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Decision :



New South Wales Court of Criminal Appeal

CITATION :	R v Keir [2002] NSWCCA 30
FILE NUMBER(S) :	CCA 60092/00
HEARING DATE(S) :	21 February 2002
JUDGMENT DATE :	28 February 2002
PARTIES :	R v Thomas Andrew KEIR
JUDGMENT OF :	Giles JA at 1; Greg James J at 41; McClellan J at 42

LOWER COURT JURISDICTION :	Supreme Court
LOWER COURT FILE NUMBER(S) :	71575/92
LOWER COURT JUDICIAL OFFICER :	Adams J

COUNSEL :	P Byrne SC & G Bashir - Appellant M G Sexton QC S-G & B K Baker - Crown
SOLICITORS :	Gregory J Goold - Appellant S E O'Connor - Crown

CATCHWORDS :	EVIDENCE - bones found - on Crown case were bones of accused's wife - DNA analysis - likelihood ratio 660,000 times more likely to obtain DNA profile found in bones of child of wife's parents than if bones of a child of a random mating in the Australian population - left to jury that 660,000 to one chance that were bones of wife rather than any other person - and that 660,000 to one chance that evidence of persons seeking the wife alive were accurate and reliable - prosecutor's fallacy - summing-up failed to correct it - conviction quashed. D.
CASES CITED:	Doheny and Adams (1997) 1 Cr App R 369; R v Galli (2001) NSWCCA 504; R v G K (2001) NSWCCA 413.
DECISION :	Orders previously made, see para 3.

**IN THE SUPREME COURT
OF NEW SOUTH WALES
COURT OF CRIMINAL APPEAL**

**CCA 60092/00
SC 70049/98
GILES JA
Greg JAMES J
McCLELLAN J**

Thursday 28 February 2002

REGINA v KEIR

Judgment

1 **GILES JA:** The appellant was indicted on the charge that he on or about 9 February 1988 at Tregear in New South Wales murdered Jean Angela Keir. His trial before Adams J and a jury began on 10 August 1999. On 17 September 1999 the jury returned a verdict of guilty. On 29 February 2000 the appellant was sentenced to 24 years imprisonment with a non-parole period of 18 years.

2 The appellant appealed against conviction and sentence. There were four grounds of appeal against conviction. The grounds of appeal were such that

the appellant accepted that, if the appeal were upheld, a new trial should be ordered.

3 We first heard submissions on whether the trial judge fell into error in directions concerning the significance of DNA statistical evidence, and, if he did, whether nonetheless a substantial miscarriage of justice had not occurred. At their conclusion we ordered that the appeal be allowed, the conviction be quashed, and a new trial be held, and said that our reasons would be published shortly

4 These are my reasons for the orders.

The Crown case in outline

5 The appellant and Jean Angela Keir (then Strachan) were married in August 1984. They lived at Tregear. They had a son, Michael, who was a little over 3 years old in February 1988. The appellant was very possessive of Mrs Keir and jealous of her contact with other men, and Mrs Keir was unhappy in the marriage. The appellant had threatened to kill Mrs Keir if she left him.

6 In late 1987 Mrs Keir had an affair with Mr Carl Nieding, of which the appellant became aware. The appellant was very angry. Although Mr Nieding ended the relationship, Mrs Keir wanted to continue it.

7 In February 1998 Mrs Keir went to Culburra on the south coast with her sister and her sister's boyfriend. The appellant had agreed to this, but after some days drove to Culburra to collect Mrs Keir. He forced her unwillingly into his car. When the appellant stopped at a petrol station on the way back to Tregear, Mrs Keir left the car and hitchhiked to Mr Nieding's flat. After communications between the appellant and Mr Nieding, late in the evening of 8 February 1988 Mr Nieding drove Mrs Keir to Tregear and left her with the appellant at their home.

8 On the Crown case the appellant murdered Mrs Keir in the course of that night, and buried her body beneath the foundations of the house. There were strong smells from beneath the house and disturbance of its structure and the ground. Mrs Keir did not after 8 February 1988 seek access to Michael, contact her parents or use her bank account.

The identification evidence

9 Mrs Keir's body was not found, although some bones were found which were the subject of DNA evidence. Whether Mrs Keir was dead was in issue, quite apart from whether the appellant had killed her.

