QUALITY IN THE CRIMINALISTICS SERVICE OF THE GUARDIA CIVIL

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CRIMINALISTICS SERVICE OF THE GUARDIA CIVIL

ABSTRACT

The Criminalistic Service was one of the first Units selected by the Spanish Civil Guard for the initial implementation of quality regulation in the Institution. This and the consolidation of the DNA laboratory happened at the same time, and that is why the tests made by this new criminalistic discipline were selected to be accredited as a first aim. The accreditation was achieved in 2003, being the first one of its kind in Spain. Since then, the Criminalistics Service has achieved accreditation for 50% of its expert areas, in which grants it a leading position in that matter among equivalent Spanish laboratories. Besides, the Criminalistics Service leads the Working Group number 3 of the National Technical Committee number 197, which monitors the works of the European Committee for Normalization number 419 on “Forensic science processes”. This Committee is currently developing the first European forensic guidelines in history. The Criminalistics Service represents AENOR in the above-mentioned Committee.

Keywords: quality regulations in criminalistics, normalization in criminalistics, conclusions of forensic reports.

1. INTRODUCTION

One of the most important factors that contributed to the decision made by a police Institution like the Spanish Guardia Civil at the beginning of the XXI century to institute a quality system in its criminalistics laboratories was the awareness that aroused among the people in charge of the need to guarantee that its clients trust their opinions. The DNA laboratory managed to be on the cutting edge for this task in the Criminalistic Service (SECRIM) and obtained the first accreditation for DNA analysis tests in Spain in 2003.

The fact that Criminalistics in this organization was already a renowned specialization was not taken into consideration, nor was the excellent view that Spanish judicial authorities had on the opinions issued by their laboratories. Any trustworthy organization, whether public or private, had started to introduce the quality systems years ago, knowing that complying with standards–international standards, if possible–was the best way to prove that its services were therefore considered, without a doubt and by all, of guaranteed quality. The international scientific forensic community was also aware of this and mobilized in Europe by creating the ENFSI (European Network of Forensic Science Institutes), the official laboratory network that is building up today to the Area of European forensic science, which the European Union hopes to see fully established in 2020.

The implementation of the European Committee for Normalization number 419, named "Forensic science processes" has been one of ENFSI network's main achievements. Driven by the European Presidency of the Polish Government in 2012, the Committee leads the composition of the first specific European standards for official forensic science laboratories in history.

In spite of such praiseworthy intentions, real Criminalistics presents a noticeable disparity of scientific quality worldwide. There are currently 24 different specialization areas in the Central Laboratory of the Guardia Civil and the scientific support for its reports is clearly unequal. While in the fields of forensic chemistry or biology it is possible to apply international quality standards created decades ago, and whose scientific basis is beyond doubt, this is hard to find in criminalistic disciplines. In this regard, even though the most traditional tests in Criminalistics can be accredited without any particular difficulties (ballistic, ridge pattern analysis matches or handwritten writing and signing matches, among others); the truth is that accreditation entity have difficulties finding both auditors outside the areas where Criminalistics are officially practiced and applicable standards to case-based forensics.

The client receives proof of the establishment of a quality system in each test by affixing a seal issued by the accrediting national entity in each expert report; it is however not easy for the client to distinguish the differences pointed out by the same seal.

There will not be many who point this out by justifying that it is better that this information never gets out of a specific controlled setting, shall we say, but truth be said, that mindset will not be of benefit to an official laboratory whose objective is to carry out a strictly scientific work. The lack of transparency is not reconcilable with such standards.

This work's authors have had more than enough experience, sometimes varied but always enriching and complementary, in establishing a quality system in an official Criminalistics laboratory. More than 50% of SECRIM's expert areas are accredited and it participates both in CEN-419 plenary and working groups, representing AENOR, and in the Quality and Competence Committee of ENFSI.

Though the current Law on Police Members (Ley de Personal del Cuerpo) allows to adjust the Unities' personnel according to the specialization needs of its members, there are 24 different criminalistic specialization areas in SECRIM that had not been yet classified in any official specialty recognized by the Service other than judicial police. This situation has never made training for forensic experts easy, especially in areas related to new technologies: forensic biology, chemistry and engineering. It has not helped either to guarantee its generational renewal, which has added a further obstacle in establishing and preserving the quality system.

2. QUALITY MANAGEMENT SYSTEM IN THE SERVICE OF CRIMINALISTICS

Quality is formally defined as the set of traits and characteristics of a product, process or service, that influence its capacity to satisfy its regulated or implied needs. In other words, quality is the vehicle that assures that a laboratory, company or factory's results or products meet the indicated requirements, both internally by its developers and by its clients.

