

ARE WE TAKING PHYSICAL EVIDENCE SERIOUSLY?

The SAPS Criminal Record and Forensic Science Service

Bilkis Omar, Institute for Security Studies
bomar@issafrica.org

Much criticism relating to delays in processing DNA and DNA backlogs has been levelled at the police's forensic science laboratory in recent years. It is, however, encouraging that South African Police Service statistics show that while backlogs were substantial from 2004 to 2006, the situation has since improved. Despite this, the Criminal Record and Forensic Science Service (CRFSS) in the SAPS still faces several challenges, notably the high cost of training, low salaries, high staff turnover in the CRFSS and problems relating to evidence collection at crime scenes.

The Criminal Record and Forensic Science Service (CRFSS) was established in May 2005 as a division of the SAPS falling under the deputy national commissioner of crime intelligence and crime detection. Previously known as the Forensic Science Laboratory and the Criminal Record Centre, it fell under the detective service. Now a division on its own, it provides 'an even more integrated approach to the analysis of exhibits and the presentation of expert evidence; [and] expensive and scarce resources such as the photographic laboratory and crime scene equipment are also shared' (SAPS 2006).

Overview and components of the CRFSS

The purpose of the CRFSS is 'to render criminal record and forensic science services to the SAPS in order to effectively prevent and combat crime' (SAPS 2007a). The allocated operational budget for the CRFSS for 2006/07 was R156 687 000 and an extra R36m has been allocated for equipment (Du Toit 2007). The main facility is located in Silverton in Pretoria, with an additional biology unit in

Arcadia. The laboratory in Cape Town has most of the forensic functions, while the laboratories in Durban and Port Elizabeth provide chemistry and ballistics analysis.

The CRFSS is headed by a divisional commissioner, and includes three components: the Criminal Record Centre (CRC), Technology and Technical Management (TTM), and the Forensic Science Laboratory (FSL) (see Diagram 1). The functions of the CRFSS are:

- The application of forensic science in respect of crime prevention and crime detection [FSL]
- The management of criminal records and the application of sophisticated techniques to recover physical evidence from crime scenes [CRC]
- The facilitation of technology development in the SAPS and the rendering of support services to the division [TTM] (SAPS 2007a)

Criminal Record Centre

The function of the Criminal Record Centre (CRC) is the management of criminal records and the

application of sophisticated techniques to recover physical evidence from crime scenes (SAPS 2007a). Ninety-two local criminal record centres (LCRC) are located across the nine provinces. LCRC members are responsible for collecting evidence from a crime scene, ranging from taking photographs to removing spent cartridges or samples of bodily fluids left at a scene – with members working on the simple rule that ‘all evidence must first be documented before it can be removed’ (SAPS 2007b). In 2002, the CRFSS also established an Automated Fingerprint System (AFIS). The function of this within the CRC is to enable the identification of criminals.

LCRCs previously fell under the ambit of the provincial commissioners. They are now being moved to the office of the divisional commissioner