10 The appellant gave evidence that Mrs Keir had left him the day after her return driven by Mr Nieding, and had telephoned him a week and a half later to say that she was not coming back. He said that she telephoned him later in 1988 and that he last heard from her in about April 1989. There was evidence in the appellant's case from the appellant's mother, Mrs Joan Keir, who said that she had seen Mrs Keir on three occasions since February

1988, in 1998 and 1999, and that her husband had received telephone calls from Mrs Keir; from Michael, who said that he had seen Mrs Keir on two occasions since February 1988, in 1992 and 1999, and had recognised her from photographs; and (by a statement) from the appellant's deceased father that he had received a telephone call from Mrs Keir. As well, the Crown called Mrs Jennifer Amos, formerly Soler, who had been at school with Mrs Keir and gave evidence that in October 1988 she saw a woman whom she believed was Mrs Keir.

11 This evidence was sometimes described in the appeal as identification evidence. The description is not accurate, but it is convenient to adopt it. The identification evidence was important in the appellant's case. If there was a reasonable possibility that Mrs Keir had telephoned or been seen after February 1988, there had to be a reasonable doubt of the appellant's guilt.

12 The grounds of appeal included that the trial judge had given inadequate or inappropriate directions as to the reliability of the identification evidence. Attention can be focussed, however, on the DNA statistical evidence and its significance in the Crown case and to the identification evidence.

The DNA statistical evidence

13 Excavations were carried out at Tregear in 1991. Some bone fragments were found. Seven bones were identified as being of human origin. In 1997 six bone fragments and blood from Mrs Keir's biological parents, Mrs Christine Strachan and Mr Gaspar Baan, were taken to the United States of America for testing. It is unnecessary to go into the contest at the trial over possible contamination in the testing, the directions in that respect also being the subject of the grounds of appeal. The testing indicated that the bones were those of a female, and by analysis of mitochondrial and nuclear DNA that they could have been the bones of a child of Mrs Strachan and Mr Baan.

14 Evidence was given by Mr Robert Goetz, a forensic biologist, of his calculations through a system of DNA analysis called Profiler Plus using the results of testing the DNA and a database. He expressed the result of his calculations as a likelihood ratio, that "it is approximately 660,000 times more likely to obtain this particular DNA profile found in the bones if it comes from a child of Christine Strachan and Gaspar Baan than from a child of a random mating in the Australian population". He said that the result very strongly supported the hypothesis that the bones were "from an offspring of Christine Strachan and Gaspar Baan". Mrs Keir was their only child.

15 This statistical evidence was relevant, see *R v G K* (2001) NSWCCA 413. It was relevant to whether the bones found at Tregear were the bones of Mrs Keir. If they were, together with other evidence that would support the Crown case that Mrs Keir had been killed by the appellant, and would undermine or negate the reliability or credibility of the identification evidence. The evidence was not objected to at the trial.

The directions

16 The trial judge's first directions involving the DNA statistical evidence were not in connection with the identification evidence. He said -

"The Crown says it is a strange coincidence that Jean Keir disappears in a context where her husband has discussed killing her, has threatened her, if the Crown case be accepted, and if the Crown case be accepted dismemberment of the body, and we have some scattered bones of a dismembered body - of course dismembered by animals or whatever is another matter - but the Crown says well, that for a start is an eerie coincidence, one which would make you think seriously, very seriously, about whether the threats were intended about how Jean Keir disappeared. How is it that someone else's body might have got or part of it might have got to this ground? Well it is speculation of course. It is obviously not impossible. The Crown says however it is improbable and that improbability you would add to the rest of the evidence in the case but the Crown says we have got more than that, there is a 660,000 to one chance that those are the bones of Jean Keir as distinct from any other person .

Now I have slightly shortened it, what the experts say are the bones of the offspring of Mr Baan and Christine Strachan, but it is perfectly obvious in the context of this case we are only talking about one possible candidate, Jean Keir.

The accused's case, as I understand it to be put to you by Mr Zahra is, we do not dispute that the result of this DNA test was 660,000 to one but we say that was the result or you might think it was the result of contamination ... ". (emphasis added)

17 After dealing with the question of contamination, the trial judge turned to the significance of the DNA statistical evidence to the identification evidence. He said -

"The Crown would say at all events even if [contamination] were a remote possibility you would think that it was a very high probability indeed that the DNA came from the bones and you would therefore be entitled to rely on it. If you were satisfied about that matter, ladies and gentlemen, the Crown says to you that means in effect there is a 660,000 to one chance for example that Miss Soler's evidence about identification is accurate and reliable .

