at cols 1379–80):

> Sir, the tragedy of drug abuse has been presented in terms of the individual drug abuser and his family. The irreparable damage caused by drug addiction to the health and career of the drug abuser and the sorrow, anxiety and the shame caused to the family has often been emphasised. This, therefore, need not be elaborated upon here.
>
> But what is not sufficiently appreciated is the threat that drug addiction poses to national security and viability. If drug abuse were to be allowed to grow unchecked, particularly among our youths, we would eventually be faced with a dangerous national security problem. In no time we would find that it had penetrated right into the vital and sensitive institutions of the State, like the Police and the Armed Forces.

232 The introduction of the two-test regime in 1989 was accompanied by an amendment to s 19A (later re-numbered as s 22), explicitly tying the presumption of consumption to a positive result for "*both urine tests conducted under section 31*." The amended provision read as follows:

Presumption relating to urine test

> 22. If any controlled drug is found in the urine of a person as a result of both urine tests conducted under section 31, he shall be presumed until the contrary is proved, to have consumed that controlled drug.

233 Section 22 of the MDA remains materially unchanged in the present MDA, save that the reference to s 31 has been amended to a specific reference to s 31(4)(b).

234 Section 22 has since been interpreted as giving rise to a presumption that both the requisite *mens rea* and *actus reus* for the offence of drug consumption exist once the controlled drug is found in the urine of an accused person as a result of both urine tests conducted under s 31(4)(b). The burden of proof then falls on the accused to disprove either element on a balance of probabilities: see *PP v Tan Loon Lui* [2003] 2 SLR(R) 216 at [6].

235 Section 22 of the MDA was clearly intended as a provision to facilitate the prosecution of the offence of drug consumption. The section was enacted as part of the MDA, the general scheme of which was to target drugs related offences. At the point of the introduction of s 22, although Parliament did not specifically address the reasons for its enactment, Parliament was clearly aware of the need to target the problem of drug consumption and addiction. Furthermore, as explained by Jeffrey Pinsler SC in *Evidence and the Litigation Process* (LexisNexis, 3rd ed, 2010) at p 426:

> The use of the legal presumption to impose the burden of proof on the accused has been criticised as being in conflict with the presumption of innocence which is a fundamental tenet of the criminal justice system. However, the legal presumption has been justified on policy grounds. It normally applies in circumstances which would make the normal duty of the prosecution to prove certain facts particularly onerous. The argument is that, in the absence of such presumptions, potential offenders would commit crimes with impunity, confident of avoiding conviction. The legal presumption has also been justified in relation to crimes which have a particularly abhorrent effect on society as a whole. The policy may be illustrated in the context of the misuse of drugs.

236 Although Prof Pinsler goes on to discuss drug trafficking, his statement is applicable to the presumption of consumption in s 22 of the MDA.

Interpretation of s 22 read with s 31(4)(b)

237 I agree with the Prosecution that a nuanced and balanced approach should be taken in interpreting s 22 read with s 31(4)(b) of the MDA, given that the different legislative purpose behind each provision must be considered. From the legislative developments and the speeches of the various Ministers when moving the legislative amendments, it appears to me that the specific intent behind the enactment of s 31(4)(b) is to provide a stronger safeguard for the accused by having two urine tests conducted independently on two urine specimens obtained from the accused instead of merely one test to ensure that the urine test results are reliable and correct, and only after both such independent tests have confirmed the presence of a controlled drug in the urine specimens provided will the accused face the rebuttable presumption under s 22 that he has committed the offence of consuming that controlled drug. Undoubtedly, the rebuttable presumption in s 22 does significantly assist the Prosecution in proving a consumption offence. Effective enforcement by CNB combined with successful prosecutions of drug addicts in court will help curb the spread of drug consumption, which is part of the larger legislative purpose underpinning the MDA. The need for having effective safeguards to minimise the risk of a wrongful conviction has to be finely balanced

with the need to have strong laws also in place to ensure that those who have in fact committed the offence do not escape the punishment of the law. The facilitative nature of s 22 of the MDA does not mean that the court is entitled to disregard the rights of the accused. Both the opposing interests (of the accused and the public) must be fully taken into account in the interpretive exercise. Therefore, I would not adopt an overly literal or narrow interpretation of s 31(4)(b) that would emasculate the efficacy of the presumption in s 22, and neither should I adopt an overly broad interpretation of s 31(4)(b) that would disregard the core safeguard of having two urine tests properly and independently conducted by qualified personnel in order to minimise errors and mix-ups and ensure increased reliability and accuracy in the results of drug analysis of urine specimens.

The context in which s 31(4)(b) operates

238 The use of "more advanced urine testing equipment" was mentioned by the then Minister for Home Affairs Prof S Jayakumar during the Second Reading of the Bill (see [223]), when he initiated the amendments in 1989 to have the second urine test on another specimen conducted by another Government chemist at the same time or soon after the first urine test. The actual determination of the constituents of the urine specimens is now a highly automated and mechanised process carried out by instruments which have been pre-programmed with set methods containing set parameters, and the results are automatically generated by the instruments themselves after analysing the samples fed into the instruments on a carousel or autosampler tray in batches of up to fifty at a time. With these advanced urine testing equipment, it is not too far-fetched to say that the machine has "replaced" the human being in the actual testing so to speak and the human being is essentially left to perform the task of analysing and interpreting the automatically generated results from the machine. However the analysis and interpretation of results generated by the test instrument is, in my view, the most important element in the whole urine testing process, as it is from that analysis and interpretation that all conclusions stated in the HSA certificate are derived. In this context, the concept of an Analyst personally carrying out the physical urine test is rendered largely meaningless in today's environment with the very advanced and highly automated urine testing equipment. In interpreting s 31(4)(b), I have to take account of the present day context in which the actual physical testing is now largely done by an automated instrument and no longer by a human being as such.

239 Another relevant aspect is the fact that the DAT laboratory's procedures as represented in the typical workflow (see Table 1) are internationally accepted. The DAT laboratory has been accredited by a well-established accreditation board ASCLD and the fact that the certifying Analyst does not physically supervise the steps involved in preparing the urine samples before feeding into the GC/MS instrument for the actual testing of the urine specimens was not met with criticism from the inspectors. The Prosecution's expert Dr Shelley Turner and the Defence's expert Dr Douse were also united in the view that the DAT laboratory's procedures meet international standards. This shows that after reviewing the totality of the laboratory's procedures, they were satisfied that the actual reliability of the test results and the conclusions as stated in the HSA certificates were not compromised in any way by the lack of physical supervision by the certifying Analyst in the preparatory steps involved prior to the actual testing by the GC/MS instrument.

240 I agree with the Prosecution that s 31(4)(b) must be interpreted in a way that *works effectively* in a *real-world context* and not merely in arid abstraction. Established and accepted laboratory practice is also part of that context, which I have to bear in mind when interpreting s 31(4)(b). Such international acceptance shows that the way in which the certifying Analysts are utilised is rational and scientifically reliable, and thus lends assurance that an interpretation of s 31(4)(b) that takes into account and is consistent with HSA's procedures that conform to international standards will not compromise the rights of the accused person and the safeguards available to him.