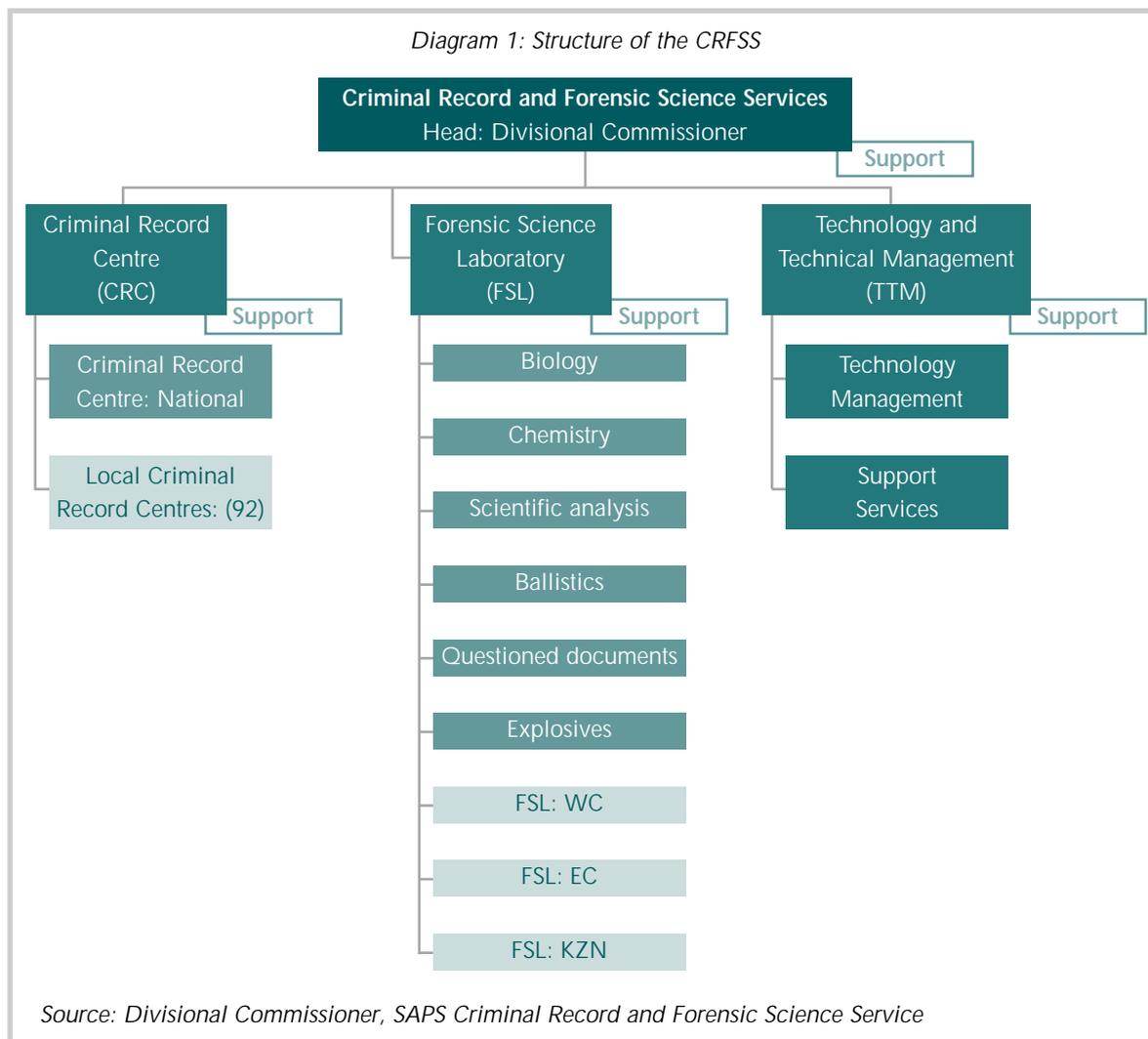
at national level to enable coordination, management and function purification of LCRCs.

Technology and Technical Management

The function of the Technology and Technical Management (TTM) component is the facilitation of technology development in the CRFSS and the rendering of support services to the division (SAPS 2007a). This component is responsible for the procurement of the most up-to-date technology for the CRFSS and the other divisions of the SAPS.

Forensic Science Laboratory

The Forensic Science Laboratory (FSL) comprises the biology, chemistry, scientific analysis, ballistics, ‘questioned document’ and explosives units.



Forensics is used to analyse almost all types of crimes, with different techniques being used for different crimes. For example, burglary, car hijacking, bank robbery, and cash-in-transit heists would require the use of fingerprint identification, ballistics and the questioned document units. Murder, attempted murder, rape, indecent assault and common assault by comparison would require fingerprint identification in addition to DNA analysis.

Given the types of crimes committed in the country, the ballistics and biology units are the most frequently used units in the component. Seventy per cent of the biology unit's cases comprise sexual assault (Lucassen 2008).

