IN THE HIGH COURT OF SOUTH AFRICA
WESTERN CAPE DIVISION, CAPE TOWN

Case No: _____

In the matter between:

Gun Free South Africa	First Applicant
Mansoer Eksteen	Second Applicant
Andre Levi Cornelius	Third Applicant
Dianne Cornelius	Fourth Applicant
Denise Mentor	Fifth Applicant
Evenlyn Davids	Sixth Applicant
Melanie Kiel	Seventh Applicant
Natalie Dirks	Eight Applicant
Simoné Julies	Ninth Applicant
Niezaam Cupido	Tenth Applicant

And

Minister of Police	First Respondent
National Commissioner of Police	Second Respondent
Provincial Commissioner of Police: Gauteng Province	Third Respondent
Provincial Commissioner of Police: Western Cape Province	Fourth Respondent
Provincial Commissioner of Police: Northern Cape	Fifth Respondent
Provincial Commissioner of Police: Eastern Cape	Sixth Respondent
Provincial Commissioner of Police: Free State	Seventh Respondent

Provincial Commissioner of Police: Mpumalanga	Eighth Respondent
Provincial Commissioner of Police: KwaZulu-Natal	Ninth Respondent
Provincial Commissioner of Police: Limpopo	Tenth Respondent
Provincial Commissioner of Police: North West	Eleventh Respondent

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EXPERT AFFIDAVIT

I, the undersigned,

Mark Stanley Mastaglio

do hereby make oath and state:

1 I am an adult residing in the United Kingdom.

2 The facts contained in this affidavit are, to the best of my knowledge and belief, true and correct. I respectfully submit that the views expressed in this affidavit fall within my field of expertise and I am duly qualified to provide this Court with the information and views contained in this affidavit are based on my qualifications and professional experience.

Overview and purpose of this affidavit

3 I have been requested by the attorneys of record for the First Applicant, Gun Free South Africa (**"GFSA"**) to provide my views on aspects of firearms related forensic science. I confirm that I have agreed to do so.

4 In order to familiarise myself with the background to the matter, I have been granted access to, and have read, the founding affidavit of Adèle Kirsten, which I understand will be used in support of an application brought by GFSA to certify a class action on behalf of persons who have suffered damages as a consequence of shootings involving the so-called "Prinsloo Firearms". I have also had access to the annexures that are referred to in that affidavit as well as a number of additional documents supplied by GFSA's attorneys.

5 I have been advised that much of the factual background to the matter is not in dispute, and I have accordingly assumed that factual averments relied upon by GFSA are true and correct.

6 In addition, I consulted with GFSA's attorneys on 19 January 2023 in order to understand certain aspects of their brief to me and the underlying assumptions made by them.

7 In this affidavit I set out:

7.1 My qualifications and experience;

7.2 The factual assumptions that I have made in expressing my expert opinion; and

7.3 My views on the questions of firearms related forensic science that are raised by the class action.

Qualifications and experience

8 I am a forensic scientist specialising in the examination of firearms and related items.

9 I graduated from the University of Bristol in 1985 with a Bachelor of Science Honours degree in Chemical Physics. From 1985 to 1989 I worked for the Ministry of Defence as a research scientist specialising in the hazard assessment of explosives.

10 In 1989, I joined the Metropolitan Police Forensic Science Laboratory ("the **MPFSL**") as a forensic scientist specialising in the examination of firearms, ammunition, and related items. In 1996, the MPFSL merged with the Home Office Forensic Science Service ("the FSS") to provide a national service to the courts.

11 From 2005 until 2012, I was the FSS Principal Scientist for firearms examination; I was the national scientific lead for the discipline within the FSS.

12 I was responsible for setting the national Standards for the examination of firearms and for ensuring that the FSS conformed to the requirements of the Firearms Act, 1968 and its amendments.

13 I was a member of the Association of Chief Police Officers Firearms and Explosives Licensing Working Group ("**ACPO FELWG**"), and a member of its Technical Sub-Group and associated tripartite Home Office, ACPO FELWG, British Shooting Sports Council forum. My principal role on these

committees was to provide assessments on the technical and legal classification of firearms and ammunition.

14 ACPO FELWG advises on UK Firearms and Explosives licensing policy and is chaired by an ACPO rank officer, and its members are made up of police licensing managers, a senior Home Office official and a firearms forensic scientist.

15 In March 2011, on behalf of ACPO FELWG, I coordinated research at the FSS to establish lethal kinetic energy thresholds for plastic pellets discharged from fully and semi-automatic airsoft guns. This work formed the basis of the exemption from the definition of firearm for certain airsoft guns, that section 57(A) of the Firearms Act 1968, and section 125(5) of the Policing and Crime Act 2017 introduced.