Application of s 31(4)(b) of the MDA to the facts

What parts constitute the "urine test"?

241 The Defence submitted that a "test" is a means, through a "process", to ascertain a certain result or conclusion. The "process" is a crucial part of the test since any error in any part of this process would lead to wrong conclusions. Thus, every part of this process has to be accurately carried out.

242 The Defence maintained that the collection of urine is also a part of this crucial process. Since the test is to determine what drug had resulted from the metabolism and excretion in the accused's urine, appropriate precautions must be taken to ensure that what is found in the urine from the test could only have originated as a result of excretion and metabolism and not from contamination. Accordingly, the urine test must cover the process of collection of the urine, the supervision of the collection and the implementation of the quality control measures governing the collection. The Defence appeared to suggest also that the HSA should have exercised supervisory jurisdiction over the urine collection process at the Police Station, to ensure that anti-contamination measures are in place so that the urine tests performed at HSA return results that are not affected by the possibility of contamination.

243 In my view, having regard to the plain reading of s 31(4)(b), I do not think the word "test" can be stretched to include the urine collection process at the Police Station. The urine "test" can only start *after* the urine specimens have been collected, marked, sealed and sent, in this case, to the HSA for testing and not before.

244 The only question is when the administrative processes at the HSA end and when the actual urine test processes begin. Table 1 at [94] shows the various processes at HSA from the arrival of the urine specimens at the reception counter at HSA to the final administrative and technical review by the Senior Analyst before a certificate of the results of the urine test is finally rendered to the requesting enforcement agency.

245 I entirely agree with the Prosecution that the first three procedures under the typical workflow of "specimen receiving", "specimen verification" and "specimen unsealing" are clearly not part of the "urine test" under s 31(4)(b). These steps do not involve any kind of scientific examination of the urine specimen or any identification of the presence of a controlled drug by means of some chemical or physical procedure or reaction. I agree with the Prosecution witnesses' characterisation of such steps as purely clerical or administrative, and not scientific in nature. The process of physically "sorting" the specimens is also in my view not part of the "urine test" for the same reasons.

246 I turn now to examine whether the screening stage is to be regarded as a part of the urine test. The screening test is done only for the *first* urine specimen but not the *second* urine specimen. HSA introduced the screening test to reduce the number of urine specimens sent for the GC/MS test. If the preliminary screening test shows a negative result, no further testing is done and no certificate is issued. Therefore, all negatively screened specimens from the *first* set of urine specimens of various accused persons are weeded out, so to speak, by this administrative screening process, and these negatively screened specimens are not picked during the "sorting" process to proceed to the next stage of sample preparation for the GC/MS test followed by the actual GG/MS instrumental test. Similarly, no specimens are picked out from the *second* set of urine specimens for the next stage of sample preparation for the actual GC/MS instrumental test when the corresponding urine specimens from the *first* set have been screened negative.

247 Assuming the screening test turns out a false negative for the presence of controlled drug(s), the accused person will simply escape being charged for the consumption offence because his urine specimen (factually positive for drugs) would have been wrongly weeded out with no subsequent confirming GC/MS test done to pick it out and correct the error made in the screening test. A false negative thus operates in favour of the accused. Assuming the screening test turns out a false positive when it should be negative for the presence of controlled drugs, then the reliable GC/MS test, that will have to be carried out later on the factually negative sample, will turn up a correct negative result anyway with no resulting prejudice to the accused whatsoever. I emphasise that the HSA certificate is not issued on the basis of any positive result (be it a false or true positive) established from the screening test but on the subsequent GC/MS test result obtained. If the GC/MS test turns out a negative result even though the screening test turns out a positive result, the certified conclusion remains negative as reliance is based only on the GC/MS test result. HSA recognises that it is the GC/MS test, and not the screening test, that reliably determines the absence or presence of the controlled drugs and measures their actual concentration in the urine specimens for the purpose of HSA's certification.

248 It is obvious to me therefore that the screening test should not be regarded as a constituent or essential part of the actual "urine test", as it can be done away with completely (albeit at the expense of HSA's administrative or operational efficiency) and without compromising the integrity of the GC/MS test. The screening test, as Dr Lui said, is basically to channel positively screened specimens for a proper confirmatory analysis by the GC/MS instrument as these are the only specimens of real interest, not the negatively screened specimens. I can understand why HSA has no desire to waste time and resources to conduct GC/MS tests on urine specimens that are negative for controlled drugs, as established by a quick screening test, and which are consequently of no real interest to the enforcement agencies.

249 Screening that may possibly result in false negatives (which I regard to be unlikely as the COBAS Integra 800 chemistry auto-analyser was operating properly on the day the screening was carried out, see [119]) is a small risk the HSA is prepared to take to cope with the numerous urine specimens sent to them daily by CNB and the various police divisions in Singapore. As explained earlier, the risk of a false negative, even if it materialises, can only prejudice the enforcement agency as the drug addict arrested will not be charged for consumption of a controlled drug when he ought to have been. For the sake of argument, assuming that the screening test by the COBAS Integra 800 chemistry auto-analyser is highly unreliable (which it is not), and many false negatives are thrown up, there is no reason for persons lucky enough to have been let off to complain. On the other hand, if the unreliable screening test were to throw up many false positives, there would also be no reason for these persons to complain either because they will still be let off eventually when the GC/MS instrument reliably returns a correct negative result. Clearly, the introduction of the screening test, even if unreliable, results in no prejudice whatsoever to the accused person.

250 It is clear to me that under the HSA protocol, a positive screening result (regardless whether it is a false or true positive) does not allow the certifying Analyst to make any determination of the presence (or the quantity) of a controlled drug in a urine specimen for the purpose of his certification. Since the positive screening result is never relied upon for the purposes of the certificate under s 16 of the MDA and a fresh sample has to be extracted from the bottles containing the accused's urine specimens and thereafter sent for the confirmatory GC/MS tests, I find that the screening test is not factually a part of the "urine test" referred to in s 31(4)(b). I reiterate that it is the GC/MS instrumental test, and not the screening test, that exclusively determines everything that is reported in the certificates of the certifying Analyst, and therefore, the "screening test" is not to be considered an integral part of the "urine test" for the purposes of s 31(4)(b).

251 I will now deal with the sampling, Solid Phase Extraction ("SPE") and derivatisation stages. The Prosecution submitted that the sampling and derivatisation stages are not part of the urine test because they concern only the preparation of the samples *for* the GC/MS test. The Prosecution's argument seems to be that a "preparation" for the test is not yet a part of the actual test. Although these preparatory steps are more complex than the purely administrative steps of specimen verification, specimen unsealing and sorting, and involve chemical reactions, the chemical reactions do not allow for the determination of the identity of the controlled drug in the sample. Instead, the determination of the identity of the controlled drug in the sample according to the Prosecution only commences when the GC/MS instrument begins its process of separating out the various controlled drugs (or analytes) in the column and fragmentising them in the Mass Spectrometer (MS) of the instrument.