A career at the CRFSS

The entry requirement for employment at the CRFSS is a Bachelors degree in science, engineering, criminology or law. The entry post level is that of a sergeant, with a starting salary of between R96 570 to R122 190 per annum (Swart 2008).

For graduates, employment at the laboratory begins with an induction, followed by specialised in-house training which varies according to specialty. Thereafter, written and oral examinations take place in addition to practical competency testing. Remedial training follows and if successful, the scientist is then declared competent. Operational mentorship is provided and once this is complete the scientist is authorised to work independently.

The cost of training per scientist is exorbitant. Biology DNA training costs approximately R450 000 per person, while the training for ballistics amounts to approximately R500 000 per trainee. Chemistry toxicology and chemistry drugs training costs approximately R330 000 per person. The duration of training courses is two to three years.

Tertiary institutions in South Africa provide courses in the sciences that are applicable for employment as a scientist at the FSL. However, none of the tertiary institutions provide ballistics or biology training that will fully equip the individual to be employed as a forensic analyst at the FSL.

Apart from the in-house training for graduates, analysts from the CRFSS provide three-day information workshops for medical doctors, nurses, magistrates and judges, and members from the National Prosecuting Authority (NPA) to update them on current activities. Investigating officers also receive training on these activities.

The process: from crime scene to laboratory to court

The crime scene

When a crime is committed, in most instances a witness will be the first to report the incident to the police. A uniformed officer from a station will respond to the call and attend to the crime, and on request, a detective will attend to the crime scene. A case will be opened, either by the uniformed officer or the detective assigned to the case, and a Case Administration System (CAS) number will be issued. In most cases the local criminal record centre members will collect the evidence from the scene, but sometimes detectives collect crime scene evidence (bearing in mind that there are only 92 local criminal record centres in the country).

The laboratory

Once collected, the evidence is sent to the laboratory for testing. The laboratory administrative assistant receives and registers the case, issues a lab number, and then registers the case on the Exhibit Management System (EMS), a system that manages and controls case files and items in storage. In this way the tracking of files and items to other storage areas and persons is simplified (Lucassen 2007).

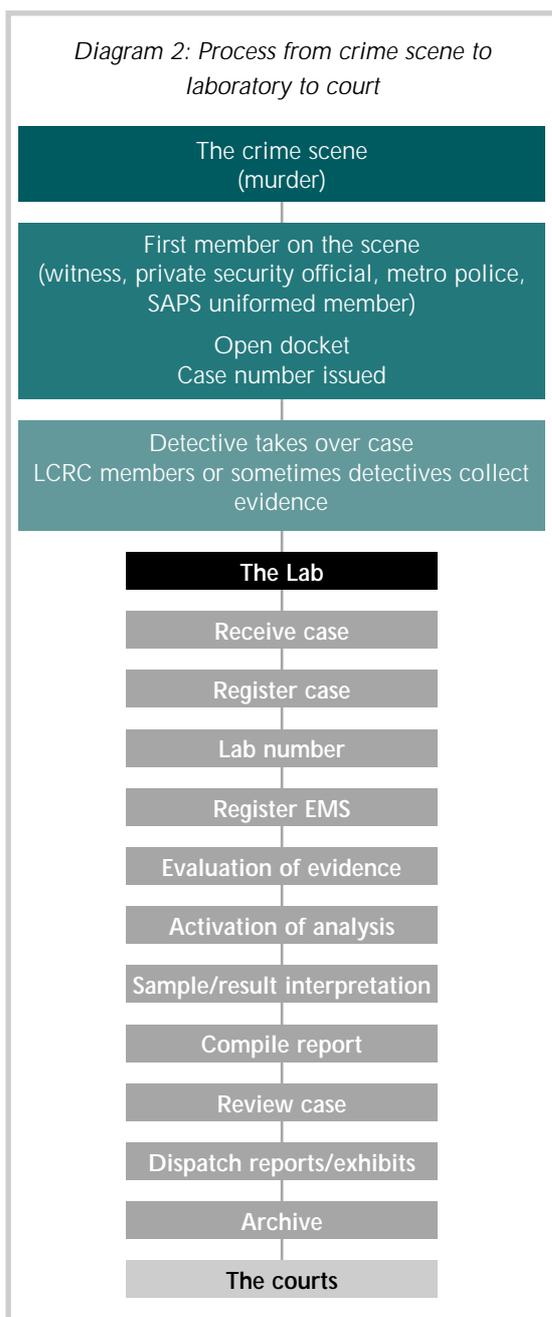
The reporting officer or analyst begins the process of evaluating the evidence received. It is important to note that some DNA cases are not immediately analysed – they are activated when requested by a state prosecutor.