16 I was a Home Office appointee on the statutory Historic Weapons Reference Panel and was also a Home Office advisor on issues of general firearms classification.

17 In 2015 The Law Commission asked me to contribute to a review of the Firearms Act 1968 that they were engaged in. My opinion was sought on areas including the definition of a firearm, lethality, antique status, and the definition of component parts.

18 When the National Ballistics Intelligence Service ("**the NABIS**") was created I was made a Senior Associate and was then appointed as the Forensic Science Providers representative on the NABIS Scientific Standards Group.

19 I was a member of the Royal Armouries service level agreement committee, which oversaw the use of the National Firearms Centre firearms reference collection.

20 I was the UK Council for the Registration of Forensic Practitioners ("**CRFP**") Lead Assessor for forensic firearms examination between 2005 and 2009 until the closure of CRFP in 2009.

21 I was a member of the Home Office Firearms Standards Group. The Group monitors the scientific standards employed in the delivery of firearms related forensic science.

22 From 2009 to 2011, I was Chair of the European Network of Forensic Science Institutes ("**ENFSI**") Firearms and Gunshot Residue Expert Working Group. ENFSI is responsible for the harmonisation of procedures throughout Europe and is recognised by the European Union as the source of advice on forensic science issues. I am now an associate member of the Working Group.

23 I am a contributing author to the 3rd and 4th editions of the textbook *Crime Scene to Court: The Essentials of Forensic Science*, published by the Royal Society of Chemistry in 2010 and 2016, respectively.

24 I co-authored the peer reviewed paper '*A discussion on the usefulness of a shared European ballistic image database*' published in Science and Justice in 2012.[1]

25 I am an international assessor for the Netherlands Register for Expert Witnesses ("**the NRGD**") in forensic firearms examination.

26 I am a Senior Forensic Ballistics Technical Advisor to the United Nations Regional Centre for Peace, Disarmament and Development in Latin America and the Caribbean ("**the UNLIREC**").

27 I am a member of the Association of Firearm and Tool Mark Examiners ("**AFTE**"), an international professional body for forensic firearms examiners.

28 I am a Fellow of the Chartered Society of Forensic Sciences. I am also an Assessor (Practical) for the Society in the discipline of Firearms.

29 In 2021, I was appointed as a member of the Home Office Forensic Science Regulator's Firearms Specialist Group whose remit is to support the Forensic Science Regulator by providing advice on all matters related to the preparation, implementation, and monitoring of forensic firearms quality standards and related issues within the remit of the Regulator.

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[1] J De Ceuster, J., Hermsen, R., Mastaglio, M., & Nennstiel, R. (2012). A discussion on the usefulness of a shared European ballistic image database. *Science and Justice, 52,* 237-242. DOI: 10.1016/j.scijus.2011.12.003.

30 I hold section 5 Authority from the Secretary of State enabling me to handle and examine, in the course of my work, all forms of prohibited weapons and ammunition, as defined by the Firearms Act 1968.

31 Over the last thirty-four years I have given forensic firearms related expert testimony in the Magistrates, Crown, Appeal, Coroners and Military courts.

32 I am now a co-founding Director of Forensic Firearms Consultancy (FFC) Ltd. and Principal Forensic Services (PFS) Ltd.

Factual assumptions

33 From my reading of Kirsten's founding affidavit and the annexures attached thereto, I have made the following factual assumptions:

34 Two senior officials of the South African Police Services ("**the SAPS**"), namely Colonel Christian Lodewyk Prinsloo ("**Prinsloo**") and Colonel David Charles Naidoo ("**Naidoo**"), were tasked with the storage, safekeeping, and ultimately the destruction of certain firearms that had been forfeited to the State or which were otherwise redundant and due for destruction. These firearms were stored at a facility in Silverton, Gauteng.

35 These officials conspired to steal and sell these firearms to intermediaries who thereafter sold those firearms to members of criminal gangs in the Western Cape. The firearms were thereafter used in the commission of crimes including shootings of members of the public which resulted in injuries and deaths. I understand that at least 2400 firearms were stolen,

the majority of which were semi-automatic 9mm Parabellum calibre[2] handguns, the majority being either Lew/Vektor Z88 and Beretta 92 self-loading pistols.

36 The scheme was ultimately discovered by the SAPS and Prinsloo and Naidoo were subsequently arrested. They were convicted of their crimes by way of a plea bargain and made certain confessions as part of that process. This includes providing law enforcement authorities with a detailed schedule of the firearms that were sold to the gang members.