252 I do not intend to take such a narrow view of the meaning of the word "test" for the purposes of s 31(4)(b). Unlike the initial three purely administrative or clerical steps of specimen verification, unsealing and sorting, the three subsequent stages of sampling, SPE and derivatisation involve physical handling of the actual liquid urine within the specimen bottles and thereafter subjecting the urine to various chemical processes:-

(a) First, by taking out fresh samples from the bottles by means of a pipette during the sampling stage (sampling);

(b) second, by using the SPE instrument to extract the drugs from the fresh urine samples, having a solvent to dissolve the drug extracts in the SPE instrument, adding hydrochloric acid to the solvent with the drugs extracted and then using a sample concentrator to evaporate the solution to dryness (SPE); and

(c) third, by subjecting the dried drugs extracted to a chemical reaction to form a derivative of the drugs though the use of chemical reagents after dissolving the dried drug extracts with solvents (derivatisation).

253 All the three stages of sampling, SPE and derivatisation are necessary before the GC/MS can commence the actual testing for the drugs in the urine samples that have gone through the three stages mentioned above.

254 To perform the above tasks, the Laboratory Officers involved must have a certain degree of scientific understanding or expertise. They must have an appropriate level of laboratory training to be able to use the pipette and operate the SPE instrument and sample concentrator correctly. When attending to the sampling, SPE and derivatisation tasks, the Laboratory Officers need to exercise laboratory skills that certainly go beyond mere clerical skills needed for sorting the samples at the sorting stage or mere "eyeball" skills needed for verifying the correctness of names, NRIC and CNB marking numbers for the verification stage for instance. If a starting point for the urine tests has to be identified, it is not illogical to start at the point when fresh samples are *first* extracted from the urine specimens in the bottles for subsequent preparation and processing for use in the testing by the GC/MS instrument, whose results are wholly relied upon for the eventual identification and quantification of the controlled drug(s) in the urine. If these preparatory steps for the GC/MS test are not done properly, they might well affect the substantive GC/MS results. Hence, these three preparatory steps for the GC/MS tests must be included as part of the "urine test". Adopting such a practical interpretation for the meaning and scope of the words "urine test" is both logical and sensible in my view, and does not lead to an untenable stretching of the literal meaning of the word "test". The meaning I have given as applied to the facts is also consistent with the ordinary dictionary definition of "test" as set out in [210]. For the purposes of s 31(4)(b), adopting too narrow

a definition of "test" is inappropriate. "Test" should be given a commonsense practical meaning wide enough to reflect holistically the procedural safeguards that Parliament intended s 31(4)(b) to provide. Accordingly, I find as a fact that the preparatory processes for the urine specimens (*i.e.* the sampling, SPE and Derivatisation) prior to the actual insertion of the processed samples onto the autosampler tray of the GC/MS for the instrument's analysis of the samples to generate the various chromatograms, readings and results for further human analysis and interpretation by the certifying Analyst are an integral part of the urine "test" referred to in s 31(4)(b).

255 Both the Prosecution and the Defence agree, and it is also patently clear to me that the urine "test" under s 31(4)(b) of the MDA must include the actual GC/MS test itself, which is the central part of the physical testing process. Finally, both the Prosecution and the Defence do not dispute that the Interpretation/Report stage performed by the certifying Analyst is also part of the "test".

256 I accept the Prosecution's submission that the certifying Analyst's interpretation of the various data in the documents given to the certifying Analyst at the analysis stage is crucial to the determination of the identity and concentration of the controlled drug in the urine specimen and must necessarily be an integral part of the "urine test" under s 31(4)(b). It is at this stage that the actual scientific establishment or determination of the identity and concentration of the controlled drug in the urine takes place. While the GC/MS instrument is able to produce the results in the chromatograms automatically (including the results showing the identity and concentration of the controlled drugs found in the urine samples), the certifying Analyst cannot conclude that they are indeed accurate and reliable results that can be reported in the certificate under s 16 of the MDA until the he has carried out a holistic evaluation of all the results produced by the GC/MS instrument, which would involve detailed checks on various parameters to ensure that they are within the acceptance criteria. Thus the urine "test" for the purposes of s 31(4)(a) is completed when the certifying Analyst analyses and interprets the GC/MS printouts and finally arrives at his/her conclusion which is reported in the Analyst's certificate under s 16 of the MDA.

Was the urine test "conducted by" the certifying Analyst?

257 The Defence submitted that the certifying Analyst must actually supervise the test process before he can be said to have conducted it and the degree of supervision must be such that the Analyst is able to claim responsibility for the whole testing process and authorship of the certificate consequently issued. The Defence highlighted that the certifying Analysts had merely checked the results but had no sight of the work carried out. By relying on the other personnel's conduct of the various parts of the test process, the Analysts could only claim to have the ability to review (and not conduct) the test process. The Defence therefore contended that this did not comply with the clear wording of s 31(4)(b), which requires the Analyst to have conduct by having actual, real time, supervision of the testing process. The Analyst had in fact delegated his or her duty to other personnel. In support of this assertion, the Defence cited *Attorney-General v. Elite Wood Products (Australia) Pty Ltd* [1992] SGCA 33 (CA).

258 However, I note that if the Defence is saying that in every urine test, there has to be "actual, real time, supervision of the testing process" before the certifying Analyst can take responsibility for the test, then this appears to contradict the assertions of their own expert witness, Dr Douse, when he said:

> A: … the analyst, I believe, could take responsibility very efficiently without taking up too much of his…time if a procedure was developed such that scientifically, he could do random checks throughout the entire procedure, but which will not mean that he has to supervise every single 7,500 analyses. This is important because the nature of …analytical chemistry has actually…

changed now.

"…you can identify a key number of interventions where you check which produces a checked sample which is representative of the whole analytical procedure. And by doing this as a small sample, this is more efficient in the use of the time of the analyst who has to take responsibility.

259 The Defence cited *Lim Boon Keong* in support of many of its contentions before this court. In that case, Steven Chong J disagreed with the district judge's holding that the certifying Analyst could be said to have conduct of the urine test if he/she reviewed the test results, as opposed to physically supervising and observing the performance of the test process (at [39]). After concluding that "*it is both necessary and sufficient for the analyst to supervise the testing process*" although "*it is strictly not necessary for the analyst to physically conduct the actual tests*", Steven Chong J went on to observe that:

(a) the certifying Analyst who merely looks at the test results is wholly dependent on what is recorded by the persons who actually performed or supervised the testing process and is therefore unable to detect any error which is not recorded or which cannot be detected from such records;

(b) there must therefore be a degree of supervision such that the certifying Analyst is able to claim responsibility for the whole testing process and authorship of the certificate subsequently issued; and

(c) in practical terms, the parts of the testing process which were already being supervised should be supervised by the certifying Analyst.