You see you put one piece of evidence with another piece of evidence. Leaving aside the numbers, one can get bamboozled with statistics. You heard Bernard Shaw who said that there are three kinds of lies. There are lies, damn

lies and statistics. Let's look at that. 660,000 to one is the undisputed scientific evidence but it was said by Dr [sic] Goetz that it meant that it was very strong confirmation of the identification of those bones as having come from Jean Keir.

If that was objective evidence which gave very strong support for that contention the Crown says you would bear that in mind when considering the reliability of these other identifications, the identifications by Mrs Keir and by Michael and the identification by Miss Soler." (emphasis added)

18 Some time later the trial judge again referred to the DNA evidence in the course of a summary of what the Crown relied on, saying -

"Reliance is placed on the discovery of the bones, on its identification as being at the odds 660,000 to one being the bones of Jean Keir , and if they are the bones of Jean Keir she is dead, and if they are the bones of Jean Keir, they were found in the house, and if they are the bones of Jean Keir there is only one person who could have possibly put them there and that is the accused, and he would only have put them there, the Crown says, because he killed her, because he had something to hide so far as her body was concerned, and the Crown submits to you what he had to hide was the fact that he intentionally and deliberately killed her." (emphasis added)

Error in the directions

19 On Mr Goetz's evidence, the likelihood ratio supported the hypothesis that the bones were those of Mrs Keir. But what the trial judge said, stating the Crown's position, went further. It amounted to saying that there was a 660,000:1 statistical probability that the bones were those of Mrs Keir, and so that there was a 660,000:1 statistical probability that the identifications by Mrs Joan Keir, Michael and Miss Soler were not correct. The jury was likely to be very much influenced by this in deciding whether Mrs Keir was dead and had been killed by the appellant, and to find the identification evidence unreliable or incredible.

20 The Crown had fallen into a version of what has come to be known as the prosecutor's fallacy. It was incorrect to move from (i) the probability of the bones being those of a child of Mrs Strachan and Mr Baan rather than of a random mating in the Australian population to (ii) the same probability that the bones were those of Mrs Keir.

21 In the appeal the Crown accepted that there was the prosecutor's fallacy, but submitted that a redirection later given rectified the error. It is therefore necessary to appreciate what the error was.

22 The prosecutor's fallacy has most recently been considered in this Court

in *R v G* and *R v Galli* (2001) NSWCCA 504. The first of these cases includes the following from *Doheny and Adams* (1997) 1 Cr App R 369 at 372-3 -

“It is easy, if one eschews rigorous analysis, to draw the following conclusion:

(1) Only one person in a million will have a DNA profile which matches that of the crime stain.

(2) The defendant has a DNA profile which matches the crime stain.

(3) Ergo there is a million to one probability that the defendant left the crime stain and is guilty of the crime.

...

Taking our example, the prosecutor’s fallacy can be simply demonstrated. If one person in a million has a DNA profile which matches that obtained from the crime stain, then the suspect will be 1 of perhaps 26 men in the United Kingdom who share that characteristic. If no fact is known about the defendant, other than that he was in the United Kingdom at the time of the crime the DNA evidence tells us no more than that there is a statistical probability that he was the criminal of 1 in 26.

The significance of the DNA evidence will depend critically upon what else is known about the suspect. If he has a convincing alibi at the other end of England at the time of the crime, it will appear highly improbable that he can have been responsible for the crime, despite his matching DNA profile. If, however, he was near the scene of the crime when it was committed, or has been identified as a suspect because of other evidence which suggests that he may have been responsible for the crime, the DNA evidence becomes more significant. The possibility that two of the only 26 men in the United Kingdom with the matching DNA should have been in the vicinity of the crime will seem almost incredible and a comparatively slight nexus between the defendant and the crime, independent of the DNA, is likely to suffice to present an overall picture to the jury that satisfies them of the defendant’s guilt.”