37 A project initiated by the SAPS subsequently recovered approximately 1100 of the 2400 firearms that had been stolen.

38 It is suspected that at least 1066 murders and 1503 attempted murders have been committed in the Western Cape alone between 2010 and 2016. Of the 1066 murders, 261 of the victims were minors.

39 Given that many of the firearms remain in circulation, it is reasonable to assume that more members of the public will be shot using these firearms.

40 During the investigations conducted by SAPS that led to the arrest of Prinsloo and Naidoo, I am given to understand that the following was established:

41 The firearms in question had all previously been in the possession of the Silverton Stores. On being received into those Stores, they would have

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[2] Synonyms for this calibre include 9mm Luger and 9 x 19mm.

been examined and test fired with the subsequent uploading of test fired samples onto the Integrated Ballistic Identification System ("**IBIS®**")[3].

42 The serial numbers of the firearms were noted and, where the serial number had been removed, the trigger guard would have been marked with a unique laboratory number (the LAB number).

43 When Prinsloo and Naidoo sold the firearms, they first modified them in order to remove the serial number and/or LAB number. They also made other modifications to aspects of some of the internal components of the guns such as their firing pins, ejectors, extractors and barrel chambers This was apparently done to hinder any attempt to link the gun to subsequently recovered fired bullets/cartridge cases.

44 SAPS were however initially alerted to the conspiracy as certain of the firearms had not been sufficiently modified and contained sufficient vestigial traces of the serial and/or LAB numbers to reveal that the weapons had originated from Silverton and could not have re-entered the public domain lawfully.

45 Furthermore, there had been a significant and inexplicable increase in the number of firearms being recovered from the Western Cape ganglands and a significant number of these had been modified in the same manner.

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[3]. https://www.ultra-forensictechnology.com/en/products-and-services/firearm-and-tool-mark-identification-ibisr/the-ibisr-solution-integrated-ballistic-identification-system/

SAPS were thereby able to conclude that all these modified firearms had originated from the Silverton Stores.

46 Once arrested, Prinsloo confirmed that this was indeed the case.

47 I understand that Col Willie Visser, W/O Zelda Meiring and W/O Quinton Bothman from the SAPS Ballistics Section, Western Cape at the Plattekloof Forensic Service Laboratory thereafter conducted testing of the recovered firearms and were able to reach certain conclusions as to the extent that a particular Prinsloo Firearm had been used in multiple crimes. An individual Prinsloo Firearm could thereby be linked to one or more open criminal dockets and the testing reports corresponding thereto.

48 Although I do not have full access to their findings, I have had sight of:

49 A 2013 presentation '*Forensic Services Ballistics Etch Investigation*' by, Q. Bothman, Z. Meiring, P. G. Engelbrech, SAPS, Ballistics Section Western Cape;

and

50 A July 2017 article published in the Servamus[4] compiled by Annalise Kempen, '*Corruption exposed: One policeman's greed results in 89 child deaths … and counting*'. The article references a SAPS presentation entitled '*Corruption exposed: previously examined police firearms back in*

[4] https://www.servamus.co.za/

circulation' presented on 28 February 2017, by Q. Bothman, Z. Meiring and W. Visser, at the 4th Forensic Services Conference, held in Pretoria.

Questions posed by GFSA

51 I am advised that should GFSA's class action be certified, individual class members would be able to come forward to prove their individual claims in court. This would require them to demonstrate on a balance of probabilities that they were shot with a Prinsloo Firearm. I am advised that the court considering the certification application will need to have some form of assurance that there is a scientifically sound method of establishing such claims.

51.1 I can express a general opinion as to what is possible from a ballistic identification point of view and what can be established using IBIS®.

52 Self-evidently, there are a variety of scenarios under which any individual could attempt to prove that they (or another person) were shot with a Prinsloo Firearm. The most likely scenarios given the assumed facts are the following:

53 Scenario 1: SAPS has recovered or will in future recover the Prinsloo Firearms. Is there a basis upon which it can be established that these firearms were used in any particular shooting? In my view, there is a high probability that these firearms could be scientifically linked to bullets and/or cartridge cases recovered from crime scenes involving the shooting of members of the public. The methodology employed in making this determination is set out further below.

54 Scenario 2: SAPS has collected and will continue to collect evidence from crime scenes (where a member of the public has been shot), including bullets and/or cartridge cases. Is it possible based on this evidence alone, that it could be concluded that the bullet or cartridge case was fired using a Prinsloo Firearm? In my general view, a robust opinion could be formed as to the likelihood that such a gun had been used. I set out further below the methodology that could be employed in making such an assessment.