The term quality is generally associated to a strategic entrepreneurial resource, but it can certainly be applied to any other context, which makes it nowadays a growing concern for managers, clients and, ultimately, our whole society. Currently, it has become a key factor for competing in a growingly demanding market. The Guardia Civil's Criminalistics laboratories are making every effort to guarantee the quality of the issued results, as they are used in decision-making procedures carried out by Unities of the Service in their researches or by courts in their procedures.

In the professional context of quality, it is normally said that "what is not written does not exist". The simplest activity of a laboratory must be standardized, documented, written, detailed and unambiguous.

The Quality Management System (SGC in its Spanish acronym) was set up in SECRIM in 1999, where the first training programs for the personnel were carried in the former Department of Analysis (currently Department of Chemistry, Environment and Biology). Those programs, based on the former standard ISO 45001, meant an initial contact with quality standards for many of the Central Laboratory members.

The current standard ISO 17025 comes from the former standard 45001, which was applied in the testing and calibration laboratories. It was a technical standard of voluntary implementation that did not include security or occupational risks aspects.

Since the implementation of the norm 17025, its requirements can be gathered in two groups: Technical requirements and Management requirements, both in the first version dating from year 2000 and in its latest update in 2005.

Technicians are in charge of personnel, facilities, environmental conditions, testing methologies, calibration and validation methologies, equipment, traceability of measurements, sampling, test and calibration sample handling, test and calibration results quality assurance, and report of the results.

Managers have more to do with organization, quality system management, document supervision, customer orders, offers and contract review, test and calibration outsourcing, services and supplies purchase, customer service, complaints, testing work supervision and/or calibration disapproval, corrective and preventive action, record control, internal audits and reviews carried out by the Executive Manager.

The first system's documentation review was approved in 2001, including, apart from the Quality Manual and General Procedures, all human DNA tests proceedings. And, as mentioned before, the first accreditation was achieved in this forensic discipline in 2003, which was granted by the Spanish National Accreditation Body (ENAC).

During the last 10 years, the QMS has spread out to the rest of the Departments of the Central Criminalistics Laboratory, as well as to the Zone (LCZ) and Command (LCC) Criminalistics Laboratories, so we can say that they are ruled nowadays by the same management and technical requirements.

2.1. DOCUMENTARY SYSTEM

The need to define the objectives and quality policies of the Laboratory, as well as the engagement all the personnel, make its documentary description essential to the QMS.

The documents defined within the System can be roughly divided into internal and external documents. Within the internal documents, and following the guidelines described in the Manual of Judicial Police of the Prefecture for that specialty of the Guardia Civil, the following documents are included:

- Quality Manual (QM): It is the System's background paper divided into chapters, where it is established as a declaration of intent, following the indicated guidelines in the standard, the aspects that have to be developed in the General Procedures.
- General Procedures (GP): These are documents where guidelines for action in fundamental aspects of the functioning of a laboratory are described: development of procedures, documentation management, execution of internal audits and nonconforming work, personnel policy, equipment and material management, samples, tests, issuing of reports and expert reports, test quality assessment, measurement uncertainty calculation, purchase of equipment and consumable goods, validation of methods, etc. There are currently 15 approved GPs, with additional documents that add up to a total of 79. These documents concern all Departments and Laboratories.
- Standard Operating Procedures (SOP): Technical or complementary documents of different activities that directly concern the tests carried out. There are various types: tests *per se*, equipment maintenance, equipment handling, etc. They are known as Technical Instructions (TIs) in the QMS.
- Technical Procedure Guides (TPG): These procedures are established in order to standardize specific tasks in the different areas of action of the Territorial Units entities (data mechanization, use of material, internal work procedures, formats of records, etc.).

TIs and TPGs have associated what is called "worksheets", in which primary data coming from all activities that are carried out are registered and which form the foundation upon which QMS rests.

SECRIM's Support Unit prepares TIs and TPGs in general matters for all derived Laboratories of the GPs. Central Laboratory Departments form the rest of TIs and TPGs about aspects related to their internal functioning and their forensic fields of activity.

The amount of work that derives from documenting the activities that take place in the SECRIM is shown in the following chart (figure nº1), where you can see both the numbers and the relative percentages of the internal documents that are currently into force in every Department.