260 With respect, the learned judge had arrived at these conclusions because he was not provided with all the evidence on the nature of the urine test and the internal built-in checks and safeguards that have been put in place for the now largely automated urine testing system operated by HSA, which allows the certifying Analyst to check for errors and mistakes in the preparation stages and in the operation of the GC/MS instrument itself.

261 After having had the benefit of the extensive evidence adduced by the Prosecution, I am satisfied that:

(a) The certifying Analyst actually has a plethora of tools at his/her disposal with which to detect errors that had been made (whether or not recorded). A summary of these tools are provided at [170] and [171]. For instance, if the accused's samples had not been prepared properly by the Laboratory Officer, the certifying Analyst would be able to tell because the peaks for the internal standards in the quantitative sample would not form properly. Although the learned judge in *Lim Boon Keong* had said,

> [The certifying Analyst] is wholly dependent on what is recorded by the persons who actually performed or supervised the tests. *He or she is therefore unable to detect any error which is not recorded or which cannot be detected from such records*.

[emphasis added]

I am able to conclude however, with all the evidence before me, that the certifying Analyst is indeed able to detect errors by the persons involved in the earlier stages of the urine test if he analyses all the generated reports and test results from the GC/MS instrument including all the

written records produced by these persons. In my view, the concerns articulated by the learned judge above have been sufficiently addressed.

(b) Indeed, an analysis of the instrumental test results of actual samples, wash samples, Open and Blind QC samples and the calibration standards by the certifying Analyst provides an even more meaningful form of supervision than real-time physical supervision as can be seen from the evidence set out at [184]. In contrast, real-time supervision would not allow the certifying Analyst to detect crucial errors: *e.g.*, if the derivatising agent itself was contaminated or if the various instruments were not performing accurately. Shortcomings and errors are detectable only by scrutinising the GC/MS results generated from the test instrument's analysis of the actual samples, wash samples, Open and Blind QC samples and the calibration standards. Visual supervision of the analysis of liquids essentially performed by instruments to detect the presence of and to quantify substances in the microgram or nanogram range (which are not observable visually) is not effective and serves no real purpose. As can be seen from the nature of processes involved in the actual urine testing, the possible errors are generally not of the types that are simply observable or detectable visually.

(c) The real safeguards to ensure reliability of the results from the GC/MS test, and the real supervision actually lies in (a) the instrumental testing of the urine samples together with the QC samples and calibration standards; and (b) the analysis and interpretation of all the instrument generated test results by the certifying Analyst. The insertion of Blind QC samples during the tests, where the identity, nature and concentration of the spiked drugs are known only to the analyst, allows for the detection of errors in the preparation, sequencing or GC/MS instrument's operation, when the expected results for the Blind QC samples throw up anomalous or unexpected results. The Open QC samples, which are also known to the Laboratory Officer, provide an additional safeguard against error. On top of that are the calibration standards, with known quantities of specific spiked drugs included as part of the GC/MS tests. Since both the Blind and Open QC samples together with the calibration standards go through the same GC/MS tests as the accused person's urine samples, any errors in the testing of the QC samples and calibration standards (all with quantities of specific spiked drugs known to the certifying Analyst) will imply an error in the testing of the accused person's urine samples. I should also add for clarity that any error in the tests can only be to the accused person's benefit. This is because, as BC testified, it is not possible to detect the presence of a controlled drug in the urine when there is no controlled drug to begin with. Hence any error in the GC/MS tests will give only a false negative – *i.e.* drugs present in the urine sample are not detected. Accordingly, I am satisfied that the results from all the tests carried out by the GC/MS instrument on the QC samples and the calibration standards allow the certifying Analyst to determine whether the instruments have been properly operated, whether proper procedures have been followed and whether the samples from the accused persons have been properly prepared for testing and, eventually, properly tested. Furthermore, as these results are generated automatically by the GC/MS instrument, the possibility that they may be falsified is negligible; and their deliberate omission will be obvious to the certifying Analysts.

(d) As various tasks carried out by the Laboratory Officers during the entire "test" have been effectively supervised by the certifying Analyst, the certifying Analyst is thus able to take full responsibility for the urine test conducted and also for the urine test results which he reports in the certificate under s 16 of the MDA.

(e) The laboratory protocols (which are in accordance with internationally accepted protocols and standards), the various additional safeguards and checks implemented at HSA, the employment of trained Laboratory Officers, who are required to pass annual proficiency tests to

demonstrate their competency, and the engagement of qualified Analysts to analyse all the instrumental test results generated following the laboratory protocols for testing urine specimens for controlled drugs, have significantly reduced the risk of human or instrumental errors. Similarly, the likelihood of erroneous results reported in the certificates (that are prejudicial to the accused) is reduced to a remote possibility (see [175] to [176] above).

262 After carefully considering the voluminous evidence produced before me, some of which are highly technical in nature, I find as a fact that the certifying Analysts BC and ORS have both "conducted" their respective urine tests within the meaning of s 31(4)(b) for the reasons that I have stated above.

263 In giving effect to the legislative purpose of the provision in the context of urine testing, I will not adopt a very narrow, literalistic and technical interpretation that the certifying Analyst would not have "conducted" the urine test for the purpose of s 31(4)(b) unless (a) the certifying Analyst had personally and physically performed all the various steps in the "test"; or (b) the certifying Analyst had personally carried out real-time physical supervision of the Laboratory Officers performing all the various steps in the test (for instance by standing behind the Laboratory Officer and observing all that he does). I accept other forms or methods of supervision and control of the urine test by the certifying Analyst, if they are proved to be effective. In fact, the supervision methods implemented by HSA is far more effective than mere real-time physical or visual supervision of the Laboratory Officers performing their tasks. Rendering the presumption in s 22 inapplicable because of an overly restrictive interpretation of the word "conduct", requiring personal performance of all the various steps in the urine testing process by the certifying Analyst or alternatively, mandating personal real-time physical supervision and observation of the Laboratory Officers' work by the certifying Analyst, would in my view run counter to the facilitative nature of s 22 of the MDA (which is tied to s 31(4)(b): see [230] to [236] above) and compromise the overall legislative purpose underlying the MDA, *viz*, the effective prosecution of drug consumption offences. I therefore adopt a less narrow interpretation of the words "conducted …. by" than that adopted by Steven Chong J in *Lim Boon Keong* after having scrutinised the whole urine testing process in HSA. I am also of the view that the less narrow interpretation I am adopting is still within the limits of the ordinary meaning of the word "conduct" or its literal dictionary definition as canvassed at [197] to [207] above, and remains consonant with the legislative purpose undergirding not only s 31(4)(b) specifically but also the MDA as a whole.