23 The first part of this passage identifies the prosecutor’s fallacy, explaining that the statistical probability within the relevant population does not translate to the same statistical probability for a given member of the population. The second part of the passage goes to a corollary, that even with a correct understanding of the statistical probability the significance of the DNA statistical evidence will depend on other evidence.

24 As the explanation applies in the present circumstances, the move from

(i) to (ii) above left out of account that within the Australian population there could statistically be other matings producing the DNA profile found in the bones; and further, attention can not be confined to the Australian population. If the bones are 660,000 times more likely to be those of a child of Mrs Strachan and Mr Baan than of the child of a random mating in the Australian population, there will still be a number of random matings in the Australian population producing the DNA profile found in the bones; and because the child whose bones were found at Tregear could have been conceived anywhere in the world, there could be many matings not in the Australian population producing the DNA profile found in the bones.

25 If attention is confined to the Australian population, a rough calculation of the kind undertaken in *Doheny and Adams* is difficult because conception of a child at an unknown time whose bones might have been those found at Tregear in 1991 is not the same as leaving a crime stain at Tregear in 1991. But on any view the relevant Australian population at the time of the random matings must be many times 660,000. The Crown accepted that statistically there could be maybe thirty random matings in the Australian population producing the DNA profile found in the bones. If so, and I take up the figure only as an illustration, Phillips LJ might have said that there was a statistical probability that the bones were the bones of Mrs Keir of something like 30:1. I would prefer not to put it that way, if for no other reason than because that can lead to failing to pay regard to the other evidence bearing upon probability, but it starkly illustrates the difference from a presentation of odds of 660,000:1. Using the same figure, what the DNA statistical evidence meant was that only about thirty persons in Australia had the DNA profile found in the bones; and then the significance of that had to be determined in the light of the other evidence bearing upon whether the bones found at Tregear were likely to have been those of Mrs Keir or those of one of the statistical other twenty-nine persons. The jury was likely to be greatly impressed by the figure with all the noughts, and to be misled into overlooking the number of other persons with the DNA profile found in the bones and failing to attend to the other evidence.

26 But in this case attention could not be confined to the Australian population. What the DNA statistical evidence meant was more complex, for that reason and because of the range of possible times of conception. If regard were had to the world population, there could be many more persons with the DNA profile found in the bones.

27 The trial judge was repeating what the Crown had put in submissions. As will be seen, counsel for the appellant did not recognise the prosecutor's fallacy and ask that it be corrected. By 1999 the prosecutor's fallacy had been sufficiently discussed in legal writings that warning bells should have rung. Unfortunately, they did not sound in the ears of the trial judge, who also did not recognise the prosecutor's fallacy and endeavour to correct it. In the result, the jury was left to assess whether the bones were those of Mrs Keir, and so to determine whether Mrs Keir was dead and had been killed by the appellant, and specifically the reliability and credibility of the

identification evidence, by regard to a misleading and prejudicial criterion.

28 Counsel for the appellant asked for a redirection, but only in relation to the identification evidence and not on the ground that the prosecutor's fallacy had intruded.

29 The transcript first records -

"Also the connection between the probability of DNA and identification by Jennifer Soler. I would submit that the directions required a very discrete consideration of the identification of Jennifer Soler and that this connection means that the jury could fall into error in essentially combining these two pieces of evidence to in fact almost by the bootstraps so to speak, bearing in mind that, so far as the probability is concerned, that 660,000 to one is not a way in fact, that they should look at the identification evidence, that it should be looked at in a discrete way, in identification that she in fact had raised.

HIS HONOUR: So you think in considering whether her identification was reliable they should disregard all the other evidence in the case?

ZAHRA: I would submit it is dangerous to connect these two pieces of evidence in some way.

HIS HONOUR: Can you deal with my contention first?

ZAHRA: I don't suggest that. It is only a question of accommodation.

HIS HONOUR: Then the question is what is the other evidence in the case to use, which they can analyse to suggest that her evidence was right? I was merely pointing out this was one part of the evidence and this was the most significant one.

ZAHRA: My submission is that it is dangerous to look at the DNA evidence and seek to combine it with the other evidence and come up with a conclusion about the accuracy of her evidence. I submit there are many other factors to consider when giving her evidence weight.

HIS HONOUR: Such as what?

ZAHRA: The fact that she had known Jean Keir for quite some time in circumstances where there was a close relationship, the identification on the particular day, particularly in relation to the identification of the hair, the showing of the photograph.