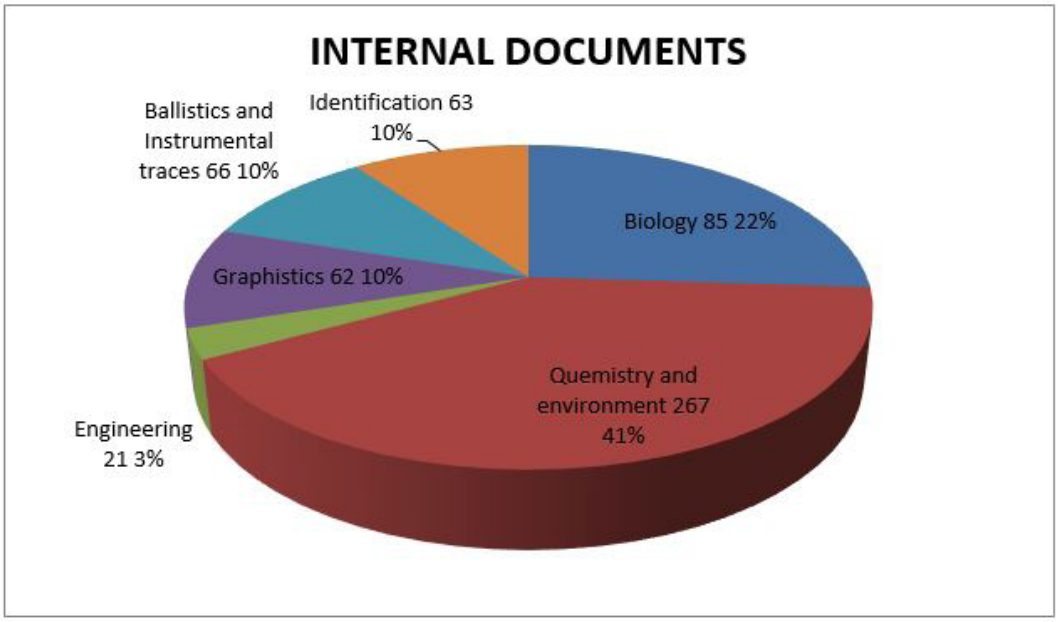

Figure nº 1: Internal documentation into effect in each Department

The directives, procedures and resources established by the Central Office of the SECRIM for the implementation of the system are prescribed in the internal documents. The results derived from the application of the documents are included in the quality records (formats, worksheets, etc.).

All documents obtained from sources outside the laboratory and that have served as a basis for the composition of internal documents are included in the external documents. The inclusion of this type of documentation can be either of mandatory (as it happens with legal provisions, laws, treaties, etc.) or voluntary nature (like references to publications or scientific studies linked to a particular test, guidelines coming from national or international entities, technical books, policy documents, etc.).

Here we have an illustrative example of the amount of external documents that currently belong to each one of the Departments of the SECRIM (figure nº2).