264 In conclusion, I agree with the Prosecution that the certifying Analyst does not need to personally perform or personally supervise the various procedures in the workflow in respect of the urine specimens in order to have "conduct" of the urine test. By virtue of his ability to detect errors in the process by analysing and interpreting all the GC/MS printouts and the rest of the documents available to him, and his ability to order a re-test, the certifying Analyst has sufficient control of the urine "test" (and indeed, the earlier stages as well) and is therefore able to take full responsibility for the results of the urine "test". Accordingly, I find that the requirement that "*a urine test shall be conducted on each part [of the urine specimen] by ... an analyst employed by the Health Sciences Authority*" as prescribed under s 31(4)(b) of the MDA has been satisfied.

Was each of the two urine tests conducted by a "different person"?

265 The Defence submitted that the words "different person" cannot be interpreted purposively or be given a broader meaning especially if this broader meaning is going to be unfavourable to the accused person. Being a penal provision, s 31(4)(b) must be strictly construed, and the words "different person" must not be extended beyond their clear and unequivocal meaning. The Defence further contended that the court would have to adopt the interpretation that is more favourable to

the accused if the words in the statute admit two possible interpretations.

266 The Defence contended that the personnel involved in the workflow for the first bottle of an accused person's urine specimen cannot be involved in the workflow for the second bottle in any way at all, whether it is the personnel actually handling the physical specimens or merely carrying out the supervision. The Defence also took issue with the fact that the different persons working on the two different sets of specimens usually work in pairs or teams and some are accustomed to work with a particular person. I do not think that just because "A" works on specimen (1) and "B" works on specimen (2) separately, and "A" and "B" for some reason like to be paired or rostered to work together at the same time, then the laboratory processes carried out on each of the accused's specimens (1) and (2) have not been done by a "different" person.

267 The Defence stated that the key purpose of s 31(4)(b) is to ensure that the laboratory personnel who carried out the test for set 1 would not have any idea of what the results were for set 2. This requirement is also to ensure that the personnel involved in one set of urine samples would not be biased by what takes place at the testing of the other set. Independence is then attained. The Defence relied on Dr Douse's evidence that:

> A: "In this regard independence is noted to be an absolute concept, and therefore the degree of crossover of staff noted to have occurred between the operation of the two separate analytical process streams, during the analysis of the defendant's urine, therefore can be seen to have compromised the independence of the analysis."

268 As such, when the various personnel who checked the first set of work had checked the second set as well, they would have contradicted the clear wording of s 31(4)(b). Not only were the two tests of the urine samples not carried out by a "different person", there was also no independence between the two sets of urine sample tests.

269 The Defence relied heavily on the observations of Steven Chong J in *Lim Boon Keong* on this aspect. Steven Chong J had stated that (at [40]):

> [T]he entire conduct of both urine tests must be done independently of each other. This means that the personnel involved in the testing of one urine sample cannot be involved in any way at all in the testing of the other urine sample. This applies equally to the actual physical testing as well as to supervision and review. I should emphasise that in applying this requirement the court will not be concerned with nice arguments about whether the personnel involved in the testing of one sample actually relied upon or were influenced by the personnel involved in the testing of the other sample – as amply shown by the survey of the legislative history, the absolute independence of the two tests from each other is the cornerstone of the regime in s 31(4)(b).

270 Since I have decided as a fact that the administrative stages of the work processes at HSA (*i.e.* the stages of specimen receiving, specimen verification, specimen unsealing and sorting for extraction) do not form part of the actual urine "test" themselves, I do not think that the requirement in s 31(4)(b) of having a "different person" applies for these administrative stages. Otherwise, even the administrative task of transporting the two sets of urine bottles within HSA from the reception counter into the DAT laboratory itself must be done separately by two different persons. Obviously, that could not have been the intention of s 31(4)(b). I note that Steven Chong J did not in his observations go so far as to say that different personnel must also be employed to perform purely administrative tasks that are not part of the actual physical testing. Neither did Steven Chong J say that any checking by the same person of the work done on each sample by a different laboratory officer, or the performance of the final administrative and technical review by the same senior analyst

(*e.g*. Dr Lui) of the separate findings of the two certifying Analysts would constitute a breach of the requirement to have the urine test conducted by a different person under s 31(4)(b). Hence, I shall not be concerned with whether or not, for the purely *administrative* stages of specimen receiving, specimen verification, specimen unsealing and sorting (which are not part of the actual physical urine testing), the administrative work at such stages has in fact been done, checked or supervised by the same person or by a different person as s 31(4)(b) is simply *not applicable* to the administrative work processes that are not part of the actual urine test.

271 Neither do I think that s 31(4)(b) is meant to apply to all *additional* layers of checks that HSA may impose on itself to further enhance the reliability of the test results, so long as the *primary* persons conducting the test remain different. An instance of an additional safeguard put in place by HSA is the technical and administrative review done at the final stage by Dr Lui (or if he is not available, then by a senior analyst). One person, Dr Lui, performs a technical and administrative review of *both* test results, which includes reviewing the entire analyses and reports by the two certifying Analysts. Does it mean that the urine test has not been conducted by a different person and therefore, there is no independence because the *same* person, Dr Lui, had checked and reviewed the work of both certifying Analysts? I think not. One of the main reasons for this final review is to identify errors, particularly those which are not detectable from simply looking at one set of results. Since the final review is to detect errors, it does not affect how or by whom the tests had been earlier conducted. It cannot compromise the independence of the two tests, if they had already been independently conducted.

272 Similarly, if HSA decides to put in another safeguard in the form of a check by a *third* person "C" on all the work done independently by two different persons "A" and "B" on each of the two urine specimens at the various stages of the urine test, does that mean that the urine test has no longer been conducted by a different person? If that were to be the case, then it would be better for HSA *not* to put in that additional safeguard of having the third person "C" check the work of both "A" and "B", so that the test thereafter can be safely construed to have been conducted by the person "A" for specimen 1 and a different person "B" for specimen 2. Surely, that is not a sensible way to interpret s 31(4)(b). Such an interpretation will detract from, and not promote, the underlying legislative purpose behind the section *i.e*. to have accurate and reliable urine test results to safeguard the interests of the accused persons. On this, Dr Lui and Ms Turner testified that mere checking is not the same as conducting the tests. Checking by itself does not change how the tests are carried out. Instead, the aim of checking is to implement an additional set of safeguards against error. The introduction of checks (and even if performed by the same person) would not introduce a lack of independence in the two urine tests.

273 I agree with the above opinions expressed by Dr Lui and Ms Turner. If the two urine tests themselves, without the additional checks, do not infringe the requirement of independence, then the implementation of the checks, which serves only to further safeguard against error, cannot precipitate a lack of independence in my view. Accordingly, I will not find as a fact that there has been non-compliance with s 31(4)(b), the moment the additional safeguards put in place by HSA involve the same person performing the checks on the primary work done by different persons (or different teams of persons) separately performing the various stages involved in the testing of each of the two urine specimens, namely sampling, SPE, derivatisation, instrumental test and interpretation report.

