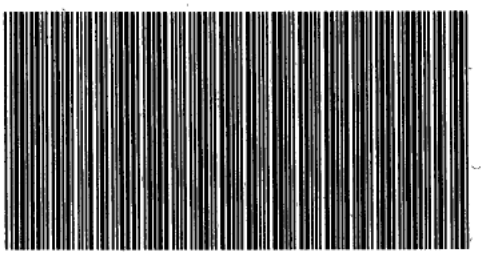

MOD-83-0000027-A

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Witness Statement

(C.J. Act 1967, s. 9 MC Act 1980, ss 5A (3a) and 5B, MC Rules 1981, r. 70)

[redacted]

ment of	Matthew James GREENHALGH BSC. (Hons)
f Witness	Over 18
pation	Forensic Scientist
	with
	Orchid Biosciences Europe Ltd. (Cellmark) Culham Science Centre, Abingdon, Oxfordshire OX14 3DB

This statement, consisting of 5 pages each signed by me, is true to the best of my knowledge and belief and I make it knowing that, if it is tendered in evidence, I shall be liable to prosecution if I have wilfully stated in it anything which I know to be false or do not believe to be true.

Dated the 30th day [redacted]une 2005

Signature.... [redacted] .....

Qualifications and Experience

I am the Director of Forensic Science at Orchid Biosciences Europe Ltd. Orchid performs DNA testing for Forensic Alliance.

I hold a degree of bachelor of science in biochemistry and I have been employed as a Forensic Scientist since 1979. During the course of my career I have examined many cases using DNA analysis techniques.

Case Reference Numbers: FAL-004965-03

Royal Military Police Reference: 64658/03

Information

I have read the statements of Mr. Anthony Larkin dated 1st July 2004 and 19th August 2004. I understand that the deceased, Nadhem IL MAHAMADAWI, is the offspring of Abdulla MANAA and Jusm IL MAHAMADAWI.

Request

In the absence of a reference DNA sample from the deceased, Nadhem IL MAHAMADAWI, I have been asked to compare the STR DNA profiles of Abdulla MANAA and Jusm IL MAHAMADAWI with the profile obtained from blood on the butt of the rifle ([redacted]2). The purpose of this examination was to establish whether or not the blood on the rifle butt could have originated from an offspring of Abdulla MANAA and Jusm IL MAHAMADAWI.

Signature [redacted] .....

Examination and Results

The STR profiling results from Abdulla MANAA, Jusm IL MAHAMADAWI, the blood from the rifle butt ([S004]2) and the semen from the trousers (MJS2) are tabulated in Appendix 2.

The STR profiling results indicate that the individual whose blood was present on the rifle butt ([S004]2) could have been an offspring of Abdulla MANAA and Jusm IL MAHAMADAWI. In considering this result I have considered two alternative scenarios:

- The individual whose blood was present on the rifle butt ([S004]2) is the offspring of Abdulla MANAA and Jusm IL MAHAMADAWI
- The individual whose blood was present on the rifle butt ([S004]2) is unrelated to Abdulla MANAA and Jusm IL MAHAMADAWI.

The DNA results are approximately 4 million times more likely if the first scenario is correct rather than the second.

To calculate this figure I have used databases of STR profiles from Caucasian, Afro-Caribbean and Indian Asian populations and chosen the most conservative value. I do not have a specific database of STR profiles from Marsh Arabs available however STR profiles have been shown to be extremely variable in all major populations so far examined and I would not expect the significance of the statistic to vary significantly if it were calculated using a Marsh Arab Database. In addition the calculations also include a factor to compensate for the effects of any population substructure that may be observed in small populations where marriages between closely related individuals may occur.

Conclusions

- The STR profiling results are approximately 4 million times more likely if the individual whose blood is present on the rifle butt ([S004]2) is the offspring of Abdulla MANAA and Jusm IL MAHAMADAWI than if they are unrelated.