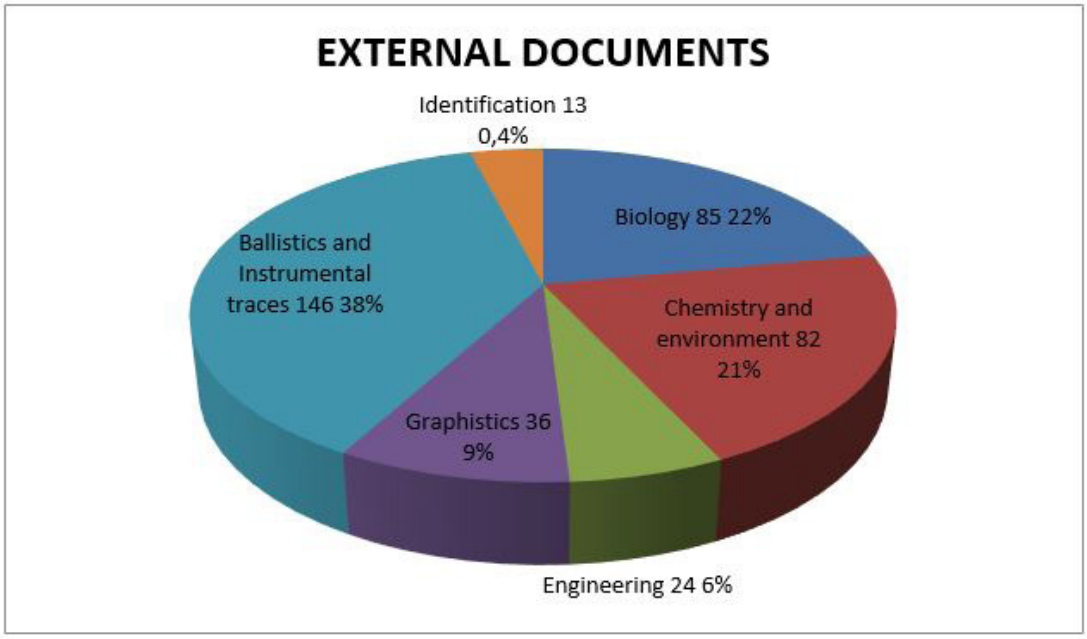

Figure nº 2: Internal documentation currently into force in each Department

This way, we establish a "documentary pyramid" whose upper vortex is the Quality Manual and its base is formed by the records that are generated from the normal functioning of the Laboratory and its QMS.

The distribution and control of this documentation is very relevant, in such a way that its access is guaranteed to every staff member that must perform any of these tasks. It is the manager for the Unity of Quality Management's duty to perform and control the distribution of that documentation of the System, in order to make sure that all people concerned have the last applicable review at their disposal. The distribution is made through the delivery of controlled and non-controlled copies to people or organizations included in a Distribution Control List. This way, it can be proved how many times, when and to whom a copy of a specific document has been given.

2.2. ASSESSMENT OF QUALITY IN TESTS

The assessment of quality in tests, also referred to as "assurance of quality in tests" in the standard 17025, is the series of activities which ensure that a laboratory continues providing correct results in the studies and tests that it usually carries out. At the same time, it allows the detection of errors during the execution of an activity, determining the actions to implement of restorative, corrective, or even preventive nature.

It is clear that, even though there is a QMS aiming to avoid errors, nobody can sleep easy if apart from this system, that indicate us how to proceed, there is not any other type of control that proves with objective evidence, namely through documental records, that this control is being implemented and that the expected objectives are being attained.

The laboratory takes on a documented systematic tests of quality control, where the activities to be performed are described, including how regularly they must be performed, the people in charge and the enforceability to record the resulting data.

The data of the periodic quality controls that are established must be analyzed and assessed by a technical director, in such a way that, if criteria of approval/rejection were not satisfied, pertinent actions should be taken in order to solve the problem and avoid the issuance of incorrect results. To do so, there is a process of internal investigation, defined and documented in the QMS named “management of nonconforming works”.

These activities on quality control can be grouped together in two big groups:

- Internal controls: Inside of which 4 main groups can be found:

    1. Negative controls, which are normally carried out in each series of analysis in order to check, for instance, the inexistence of pollution.

    2. Positive controls of some parameters in each series of analysis in order to verify that all activities have been correctly carried out. They are not always implemented, as they imply an additional pollution risk. It is recommended that they are only carried out periodically.

    3. Blind samples, which consist in the repetition of a sample that has already been analyzed. Therefore, it has a defined value that makes it possible to confirm that the results replicate over time with different analysts, teams, etc.

    4. Repetition of samples, consisting in the repetition of a sample carried out by two analysts at the same time. This sample has not been previously analyzed.

- External controls: They are used to compare the results of the Laboratory with other similar results. There are different types of intercomparative and inter-laboratory tests (for instance aptitude, collaborative, or certification tests), although laboratories normally and preferably carry out aptitude tests.

The Laboratory has defined, within its policy framework, its intention to participate in intercomparative or inter-laboratory trials or tests, as well as to establish a participation program that includes no more than a period of four years, and in which the frequency of participation for each family or the type of tests are established.

There are currently plenty of intercomparative tests providers, with it even being an activity field provable before an accrediting body. Each Laboratory must suitably select the intercomparative tests according to its equipment and technical capacity. Subscriptions are made annually with providers from the international sphere (for instance, those organized by the CTS, Collaborative Testing Service) and from the national sphere (for instance, those organized by the INTCF, National Institute of Toxicology and Forensic Sciences), apart from those programs included in the forensic organizations to which the SECRIM belongs, like the ENFSI and the Ibero-American Association of Sciences and Forensic Studies (AICEF).

The Central Laboratory takes part each year in 130 tests that affect the majority of the Departments. The Department of Chemistry and Environment stands out in this matter, as it carries out more than 50 % of the tests, all of that in line with the number of tests accredited in its fields.