The next phase is the activation of the DNA analysis process. This process involves the following steps: extraction of DNA from the exhibit, amplification of the DNA to a workable amount, and separating of the DNA fragments into different sizes. The sample result interpretation is then done and the reporting officer thereafter compiles a report which is

reviewed by another senior reporting officer. The administrative staff then dispatch the report and the exhibits.

The courts

In many instances the analysts forward an affidavit to the prosecutor, which suffices to prove the state's case. However, analysts often have to be available to testify in court.



Case turnaround times and backlogs for DNA processing

Given that the media and public interest is largely focused on the functioning of the Forensic Science Laboratory, this section considers issues of casework process, turnaround times, and backlogs in relation to DNA testing at the FSL's biology unit only.

Much criticism relating to delays in processing DNA and DNA backlogs has been levelled at the forensic science laboratory in recent years (*Sunday Times* 2006; *Carte Blanche* 2006; *Saturday Star* 2007). Due consideration must be given to the complexity of the analysis process and the fact that various factors influence this process. Having said this, SAPS statistics indicate that while backlogs were substantial from 2004 to 2006, the situation has since improved (Table 1). Between April and November 2007 the laboratory received 35 241 cases, and 36 754 cases were finalised (the finalised number is greater because it includes samples carried over from previous years).

Table 1: Cases received and finalised by the Forensic Science Laboratory

	Apr 04- Mar 05	Apr 05- Mar 06	Apr 06- Mar 07	Apr 07- Nov 07
Cases received	41 285	42 746	42 724	35 241
Cases finalised ¹	35 805	41 256	47 230	36 754

Source: SAPS Biology Unit, CRFSS

At the laboratory, it takes approximately 30 days from receipt of case until activation of the analysis. Thereafter, the time from activation until the report is forwarded to court is 90 days. In total then, the duration of time from receipt of a case until the submission of a report to court is approximately 16 weeks or 120 days (see Diagram 2 for the process from crime scene to court). These turnaround times are influenced by various factors such as:

- The condition of the sample (the sample may have been exposed to environmental factors, for example, sunlight and rain, for a few days

before a crime is reported with the result that the DNA in the sample degrades

- The amount of DNA (which sometimes is insufficient to do a DNA test)
- The court date and the urgency of a case

There has been a move by the Divisional Commissioner and the biology unit to improve the turnaround time by ten per cent, which would mean that the turnaround time from receipt of a case to submission of a report to court will be 108 days.

A comparison with international laboratories illustrates that the FSL's 120 days turnaround time is not unreasonable. The average forensic laboratory service turnaround time for a biological sample in Canada in June 2005 was 114 days (Fram 2007). At the Federal Bureau of Investigation (FBI) DNA Forensic Science Laboratory, 'the average turnaround time for a case is about one year' (Fram 2007).

In order to determine the success or otherwise of the FSL's biology unit in terms of its statistics, it is important to understand the casework process. In a particular year, the biology unit can receive up to 42 000 cases for DNA analysis. These cases will be sent for evidence recovery which involves screening each case for the presence of body fluids. If no blood or semen can be found, no DNA analysis will be performed.