55 Before expressing my views in respect of each of these two questions, it is necessary to give some general information regarding:

55.1 The various components of a self-loading pistol;

55.2 How firearms are linked to fired bullets and cartridge cases; and

55.3 How IBIS® assists in linking firearms to fired bullets and cartridge cases.

The components of a self-loading pistol ("SLP")

56 An SLP is a repeating firearm that requires a separate pull of the trigger for each shot fired, and which uses a portion of the energy of discharge to perform the operating or firing cycle. Such guns automatically extract a discharged cartridge case from the gun's chamber, eject it, and load a new cartridge into the chamber from its magazine.

57 Such a gun is comprised of components which typically include a rifled barrel, chamber, breech face, firing pin, extractor, and ejector. These steel components, amongst others, can impart generally repeatable individual microscopic marks onto the softer metallic cartridge component be it the

bullet or cartridge case enabling the source gun to be identified with a high degree of confidence.

Firearms Identification: linking fired bullets/cartridge cases to a specific firearm

58 Firearm identification is one of the fundamental branches of forensic science. A firearm can impart tool marks (such as striations and impressions) onto the bullet and cartridge case during loading, discharge, and ejection. These include class marks which are characteristic of a particular make/model of gun and those which are individual to a specific gun. The latter individual characteristics can arise through random imperfections/irregularities of tool surfaces and/or wear, corrosion or damage over time. These individual marks usually demonstrate a great deal of agreement from one shot to the other. Based on the level of agreement between the individual microscopic marks, the forensic firearms expert can come to an opinion on the likelihood of a common origin.

59 The principles of firearms identification were established in the early 1900s and remain unchanged. A great deal of statistical evaluation has been carried out in the intervening period. The science behind this forensic discipline has been empirically validated throughout the years.[5]

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[5] R. Nichols, Firearm and Tool Mark Identification: The Scientific Reliability of the Forensic Science Discipline, Academic Press 2018, ISBN: 9780128132500. https://www.sciencedirect.com/book/9780128132500/firearm-and-toolmark-identification?via=ihub=

Typically, in order to determine the number of guns used and their type, the forensic firearms expert examines recovered fired bullets/cartridge cases using a comparison microscope[6] and potentially an automated comparison system such as IBIS®. A recovered gun can also be test fired to generate bullets and cartridge cases which can then be uploaded onto IBIS® and examined using comparison microscopy.

IBIS® and comparison microscopy are used to determine whether the bullets/cartridge cases, be they from a crime scene or from a seized gun, link to previous shootings.

How IBIS® assists in Firearms Identification

60 IBIS®, a product first developed by Forensic Technology Inc. ("**FTI**"), is an automated imaging and analysis system that enables the creation of a searchable database of digital images of the gun-dependent tool marks present on fired bullets and cartridge cases.

61 The technology assists forensic firearms experts in linking guns and crime scenes by using correlation algorithms to rank potential similarities present in the tool marks transferred from the gun to the spent bullets/cartridge cases.

62 IBIS® is used in a large number of jurisdictions, including South Africa, and is used primarily as a filtering tool to reduce the number of physical

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[6] A comparison microscope is in effect two microscopes joined by an optical bridge and uses a prism to enable two objects to be viewed simultaneously, side by side, at the same magnification.

comparison microscopy examinations that must be performed by the forensic firearms expert in order to establish whether a specific firearm has been used to discharge one or more bullets/cartridge cases contained in an Open Case File (**"the OCF"**).[7]

63 These expert opinions, based on a physical examination using a comparison microscope, are routinely accepted in criminal trials.

Limitations of IBIS®

64 IBIS® is an excellent and reliable filtering tool, but its use must be augmented by the input of a forensic firearms expert competent in comparison microscopy.

65 IBIS® is very powerful; used correctly it can place almost all ballistic image connections in the top 30 of its correlation lists. [8,9] In general, the technology can perform consistently better with spent cartridge cases than it can with discharged and damaged bullets and their fragments.

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[7] Most government or police forensic firearms laboratories have what is known as an open case file (OCF). This consists of a collection of ammunition components, such as bullets, cartridge cases and plastic shotgun wads which have been recovered from the scenes of unsolved crimes. The collection is subdivided into calibre, and in the case of bullets, rifling characteristics. When appropriate spent or unfired ammunition and its components are submitted to the laboratory, they are screened through the OCF to see if there is any previous use of the same gun. Similarly, when a firearm is submitted, its test-fired bullets and cartridge cases are screened through the OCF.