Overall, we can say that the system to follow in each inter-laboratory test that is carried out in a laboratory is the same one that is followed for any other test application

that is received for its approval, allocation, execution, report composition and issuance, with the following special features:

- The organizer indicates when and how the replies have to be made.
- After receiving the results sent by the organizing entity, the technical director reviews the results obtained taking into account the criteria established for the test. He prepares an assessment report of the test comparing the results obtained with those coming from other participating laboratories and those from the Organization.

2.3. STAFF MANAGEMENT

Within the implementation of the standard, one of the fundamental aspects that have to be monitored is the one referring to the staff. The laboratory must document and guarantee that the staff implied in activities of the QMS meet the requirements (studies, preparation, experience and training) in order to carry out their duties.

The requirements established apply to all the staff carrying out activities related to equipment handling, tests and/or calibrations, issuance of interpretations, report signing, etc., and for those whose functions and responsibilities have previously been defined.

Within the concept of staff it is included as well everyone who carries out activities in the laboratory through a contractual relationship, an internship period (through Collaboration Agreements on Curricular Internships with Universities), etc.

The Laboratory establishes an adequate training program in order to guarantee that its staff has enough theoretical and practical knowledge to carry out the activities they are entrusted. The Training Schemes of the SECRIM explicitly state the knowledge that experts must have in each of their 24 areas in order to be able to compose and defend the expert's reports before Court if necessary. Study requirements, training and experience are mandatory in order to take up each one of the job positions related to the quality of tests and analysis that are established. These requirements can be consulted in the Job Position Descriptive Infosheets, and must be approved by the head of the SECRIM.

In order to guarantee the effective functioning of the QMS, a series of functions and responsibilities are assigned to the different job positions detailed in the different documents of the QMS. There is a distinction between the functions and responsibilities related to management functions like, for instance, the ones practiced by the head of the Laboratory or a Department, and the ones related to functions eminently technical like, for example, those of a technical director or an expert.

Likewise, the Laboratory draws up a replacement diagram for the Job Positions defined in the QMS, especially for those considered critical by the standard, like the person responsible for Quality or a technical director.

The Laboratory also guarantees at all times the impartiality, independence and integrity of the staff that carries out each one of the activities, as well as the fact that they are not under any kind of pressure that could affect their technical opinions. Similarly, it is guaranteed that the staff is not linked to any other organizations that could affect their independence; this is proved through the declaration of confidentiality.

The Laboratory's policy foresees an ongoing training of its staff in every aspect affected by the System (quality and administrative technicians). To do this, Training Schemes that include both technical aspects of each Area and those specific of the quality regulation are being prepared. The training is carried out through internal and external activities of theoretical and practical nature. Approximately 40 activities of external training are carried out annually, in which staff coming from all Laboratories of the Guardia Civil take part. The QMS makes it compulsory to assess the effectiveness of the training actions implemented.

The laboratory establishes a systematic for the assessment of the staff working there, including those who issue opinions or interpretations in the reports, activities which cannot be accredited at the moment. Assessment is understood as the formal acknowledgement that someone can successfully carry out the tasks they are entrusted. The previous training and experience of a person regarding the mentioned tasks are taken into consideration, as well as completing them with specific preparation, training, and the successful completion of tests established for the activities to be assessed. The technical director is in charge of defining the tasks that his staff is to carry out. The assessment of the laboratory staff is certified by the head of the Department.

Currently, there are a total of 18 technical directors in the SECRIM. Approximately, 35% of the specialist staff in the SECRIM has a university degree. The minimum experience time required for the Technical Direction is an average of slightly more than two years.

2.4. TRACEABILITY OF VESTIGES INSIDE THE LABORATORY

The laboratory has described a systematic that guarantees the proper handling of vestiges in tests or calibration procedures, so that the test results are not affected by an inadequate handling. Moreover, it includes the necessary measures in order to guarantee at all times the integrity of vestiges and their samples, as well as the interests of the requestor.

The established requirements are applied to every vestige collected and received in the laboratory and affect all activities: from its reception to its return or storage. The activities that are included in the vestige management are the following:

- Reception of the vestiges in the laboratory.
- Distribution of the vestiges into the different work areas, which are unambiguously identified so that a vestige is assigned just one code while it is being examined inside the laboratory.
- Sample collection of the vestiges and handling of said samples in the test or examination procedures.
- Adequate identification of the vestiges and their samples in order to avoid both physical confusion and possible mistakes on misleading referencing in the records or other documents. This identification is kept during the permanence of the vestige and its samples in the laboratory. It is carried out clearly, visibly and indelibly in the vestige container, to avoid it being damaged.