274 I thus agree with the Prosecution's submission that it would be taking the requirement of independence too far to require absolute independence even in the personnel carrying out the various "checking" functions along the workflow. I further agree that the "checking" function is not to be regarded as necessary or essential to the carrying out of the urine test given that it is simply an

additional step that has been added in the typical workflow to *increase* the reliability of the test results (see [97] above). Indeed, the DAT Laboratory Manual does not mandate that such checking must be carried out, much less that it should be done by the certifying Analyst. The person who carries out the checks is merely an "extra pair of eyes" and does not physically deal with the samples at all. The Defence has not been able to explain how having such an "extra pair of eyes" to do another check on work already done by two different persons poses a real risk to the independence of the urine testing. In my view, the Defence's technical objection is without merit.

275 While Steven Chong J has emphasised the "absolute independence" of the two tests, the Parliamentary speeches elaborating on the rationale for the two-test regime (see [217] and [218]) establish that the fundamental reason for having independent tests is to ensure that the test results for the first bottle can be verified by reference to the test results for the second. In other words, Parliament's concern was *not with independence as an end in itself, but as a means to an end – viz*, the protection of the accused's rights by ensuring the reliability of the test results.

276 I am satisfied after carefully examining the workflow in HSA for the urine tests as set out Table 1 (see [94]), that all the relevant stages of the urine test process for each of the two urine specimens of the accused have been conducted by a "different person" and this part of the requirement in s 31(4)(b) has been met. It is significant also to note that each urine specimen is tested in a *different* GC/MS instrument and each certifying Analyst strictly does not refer to the GC/MS test results for the other bottle of urine in arriving at his/her conclusion.

Does the s 22 presumption arise, and has it been rebutted?

277 Since HSA's urine tests on both of the accused's urine specimens in the present case satisfy the requirements set out in s 31(4)(b), the presumption of consumption in s 22 will apply. Has the accused then rebutted the presumption of both the *mens rea* and *actus reus* of consumption of Methamphetamine by proving to the contrary on a balance of probabilities that he did not (a) have the *mens rea*; and/or (b) commit the *actus reus* of consumption of Methamphetamine?

278 On the particular facts of this case, I will concentrate only on the *actus reus* as that is the only challenge mounted by the Defence. Since I have already found that the Defence has not succeeded even in raising a reasonable doubt by his contention that it was entirely contamination, *a fortiori*, the Defence would necessarily have failed to prove that the accused did not factually consume Methamphetamine on a balance of probabilities. When the presumption of consumption applies under s 22, rebuttal of this presumption on a balance of probabilities is obviously a higher hurdle than merely raising a reasonable doubt.

279 Accordingly, I am also finding the accused guilty solely on the basis of the two HSA certificates for the urine tests conducted on the accused's urine specimens, which in my view have complied with the requirements under s 31(4)(b).With no proof to the contrary, the accused is therefore presumed "to have consumed [Methamphetamine] in contravention of section 8(b)". Thus the Defence has not succeeded even under the artificially modified factual circumstances.

The remaining peripheral scientific challenges

280 A number of other scientific challenges were raised and subsequently abandoned by the Defence. I will state that I find them to be without any merit and they were rightly not even alluded to in the Defence submissions. For completeness, these have been succinctly summarised by the Prosecution below:

Peripheral Scientific Issue 1: Parent Ion

220. It was suggested to Dr Lui (PW12) during cross-examination that as there was no peak for the Parent Ion at molecular mass 245 on the GC/MS test results in relation to the accused's urine, he could not confirm the presence of methamphetamine in the accused's urine. Dr Lui disagreed with this and stated that it is sufficient to identify the three principal ions of TFA derivatised-Methamphetamine at molecular mass 110, 118 and 154, as stated in the United Nations Manual (Exhibit P64 at pg 68) and compare the retention time of the methamphetamine in the accused's urine specimens with the standards. Ms Turner (PW13)'s testimony on this aspect was in agreement with Dr Lui (see her report Exhibit P74 and 'Principles of Forensic Toxicology' Exhibit P74A at para 3). The Defence's own expert Dr Douse conceded during cross-examination that the international scientific community, including in the UK, accepts that the mere presence of 3 characteristic fragment ions is wholly sufficient to identify the presence of a certain drug in the urine. (Footnotes in original text are removed.)

Peripheral Scientific Issue 2: using high resolution GC/MS

221. Dr Lui was asked during cross-examination whether high resolution GC/MS, as compared with the "routine GC/MS" used in the present case, should be used in order to detect the presence of Parent Ion. It was Dr Lui's evidence that he has not come across any laboratory using high resolution GC/MS for routine drug urine testing and explained that a "high resolution" GC/MS would not be able to detect the Parent Ion as that would still have been fragmented already. High resolution merely means that the instrument measures the exact molecular mass of what can be detected. In line with his evidence, Dr Lui subsequently produced a high resolution GC/MS test result from a methamphetamine-TFA spiked sample (Exhibit P75) which only showed the 3 characteristic fragment ions at molecular mass 110.23, 118.30 and 154.32. Like the "routine GC/MS" printout, there was also no parent ion peak seen at the molecular mass region of 245 to 246, effectively demolishing any argument that high resolution GC/MS has to be used to tell the presence of methamphetamine in urine.

222. Ms Turner's evidence was also in concert with Dr Lui on this aspect relating to high resolution GC/MS. In her report P74, she stated that drug analysis in urine are routinely performed using standard GC/MS instrument and high resolution GC/MS instrument is not necessary as drug analysis performed using the latter would result in the same conclusion as the former. (Footnotes in original text are removed.)

Peripheral Scientific Issue 3: Conversion of ephedrine to methamphetamine

223. During his cross-examination, Dr Lui was referred to an article on the conversion of ephedrine to methamphetamine and amphetamine-like compounds (Exhibit D15), which raised the issue that consumption of large amounts of ephedrine can interfere with the analysis for the detection of Methamphetamine in Urine. The argument is that only if these three ions were selected for analysis, selected ion monitoring (SIM) analysis of methamphetamine would be indistinguishable from HFB ephedrine contaminants.

224. In the present case, Dr Lui was confident that the presence of Methamphetamine in the accused's urine specimens was not due to the conversion of ephedrine to methamphetamine but rather, due to the consumption of methamphetamine by the accused. This was because:

There was absolutely no trace of ephedrine or pseudoephedrine in the accused's urine specimens (see the chromatograms at pages 332 and 240 of the Agreed Bundle). If ephedrine was present in

the original sample, the GC/MS full scan mode should show the presence of ephedrine, like the chromatograms of the calibration standards spiked with mixed amphetamines (see page 252 of the Agreed Bundle, which showed the peak for Ephedrine-TFA at retention time 8.075, clearly different from the peak for methamphetamine-TFA at retention time 8.226).

Other than looking for the three principal fragment ions (110, 118 and 154 for methamphetamine), other minor fragment ions like 69 and 91 were also taken into consideration. These fragment ions in the accused's sample should mirror those in the reference library. The fragments are characteristic enough to show the uniqueness of the fragmentation pattern of that particular chemical and by comparing with the standards, the presence of such a drug can be confirmed.