HIS HONOUR: I brought that to the jury's attention."

30 Later the transcript records -

"The other aspect is in relation to Jennifer Soler's evidence, identification evidence, where your Honour had looked at that piece of evidence with the DNA evidence and my submission was that it should not be confined in that way

because the jury may misdirect themselves to properly applying the acceptable principles of the facts to be considered in identification – it was not a matter to look at that – it is not a matter to look at Jennifer Soler’s evidence as a statistical probability. The important matters are no doubt the matter of the previous association and the time she had her under review and those matters are relevant.

HIS HONOUR: Are you submitting they should not take into account the conclusion which they might draw from the DNA evidence that it – I didn’t use this word to them but assume they did – that it was virtually certain that those bones were Jean Keir, but are you saying they couldn’t use their view of the likelihood that those bones were those of Jean Keir to consider whether they accepted the reliability of the evidence of Jennifer Soler?

ZAHRA: Your Honour what I submitted yesterday, there would be a need of degree of caution in a sense to cross-pollinate these two particular aspects because the question of identification is in fact quite a complex one in the sense there are various facts they would need to weigh-up quite independently and that is obviously the particular relationship between Miss Soler and Jean Keir, the method by which she was able to identify Jean Keir at this point of time, together with the evidence in this Court of the photographs, so it should be considered in a discrete way, that caution should be exercised in cross-pollinating both, but it is important that they consider also the weight of the evidence of Miss Soler. In fact the opposite would occur. If obviously they were satisfied that Jennifer Soler did in fact identify Jean Keir, then obviously that may reflect also on the DNA evidence but it is important for this identification to at least in some way --

HIS HONOUR: They may need to decide which they prefer?

ZAHRA: Yes, that’s right.

HIS HONOUR: But if they come to a view about the DNA evidence and accepted that indeed it did show those odds, are you submitting to me this, they should not bear that in mind when considering Jennifer Soler’s---?

ZAHRA: No, only a degree of caution should be exercised when considering her evidence.

HIS HONOUR: That’s precisely what I said in relation to the scientific evidence.

ZAHRA: That’s what I said yesterday afternoon, that your Honour should tell them they should be minded to look at these as discrete matters before considering the aspect of the evidence together.”

but it was not that there had been the impermissible move from (i) to (ii) above. There may have been complaint about using the DNA statistical evidence at all as a criterion for the reliability and credibility of the identification evidence, a matter which need not be addressed in these reasons. At least there was raised the need to ensure that the probability ratio was seen as part only of the evidence, and evaluated in the light of the totality of the evidence. That was the subject of the second part of the passage from *Doheny and Adams* set out above. But what counsel said did not touch what was there first addressed, the erroneous appreciation of the significance of the probability ratio under the influence of the prosecutor's fallacy.

32 The trial judge did give a further direction, saying -

"I reminded you of the evidence of Jennifer Soler and I pointed out to you that you should not look at this evidence by itself and in a stark way I pointed out that if you accepted the DNA evidence that there was a 660,000 chance to one that these bones were not those of Jean Keir then that would lead you to look at Jennifer Soler's identification with some scepticism.

Ladies and gentlemen, I think there are a number of things I should say about that. First of all, of course, what I was really intending to do there was to point out that you don't look at each piece of evidence as a compartment but you do look at each piece of evidence.

Mr Zahra submitted to you and the defence case is well, if you looked at Jennifer Soler and having regard to the fact that she knew Jean Keir, that she was sure that it was Jean Keir, that she had an adequate opportunity to observe the woman she identified as Jean Keir, that she not only got the face right, says Mr Zahra, but also got the hair right. If you started from that line it might lead you to doubt for example the DNA evidence.

Well it is a matter for you as to what parts of the evidence you rely on as being reliable but in dealing with this matter of course you don't only look at the DNA evidence; you look at the whole of the evidence in the case and you weigh-up each piece of evidence by looking at the whole, what you accept and what you don't.