[8] Garten, S. R. (2019). IBIS BrassTRAX Correlation Performance and Review Practices. AFTE Journal, 51(1), 37-46.

[9] Nichols, R. (2019). Evaluation of Rank Positions Within Regions of Interest (ROI) for Published NIBIN Leads. AFTE Journal, 51(1), 20-24.

66 However, for a positive connection (or exclusion) to be made a competent forensic firearms expert must physically examine the questioned bullets/cartridge cases highlighted by IBIS® using a comparison microscope.

The first scenario

67 In this scenario, a firearm has been recovered from the scene of a shooting. Given the type of firearm, the method of modification, and SAPS' own records, it is highly probable that it can be established with a fair degree of certainty whether the firearm recovered is a Prinsloo Firearm.

68 In the absence of any other evidence it will be highly probable, through assessment of the gun-dependent tool marks transferred to the fired bullet(s)/cartridge case(s), that it would be possible to determine whether the fired bullet(s) and/or spent cartridge case(s) involved in the shooting were fired by the recovered firearm.

69 Secondly, once a firearm has been recovered, it is test fired and those results are stored on the IBIS® system. Thereafter it is possible using comparison microscopy following the IBIS® screen to determine whether a bullet or cartridge case recovered from an unrelated crime scene was fired using the recovered firearm.

70 Accordingly, it is scientifically possible for the recovered Prinsloo Firearms to be linked to any number of shootings, provided that a bullet or cartridge case was recovered from those crime scenes.

71 As noted above, and from the documentation provided to me, it appears that the SAPS Forensic Division has in fact performed such an exercise and has linked a single recovered firearm to multiple shootings that involve the class action participants.

The second scenario

72 In this scenario, no firearm has been recovered and the SAPS will only be in possession of a bullet(s) or cartridge case(s).

73 Assuming that test fires from the firearm responsible for that shooting have not been entered onto IBIS®, then obviously screening the IBIS® database would not result in a possible identification of the responsible gun. Should a gun be recovered that was suspected of discharging the crime bullet(s) or cartridge cases(s) then comparison microscopy could be carried out to determine if the gun was indeed responsible.

74 Uploading the bullet(s)/cartridge case(s) onto IBIS® would speed the OCF screen and assist in determining whether the bullet(s)/cartridge case(s) were potentially linked to other shootings.

75 It may also be possible to estimate the likelihood that the recovered bullet(s)/cartridge case(s) had been discharged in a Prinsloo Firearm given the *modus operandi* of firearm modification and the consequent potential similarities in the transferred gun-dependant tool marks.

76 On the information I have seen, I cannot express a view as to the likelihood of an attribution to a Prinsloo Firearm as this would require:

77 An opportunity to inspect a suitable cohort of Prinsloo Firearms in order to ascertain exactly what modification characteristics were made and their likely influence on the fired bullets and spent cartridge cases.

78 Inspection of the fired bullet(s) or cartridge case(s) used in each specified shooting in order to determine the likelihood that they had been fired by a Prinsloo Firearm.

79 Knowledge of the prevalence of non-Prinsloo Firearms which have had some of their internal components modified in a similar manner to the Prinsloo Firearms.

80 Greater access to the methodology employed by Bothman, Meiring and Visser when they reached the conclusions contained in their presentations.

81 Assuming that the above can be provided it may well be possible to conclude, on a balance of probabilities, whether any particular bullet or cartridge case had been fired from a Prinsloo Firearm.

Mark Stanley Mastaglio

I hereby certify that the deponent knows and understands the contents of this affidavit and that it is to the best of the deponent's knowledge both true and correct. This affidavit was signed and ~~sworn to~~ affirmed before me at London, England on this the 9th day of May 2023, and that the Regulations contained in Government Notice R.1258 of 21 July 1972, as amended by R1648 of 19 August 1977, and as further amended by R1428 of 11 July 1989, having been complied with.

Bernard Cordell

COMMISSIONER OF OATHS

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Protocol No. 1314/23

Bernard Cordell

APOSTILLE

(Convention de La Haye du 5 octobre 1961)

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4. Bears the seal / stamp of est revêtu du sceau / timbre de y está revestido del sello / timbre de	The Said Notary Public

Certified

Attesté / Certificado

5. at á / en	London	**6. the** le / el día	09 May 2023
7. by par / por	His Majesty's Principal Secretary of State for Foreign, Commonwealth and Development Affairs		
8. Number sous no / bajo el numero	APO-MN73-3UOJ-WE02-3WSM		
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