The article Exhibit D15 stated that ephedrine can only convert to methamphetamine but not amphetamine. Dr Lui explained that only if the accused had consumed methamphetamine, then the GC/MS result of the accused's urine would show both methamphetamine and amphetamine. The presence of amphetamine in the accused's urine was not due to the conversion from ephedrine, but rather, has been partly metabolised by the accused's body from methamphetamine to amphetamine.

225. Ms Turner's evidence on this aspect was in line with Dr Lui's testimony. Ms Turner stated in her report P74 that while ephedrine can be converted to methamphetamine during the GC/MS tests, the SCAN chromatograms (for qualitative test) relating to the present case did not indicate any presence of Ephedrine, and therefore, there was no interference in the detection of Methamphetamine in the accsued's urine samples. The retention time of Ephedrine is wholly different from that of Methamphetamine, as demonstrated on the SCAN chromatogram of the Mixed Amphetamines Standard in Urine. (Footnotes in original text are removed.)

Peripheral Scientific Issue 4: d (dextro)- and l (levo)-form of Methamphetamine

226. Another line of questioning raised by the Defence during Dr Lui's cross-examination was in relation to the issue of whether it was the *d*- (dextro) or *l*- (levo) form of methamphetamine in the accused's urine specimen. Significantly, the 18 packets of crystalline substances analysed in the IDL are the *d*-form of Methamphetamine.... As stated above, the accused had described in his statement how he repacked 24 packets each weighing 0.1 grams from an original packet of 'Ice' weighing 2.4 grams which he obtained from 'Kopi Kia'. The 18 packets analysed were from the 24 packets as the accused consumed 6 of the 24 packets. The Defence's own expert was of the opinion that the 18 packets of crystalline substance should therefore be of the *d*-form as well...This opinion was consistent with that of Dr Yap's. (Footnotes in original text are removed.)

Peripheral Scientific Issue 5: Consumption of seleginine

227. During the cross-examination of Dr Lui, he was referred to the UN Manual (Exhibit P64) at page 70, which listed 5 drugs that will metabolise to methamphetamine, being: Dimethylamphetamine, Benzphetamine, Furfenorex, Seleginine and Fencamine. The presence of Seleginine later became a point of contention as the Defence proceeded on a line of questioning relating to consumption of Seleginine, albeit it was not the Defence's case that the accused had consumed Seleginine or any of the other 4 drugs listed at of pg 70 of the UN Manual. However, this too proved to be an empty argument as Dr Yap could confidently exclude the presence of Seleginine on the improvised pipe and the 18 packets of crystalline substance. In any case, Selegiline is a pharmaceutical drug used to treat Parkinson's disease and it is submitted that it is highly unlikely that it would be sold as 'Ice', especially given that Dr Yap has not encountered it in the 'Ice' sent to HSA for analysis before. Indeed, it should be noted that Dr Douse himself

agreed that the 'Ice' smoked by the accused in this case was methamphetamine and not some other compound. (Footnotes in original text are removed.)

Conclusion

281 Despite the numerous lines of argument pursued, the Defence has not managed to cast any reasonable doubt on the Prosecution's case.

282 The accused's various voluntary admissions, which were unchallenged, demonstrate that he consumed "Ice" knowing it to be"Ice". The HSA certificates certifying that there was Methamphetamine in the stains on the improvised pipe and in the 18 packets of "Ice" seized from the accused were further corroborative evidence. The results in the HSA certificates, *viz*., that his urine contained Methamphetamine were therefore perfectly consistent with the accused's own admissions.

283 The Defence was only left with defences to the effect that what the accused *thought* was 'Ice' was in fact some other substance, *viz*, ephedrine or selegiline. When these arguments appeared to have little traction in the face of the evidence, the Defence switched their focus to contamination from the loose "Ice" *i.e*., from the 18 packets of crystalline substance and from the accused placing his fingers in the bottles during the process of selection (despite not having challenged Cpl Goh's evidence-in-chief when he first gave evidence). When Cpl Goh gave evidence recalling that the bottles had been capped and the accused had not put his fingers in his urine during the giving of the specimen, the Defence then suggested that Cpl Goh was not the person who had procured the accused's urine specimen. I agree with the Prosecution's submission that the entirety of the Defence was a series of improbable arguments aimed at escaping from the conclusion which all the objective scientific evidence and indeed the accused's own statements pointed towards – that the accused had knowingly consumed Methamphetamine.

284 The Prosecution has proved its case almost beyond any doubt, let alone a lower threshold of beyond a reasonable doubt. The detailed evidence that has been led in this trial clearly establishes the integrity of the DAT laboratory's drug handling and standard testing procedures and their conformance with the requirements set out in s 31(4)(b) of the MDA. For the reasons stated above in this judgment, I find that both urine tests were conducted by the certifying Analysts ORS and BC in full compliance with s 31(4)(b).

285 I therefore find the accused guilty of the consumption charge and convict him accordingly. I shall now deal with his sentence.

Annex A

[LawNet Admin Note: Annex A is viewable only to LawNet subscribers via the PDF in the Case View Tools.]

[note: 1] Translated from the Malay words "air batu" as used by the accused.

[note: 2] See the formula in P90

Table 1 – A typical workflow of urine testing for Amphetamines

First urine bottle				**Second urine bottle**			
Lab procedure		Lab personnel	Checked by	Lab procedure		Lab personnel	Checked by
Receiving of urine specimens		CSO A1	lab officer B	Receiving of urine specimens		CSO A2	lab officer B
Verification of urine specimens		analyst C		Verification of urine specimens		analyst C	
Breaking of specimen seals		HSO D	lab officer E	Breaking of specimen seals		HSO D	lab officer E
Screening		lab officer E	lab officer F	NA			
Sample preparation	Sorting	lab officer G1	lab officer B	Sample preparation	Sorting	lab officer G1	lab officer B
	Sampling	lab officer G1	lab officer G2		Sampling	lab officer G2	lab officer G1
	Solid Phase Extraction	lab officer G1	analyst H		Solid Phase Extraction	lab officer G2	analyst H
	Derivatisation	lab officer G1	analyst J		Derivatisation	lab officer G2	analyst J
Instrumental test (GC/MS) *GC/MS Queue was checked by another Lab Officer (in this case, LNL)		lab officer K1	Certifying analyst C	Instrumental test (GC/MS) *GC/MS Queue was checked by another Lab Officer (in this case, LNL)		lab officer K2	Certifying analyst L
Interpretation /Report		Certifying analyst C		Interpretation /Report		Certifying analyst L	

Table 2: Typical GC/MS test queue for samples used in the certifying Analysts' checks