[My opinion as to the strength of the DNA evidence is provided here for the benefit of the prosecution and defence. In the event of a not guilty plea, all the words within these square brackets should be deleted from my statement to avoid contravening the Court of Appeal ruling in Doheny (1997).
I have expressed the strength of my conclusion using the following scale of scientific support: no, weak, moderate, moderately strong, strong, very strong and extremely strong.

Signature [redacted] .....

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In my opinion these findings provide **extremely strong scientific support** for the assertion that the individual whose blood was present on the rifle butt (S004[redacted]2) was an offspring of Abdulla MANAA and Jusm IL MAHAMADAWI.

Furthermore I understand from the statement of Mr. Larkin dated 1st July 2004, that an area of semen staining in the groin of the trousers (MJS2) gave an STR profile matching that of the blood on the rifle butt (S004[redacted]2). The probability of obtaining a matching STR profile if the semen did not originate from the same person whose blood is present on the rifle butt, but instead came from an unrelated person is less than 1 in 1 billion. If it is accepted that the trousers, (MJS2) were worn by Nadhem IL MAHAMADAWI and that the semen originated from him, then the STR profiling results provide **extremely strong scientific support** for the assertion that the blood on the rifle butt (S004[redacted]2) originated from Nadhem IL MAHAMADAWI.]

Signature [redacted].....

Appendix [1]

STR profiling

STR (Short Tandem Repeat) profiling is a form of DNA analysis. DNA is a complex chemical found in most cells of the human body. It carries genetic information that determines the physical characteristics of a person. This information is carried in coded form and half is inherited from each parent. Except in the case of identical twins, each person's DNA is unique, although STR profiling does not enable us to analyse every part of an individual's DNA. Each person's DNA is the same in all their cells so DNA recovered from blood cells will be the same as cellular DNA from hair roots, saliva or semen.

STR profiling uses the technique of DNA amplification in which specific areas of DNA are targeted and copied many times.

In this case a technique called SGM Plus was used. The STR profiles were produced by amplifying eleven different areas of DNA. Ten of these areas contain an STR. These are called D3, VWA, D16, D2, D8, D21, D18, D19, THO1 and FGA. The eleventh area, known as amelogenin, indicates the sex of the donor. These regions are used to produce an STR profile that appears as a series of peaks. A person will have two peaks for each STR, one inherited from each parent. If the same peak is inherited from both parents then only one peak will be observed. The positions in which these peaks appear can be measured and have been found to vary widely between individuals.

A statistical estimate can be made of the significance of a match in the circumstances of the case. This is done by estimating the probability of occurrence of each peak in the STR profile and using a formula to multiply these probabilities together. This is known as the product rule calculation. The estimates of peak probability are increased to allow for possible associations between peaks and within populations, using established methods.

There are three databases available to refer to when estimating the probability of occurrence of an STR profile. These are taken from the White Caucasian, Afro-Caribbean and Indo-Pakistani populations of this country. Where the racial origin of the person who left the body fluid is not known then the most conservative of the results obtained from the three databases is quoted.

As DNA is inherited related persons are more likely to have similar STR profiles than those who are unrelated.

Signature [redacted] .....

ITEM	STR PROFILE										
	D3	VWA	D16	D2	AMEL (♣)	D8	D21	D18	D19	THO 1	FGA
JM/1 Jusm IL MAHAMADAWI	16,16	14,19	11,11	17,23	X,X	13,13	29,30.2	13,13	12,14	7,7	20,21
BGS/1 Abdullah MANAA	16,17	17,19	11,12	17,23	X,Y	11,13	29,33.2	12,20	12,14	8,9	21.2,23
SAM2 Blood from rifle butt	16,17	14,17	11,12	17,17	X,Y	13,13	29,30.2	12,13	12,12	7,9	21,23
MJS2 Semen from trousers	16,17	14,17	11,12	17,17	X,Y	13,13	29,30.2	12,13	12,12	7,9	21,23

(♣) X, X indicates the source of the DNA is female, X, Y indicates the source of the DNA is male.

Signature [redacted] .....

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