Based on previous experience, one can expect 60 per cent of 42 000 cases to be classified as 'negative'; thus, DNA analysis will not be done on 25 200 cases. Of the 40 per cent (16 800) cases that are expected to be blood or semen 'positive' and on which DNA analyses will be done, only 24 per cent will have enough 'good quality' DNA that will be further analysed. Thus, realistically, only 4 032 of the original 42 000 cases (or ten per cent) will potentially be analysed.

Evidence collection

The above numbers are cause for concern. Some challenges lie at the evidence collection phase at crime scenes. Evidence is collected by forensic field workers based at the local criminal record centres,

and in some instances, by detectives. Health care practitioners or district surgeons also collect DNA samples from victims.

Some of the problems that can be attributed to the evidence collection phase are:

- The training of forensic field workers is insufficient
- The samples are of a poor quality because of degradation due to exposure to environmental factors
- The health care practitioner submits a crime kit that is partially complete
- The crime kits are not stored in a cool place, or the kits are not sent to the laboratories as quickly as possible

It stands to reason that if there is a problem at the evidence recovery stage – the most important phase of the process – the laboratories will demonstrate flawed statistics, and success will be difficult to achieve.

Prosecutor requests

One of the requirements of the laboratories is the submission of a letter or form in which DNA analysis of exhibits is requested. In 2007, only 6 984 prosecutor requests were received by the biology unit that were finalised on a DNA level. This means that many cases remain unanalysed and are simply being stored in laboratory fridges.

The prosecutor request form is compiled by the lab and provided to prosecutors to complete when requesting the analysis of DNA. The purpose of the letter is to prioritise the sample testing process to ensure that samples are ready as evidence for the next court appearance or hearing. The failure to produce a prosecutor letter results in the case not being given priority by the labs, and a concomitant delay in the court process because of a postponement. The prosecutor request further serves to make the lab aware of the precise information required for court.

An argument can be made that a request need not be furnished as all evidence submitted to the laboratories would be for the purposes of DNA testing. However, the reasons for requiring the

request are sound. For example, if a false rape claim is made and the case is subsequently withdrawn from the court roll but the laboratories are not informed of the withdrawal, the labs would proceed to do the test, wasting substantial time and resources in the process (Lucassen 2007).

Staffing and case complexities

The staff complement at the biology unit is concerning and further exacerbates delays in DNA processing. The total personnel count is 210 made up of 90 casework analysts, 30 technicians working on the DNA analysis process, 50 support staff and 40 staff employed at other sections (Lucassen 2008).

Capacity in the CRFSS as a whole is a serious challenge. As of March 2007, the total number of CRFSS personnel was 1 391, excluding members working at the 92 local criminal record centres in the nine provinces. There is a move to employ a further 486 staff at the CRFSS to increase the division's human resource capacity (Du Toit 2007).

The capacity challenge is evident in the high staff turnover at the laboratory. Many highly skilled scientists have left South Africa to work in foreign countries like the USA, UK, New Zealand and Australia (Du Toit 2007). These scientists generally enter foreign institutions without needing any additional training because the CRFSS training is of such a high standard (Gouws 2007).

South African institutions like the Department of Health have also successfully attracted scientists trained by the CRFSS; the lure being a salary twice that of the SAPS. In the Western Cape alone, a total of 49 years of experience has been lost since 2000 because members have left the SAPS (Gouws 2007). The divisional commissioner of the CRFSS is not able to offer higher pay to retain staff, but has introduced the scarce skills policy that provides for an additional R1 000 per month for each scientist in the lab (Du Toit 2007).

The promotion policy too is of concern. Members are required to apply to other units or divisions to progress to a more senior rank, with the result that they have to be re-trained for the specific job. This means that either their expertise within the unit is

lost, or they remain in the same post for many years.

Given the high cost of training, the low salaries, and the high staff turnover, the strategy to retain staff may need to involve relying on contracts, and staff will have to pay back the cost of their training if they leave the CRFSS within a specific time period (Du Toit 2007). This strategy will serve to retain staff for a longer duration and will ensure that the SAPS receive value for money on its investments.