Vial position	Type of sample	Nature of sample
1	Qualitative calibration standard	The qualitative calibration standard sample serves as a reference for the analyst to determine the retention time and fragmentation pattern of each drug (in the present case, amphetamines).
2	Solvent wash	Solvent that is free of controlled drugs
3	Reagent blank	Derivatising agent (TFA) and reconstituting solvent (ethyl acetate) on which a qualitative test is performed
4	Solvent wash	Solvent that is free of controlled drugs, that is tested prior to the vial of quantitative calibration standard sample
5	Quantitative calibration standard	This basically allows the instrument to calculate a response factor that will help in correlating the peak area of a given drug with an actual numerical concentration in ng/ml, based on certain mathematical formulas. The quantitative calibration standard is tested twice to give the average peak area which is used for the calculation.
6	Solvent wash	Solvent that is free of controlled drugs, that is tested prior to the upper QC sample
7	Upper QC (QC2000)	A sample spiked with 2,000 ng/ml each of the controlled amphetamines and also containing internal standards
8	Solvent wash	Solvent that is free of controlled drugs, that is tested prior to the lower QC sample and also containing internal standards
9	Lower QC (QC100)	A sample spiked with 100 ng/ml each of the controlled amphetamines and also containing internal standards

Table 3: Steps carried out by the certifying Analysts

What the Analysts are to look at	Steps/ Checks performed
ATL Screening Test Result	(For the first set only) Check that the screening results for the Blind QC samples (positive and negative) as well as the Open QC samples (positive and negative) are all as expected (*viz*, below the screening cut-off level of 500 ng/ml for all the negative QC samples and above 2,000ng/ml for all the positive QC samples), to satisfy themselves that the screening instrument is performing accurately.
Autotune report	Check the autotune report to satisfy themselves that the mass spectrometer is functioning well.
Printouts for Vial 1 (Qualitative calibration standard)	Identify the retention time for each of the four controlled Amphetamines. The Analysts look at the fragmentation pattern for each peak to ensure that the correct drug is identified. The principal ions for Methamphetamine are 110, 118 and 154 and the principal ions for Amphetamine are 91, 118 and 140. The principal ions must also be present in the correct relative abundance. This retention time is used as a reference (or "ruler") to subsequently identify the analytes found in the accused's urine samples.
Printouts for Vial 2 (Solvent wash)	Check to ensure that there are no prominent peaks, showing that the instrument is able to wash itself and is free of controlled drugs.
Printouts for Vial 3 (Reagent blank)	Check to ensure there are no prominent peaks, showing that the derivatising agent itself does not contain any controlled drugs that would contaminate an accused's sample.
Printouts for Vial 4 (Solvent wash)	Same as for vial 2.
Printouts for Vial 5 (Quantitative calibration standard)	Vial 5 is injected several times: the first two times to obtain the average peak area for calculation of the response factor and thereafter every 10 to 15 samples as a "performance check". Check that the concentrations for each of the spiked drugs are within +/- 5% of the expected value, *viz*, 500 ng/ml.

	The results for each performance check must be looked at to ensure that the retention times, fragmentation patterns, response factors and concentrations are consistent with those earlier obtained in respect of the calibration standard, in order to be satisfied of the continuing accuracy of the GC/MS instrument. The various results must be within the acceptable ranges set out in the protocols, *e.g.*, +/- 5% of expected values for concentration. Check that the peaks for the internal standards are well-formed, thus indicating that the entire process of sample preparation for GC/MS testing has been done properly.
Printouts for Vial 6 (Solvent wash)	Check that no controlled drugs are detected, to ensure that the instrument is clean before the upper QC sample is tested.
Printouts for Vial 7 (Upper QC (QC2000))	Check that the concentration detected of each of the amphetamines is within the acceptable range (+/- 20% of the expected value), to see if the GC/MS instrument is performing quantitation accurately. Check that the peaks for the internal standards are present, to see if the extraction process is performed correctly.
Printouts for Vial 8 (Solvent wash (prior to QC100))	Check that no controlled drugs are detected, to ensure that the instrument is clean before the lower QC sample is tested.
Printouts for Vial 9 (Lower QC (QC100))	Check that the concentration detected of each of the Amphetamines is within the acceptable range (+/- 20% of the expected value), to see if the GC/MS instrument is performing quantitation accurately. Check that the peaks for the internal standards are present, to see if the extraction process is performed correctly
The Open positive and negative QC samples, and the Blind positive QC sample	Check the qualitative and quantitative test chromatograms to ensure that the amounts of Amphetamines are within the expected range for the positive QC samples and no Amphetamines should be detected for the negative QC samples.

ANNEX A

Case : MOHAMMAD ASHIK BIN ARIS (S8020301B)

Summary of the analysis of Specimen No. C-SG-10-00099-1 (Lab No. AT-1033-00927-001-03) and C-SG-10-00099-2 (Lab No. AT-1033-00927-002-03)

Duty Officer: Ong Rui Shen

Lab No. AT-1033-00927-001-03					**Lab No. AT-1033-00927-002-03**				
Date	**Procedure**		**Lab Personnel**	**Checked by**	**Date**	**Procedure**		**Lab Personnel**	**Checked by**
25 Jan 10	Specimen receiving		KBA (CSO)	TME (LO)	25 Jan 10	Specimen receiving		SN (CSO)	TME (LO)
25 Jan 10	Specimen verification		ORS (A)	N.A.	25 Jan 10	Specimen verification		ORS (A)	N.A.
25 Jan 10	Specimen unsealing		MYO (HSO)	LWS (LO)	25 Jan 10	Specimen unsealing		MYO (HSO)	LWS (LO)
25 Jan 10	Screening		LWS (LO)	LMF (LO)	N.A.				
25 Jan 10	Extraction	Sorting	ML (LO)	TME (LO)	25 Jan 10	Extraction	Sorting	ML (LO)	TME (LO)
		Sampling		YT (LO)			Sampling	YT (LO)	ML (LO)
		SPE		LHS (A)			SPE		LHS (A)
26 Jan 10	Sample Preparation for GC/MS		ML (LO)	FCY (A)	26 Jan 10	Sample Preparation for GC/MS		YT (LO)	FCY (A)
26 Jan 10	Analysis of GC/MS (GC/MS queue was checked by LO LNL)		FAL (LO)	ORS (A)	26 Jan 10	Analysis of GC/MS (GC/MS queue was checked by LO LNL)		MH (LO)	BC (A)
Reporting									
28 Jan10	Review/report		ORS (A)		28 Jan 10	Review/report		BC (A)	

ML- Lee Mei Lan
LMF- Loh Mun Foong, Esther
FAL- Fathiyah Abdul Latiff
ORS- Ong Rui Shen
SN- Siti Norhayati B M Raji
FCY- Fong Ching Yee
LWS- Lee Wee Soon
TME- Tan Moy Eng
BC- Bellene Chung
LNL – Lee Ngak Lee
LHS- Leong Huey Sze
YT- Yvonne Teo Gee Yan
MH- Muhierah Bte Mohd Rashid
KBA- Kamisah Binte Amat

Legend: A stands for Analyst, LO stands for Laboratory Officer , HSO stands for Health Support Officer, CSO stands for corporate support officer