I think in fairness to the Crown you will recall that I pointed out Mr Bernard Shaw's statement about lies, damn lies and statistics. In this case, however, there is no suggestion that the statistics are false or misleading. They of course don't amount to certainty. They were statistics concerned about probabilities and there was no cross-examination directed to Mr Goetz - I wrongly called him Doctor - to Mr Goetz that suggested that the statistical process was unfair, unreasonable, not arithmetical, not reliable - no suggestion

of that in this case – but what I am saying to you is that what it indicates is that it is a very high degree of probability indeed , you might think, and that if you were persuaded that that was reliable and that there was no contamination of that the reasonable possibility of contamination could be dismissed, I did suggest to you that that evidence, because it is objective, is a very useful compass or a very useful standard by which you look at other areas in the case.”
(emphasis added)

33 As I have indicated, the Crown submitted that this rectified the error in the earlier directions, because the jury was reminded that the evaluation of DNA evidence was a matter for them in the light of the totality of expert and non-expert evidence. Whether it was sufficient as such a reminder need not be decided, but it did not rectify the error. The prosecutor’s fallacy was still not recognized. The misuse of the statistical probability was not corrected in relation to the identification evidence or otherwise, and more, was reinforced in relation to the identification evidence by the trial judge referring to “a 660,000 chance to one that these bones were not those of Jean Keir ...” and suggesting in that connection that the jury could see the statistical process as indicating “a very high degree of probability indeed”. If it was proper to leave the jury with odds at all, the jury was left with the potentially misleading odds of 660,000:1 and without guidance on what the DNA statistical evidence really meant.

Leave and the proviso

34 The Crown did not submit that, because counsel for the appellant did not seek an appropriate redirection, the appellant should not be permitted to appeal in relation to the directions presently under consideration. That could hardly have been done when the Crown was the source of the error.

35 The Crown submitted that nonetheless a substantial miscarriage of justice had not occurred and the proviso in s 6 of the *Criminal Appeal Act* 1912 should be applied. It was said that the Crown case was strong and the identification evidence was weak, quite apart from the DNA statistical evidence.

36 Albeit briefly, I have outlined the Crown case earlier in these reasons. As to the identification evidence, in summary it was said that Mrs Joan Keir had seen the person she thought was Mrs Keir under less than ideal circumstances and had obvious reason to give evidence in favour of her son; that because of his age Michael’s identifications were of little weight; and that Miss Soler had seen the person she thought was Mrs Keir only for a few seconds and at a distance possibly beyond her short sight, and had conceded that she was not sure that she could see the person clearly.

37 The Crown case was strong. But it can not be taken in isolation from the identification evidence, and although reasons for doubting its reliability or credibility could properly be put forward that evidence can not be swept

aside. The jury had to evaluate the evidence, and it would have been sufficient for the appellant that the identification evidence brought reasonable doubt. Miss Soler, in particular, was independent from the appellant and said that the person she thought was Mrs Keir had curly hair, which Mrs Keir had not had when previously known to her: other evidence showed that Mrs Keir had changed her hair style and had curly hair in early 1988. I do not think it can be said that, had the jury not been left with an erroneous appreciation of the significance of the DNA statistical evidence, the appellant would inevitably have been convicted.

The result

38 Hence the orders, without the need to go to the other matters raised in the grounds of appeal.

A caveat

39 I have noted that the DNA statistical evidence was not objected to at the trial. Even if the Crown had not introduced the prosecutor's fallacy into the trial, there was a danger that the jury would reason for themselves in the way the Crown put to them at the trial. In *R v GK* it was said (at [59]) that the paternity index figures there in question should have gone to the jury "accompanied by appropriate directions emphasising the need to avoid the prosecutor's fallacy". In *R v Galli* it was said (at [89])-[97]) that, although a direction about the prosecutor's fallacy may not be necessary in all cases where DNA evidence is led, a warning about impermissible reasoning would have been desirable.

40 Because the directions in the present case positively endorsed the prosecutor's fallacy, it has not been necessary to consider what the trial judge should or could have said about the use which could be made of the DNA statistical evidence and avoidance of the prosecutor's fallacy. In a case such as the present, not of the crime stain kind, it may not be easy to give proper guidance to the jury, and if that can not satisfactorily be done it may be that discretionary considerations will arise in relation to admission of the DNA statistical evidence.

41 **GREG JAMES, J:** I agree with the orders proposed by Giles JA, and with his reasons.

42 **McCLELLAN J:** I agree with Giles JA.

that the intended use of that material does not breach any such order or provision. Further enquiries may be directed to the Registry of the Court or Tribunal in which it was generated.