How the new robotics system can help

In 2005 forensic scientists in the SAPS lab developed a forensic automation system for DNA evidence using robotics. Called the Genetic Sample Processing System (GSPS), it is the first and the largest single automated forensic DNA analysis system in the world, costing approximately R80m. The system is controlled by 27 personal computers and four robotic arms, which facilitate conveyance of laboratory wares between components (SAPS 2007c).

The GSPS system, from the police's side at least, seeks to improve the SAPS capacity to process DNA samples. As has been illustrated previously, while there has been a marked improvement in case backlogs, the GSPS system will serve to improve DNA testing by a bigger margin.

Housed in a glass room, analysts feed samples into the system, and the robotic features direct the samples through a series of analytical processes in three chambers. The technology that is used during the process ensures that no detectable cross contamination takes place between the samples and it also eliminates space for human error.

The final outcome of the process is the generation of a DNA profile which is then compared to DNA profiles on the DNA database.

It is not possible, currently, to provide a time frame for the processing of DNA from chamber one to chamber three, because the process is not running to full capacity. However, it is anticipated that the system will generate approximately 4 000 samples

per week, at different levels of the DNA analysis process (Lucassen 2008).

The GSPS first became operational in March 2007. Since then most of the technical problems that were of concern have been ironed out. The most challenging problem for the laboratory – the ongoing maintenance of the system – has subsequently been allocated to a German company (Du Toit 2007). The GSPS has an uninterrupted power supply, and all results generated are backed up by a server. This is an important consideration because all recorded results will at some time be required for court purposes.

Since February 2008, only DNA cases that have been stored are being processed by the GSPS, due to the absence of court dates, or because no arrests have been made in connection to these cases. Completed cases are being fed into the DNA database of suspects, and these will be matched against all future cases coming into the laboratory. Cases required for current court purposes are being processed by the manual DNA analysis process.

The benefits of the GSPS are boundless. Once fully operational, the potential for human error will be eliminated, DNA analysts will be used for case work management to analyse and verify results, a high volume of cases will be processed, and – most importantly – the SAPS will be able to improve their turnaround time.

Summary of challenges facing the CRFSS

Turnaround time

The length of time to process DNA has been a contention for many years but the complexity of the casework process, in addition to the annual increase in the volume of casework and shortage of staff, has demonstrated that this process cannot be much improved. In addition, other factors, like staff having to testify in court, exacerbate the matter.

Evidence collection

Probably the most challenging issue for the CRFSS is the inadequate collection of evidence by the LCRC investigating officers and health care practitioners, which is the cause of many samples being of too poor a quality to be tested.

Prosecutor requests

The request for a prosecutor letter to accompany an exhibit is designed to prioritise testing for court and assists the lab in preparing for the court case. The challenge lies in getting prosecutors and related role players to adhere to this.

Retention of staff

It is not surprising that the low salary paid to graduates, in addition to the questionable promotion policy and lack of career development at the CRFSS, has caused an exodus of staff from the Service.

Unsuccessful trainees

The cost to the SAPS of training graduates is exorbitant, especially if the graduate does not pass the examinations. Apart from the large amount of money spent on training graduates, there is no probationary period that can provide for an exit strategy. The result is that the CRFSS is compelled to continue to employ the graduate. The option of a transfer to a police station is not possible because graduates do not have police training.

Recommendations

The following recommendations might assist the CRFSS in its approach.

Given the number of cases being processed yearly, the CRFSS needs to increase its human resource capacity. Even if this is attainable, it can only be maintained if the posts are made more attractive. Salaries must be market related, an effective promotion policy must be introduced, and career development must be made a priority, more especially because the work of an analyst/scientist is so specialised.

Furthermore, and as proposed by the Divisional Commissioner (Du Toit 2007), the introduction of a higher entry level will ensure that more experienced personnel are employed. In addition, staff must be made contractually liable for at least five years in order to ensure that the high cost of training pays off and the SAPS gets a return on its investment. If rescinded, the employee should refund the cost of the training.

New graduates must be placed on probation in the event that they are unsuccessful in the examination. They must further be compelled to re-write the examination until a suitable score is attained. This will remove the obligation on the organisation to retain their service.

The use of an offender database is not permissible because it is considered a violation of a person's human rights. Given the high rate of crime in South Africa, an offender database will enable police to find a 'match', which will facilitate a speedy prosecution. It will also ensure that the rate of recidivism is decreased or prevented. Thus, when a person is convicted of an offence, s/he should be compelled to provide a blood sample in order that his or her DNA history is recorded on the database. Article 37 of the Criminal Procedure Act has to be re-examined for this purpose.

It has been proven that the prosecutor letter is a necessary requirement given that not one request to date has ever been denied by the laboratories. In order to get the various role players, especially the prosecutors, to comply with this, more frequent training workshops must be held.

The poor quality of evidence being collected from crime scenes must be addressed urgently. An audit of all 92 LCRCs must be done to identify the problem offices. The national CRFSS has to further ensure that more LCRCs are established to improve service delivery and that members assigned to a case be provided with regular, comprehensive training in evidence collection.

Conclusion

This article provides an overview of the SAPS CRFSS with a focus on the ballistics and biology units of the forensic science laboratory component. As has been illustrated, various challenges face the Service, all of which are acknowledged by the CRFSS. In many instances, policies, such as those relating to salaries and promotions, are formulated at other divisions or levels of the SAPS, and compliance with these policies is a requisite. However, the unique skills and expertise that the CRFSS depends on requires that special consideration be given to the issues identified above.

References

- Carte Blanche 2006. *DNA Backlogs*. 29 October. Johannesburg.
- Du Toit, P 2007. Divisional Commissioner. SAPS National Criminal Record and Forensic Science Service. Personal interview. 20 November. Pretoria.
- Fram, R 2007. *The Scientist*. 21 May. United States of America.
- Gouws, P 2007. Director, Ballistics Division. SAPS National Criminal Record and Forensic Science Service. Personal interview. 27 November. Pretoria.
- Lucassen, A 2007. Superintendent. Biology Unit. SAPS National Criminal Record and Forensic Science Service. Personal interview. 29 November. Pretoria.
- Lucassen, A 2008. Superintendent. Biology Unit. SAPS National Criminal Record and Forensic Science Service. Personal interview. 11 February. Pretoria.
- South African Police Service 2002. South African Police Service. Ballistics Training Handbook. Pretoria.
- South African Police Service 2006. *Annual Report 2005/2006*. Pretoria.
- South African Police Service 2007a. *Presentation. Status: Forensic Science Laboratory*. Pretoria.
- South African Police Service 2007b. Forensics: Collecting Evidence. *Servamus* 100(11). P 41. Pretoria.
- South African Police Service 2007c. *Genetic Sampling Processing System: The Automated Forensic DNA Robotics System*. Pretoria.
- Sunday Times 2006. Why Criminals are Walking Free. *Sunday Times*. Available at www.suntimes.co.za/PrintMail/FinishPrint.aspx. Accessed 01 October 2007.
- Saturday Star 2007. Forensics are falling behind badly in the battle to combat crime. *Saturday Star*. September 1:8-9. Johannesburg.
- Swart, JS 2008. Director. Efficiency Services. Message to Omar, B (bomar@issafrica.org) 28 March. Pretoria.
- Van der Merwe 2007. *Commentary on the Criminal Procedure Act 57 of 1977, Subsection 37*. Juta. Cape Town.

Endnotes

- 1 Finalised cases include all cases received and registered by the biology unit. In many instances, cases are analysed for body fluids and the process is halted pending a request from a prosecutor, and in some instances, the analysis process is completed until it is dispatched to court.