- Referral and/or elimination of the vestiges and their analyzed samples and the remainders of the vestiges, as well as the samples sent.

It is necessary to keep in mind at all times the implementation of the best preservation measures depending on the nature of the vestiges and the test object samples at each of the stages described.

The traceability of the samples inside the laboratory allows us to know, through documental records, what has happened to each one of them after being extracted from the vestiges. In case they had been stored, their exact location could be determined. All of this is of utmost importance when a great quantity of samples is being handled, as in a laboratory like the one of the Guardia Civil. Here, it is frequently needed to reanalyze samples that are left in storage, like in the case of DNA extracts as a consequence of the need to increase the results obtained from a sample due to the improvement and optimization of the analysis techniques and the course of time.

3. ACCREDITATIONS

The accreditation of tests according to the UNE-EN-ISO 17025 Standard is the formal acknowledgment to say that SECRIM has the technical competence to carry out tests and to guarantee the reliability of the results obtained, which is granted to SECRIM by the only national Body authorized to do so, being the Spanish National Accreditation Body (ENAC by its Spanish initials), working beyond “simple” quality management.

It is a globally recognized acknowledgement, which has granted greater credit to the laboratory from those who are on the receiving hand of its work (judicial authorities, Operating Units, etc.) since the laboratory obtained it in 2003 and which is the basis upon which forensic information “quality” that is currently shared within the European Union must be founded.

Currently, SECRIM has two test accreditation files:

- **383/LE776**: Criminalistic tests. Obtained in 2003. It currently includes tests on human DNA, bacterial DNA, fingerprints, documents, paper money, writing, combustion accelerators, lamps, bullet drops, matching of ballistic elements, shoe prints, voice matching, and more.


Acreditación

ENAC
Entidad Nacional de Acreditación
Otorga la presente / Grants this

ACREDITACIÓN
383/LE776

a la entidad técnica / to the technical entity

DIRECCIÓN GENERAL DE LA GUARDIA CIVIL. SERVICIO DE CRIMINALÍSTICA

Según criterios recogidos en la Norma UNE-EN ISO/IEC 17025, para la realización de ENSAYOS de CRIMINALÍSTICA definidos en el ANEXO TÉCNICO adjunto.

According to the criteria in UNE-EN ISO/IEC 17025 for the performance of Test of Criminalistics as defined in the attached Technical Annex.

Fecha de entrada en vigor / Coming into effect: 26/09/2003

D. Antonio Muñoz Muñoz
Presidente

Figure nº 3 Accreditation certificate 383/LE776 (criminalistic tests)

383/LE1151: Environmental tests. Obtained in 2006. Physical, chemical, microbiological, chromatographic and spectroscopy analysis about continental, waste and consumption waters…


Acreditación

ENAC
Entidad Nacional de Acreditación

ACREDITACIÓN
383/LE1151

DIRECCIÓN GENERAL DE LA GUARDIA CIVIL. SERVICIO DE CRIMINALÍSTICA

Figure nº 4 Accreditation Certificate 383/LE1151 (environmental tests)

During 2011 and 2012 works for the establishment of QMS requirements in the Zone (LCZ, by its Spanish initials) and Command (LCC: Spanish initials) were implemented in the Criminalistics Laboratories. Thus far, 24 audits have taken place in different LCC's with the aim of including them in the accreditation related to the collation of fingerprints for matches and their developing processes, all to be in compliance with what was established in the Council Framework Decision 2009/905/JHA on Accreditation of forensic service providers carrying out laboratory activities, expected before November 2015.

In 2013, the Central Laboratory obtained the accreditation for the processing of fingerprints with different developers and on different surfaces. Afterwards, these work procedures were extended to all LCCs. Moreover, the accreditation for human DNA tests through the procedure called "Flexible Reach" was obtained, which allows the immediate incorporation of the latest developments in this field of work (new kits, equipment, etc.) to be added to the laboratory, given their status as accredited tests.

In order to perform an efficient and effective management of all procedures that are carried out in the Criminalistics Laboratories, we have been working since 2007 on the design of a Laboratory management application (Laboratory Information Management System – LIMS), which allows us to manage the preparation of expert and technical reports with the best legal and scientific guarantees. The LIMS app, developed by the American company Labware, has seen a progressive installation across all LCCs.

In any case, we must take into account that it is not possible to obtain the accreditation for all the tests that are carried out in a criminalistics laboratory such as that of the Guardia Civil, as this would be too costly. Even so, this does not mean that the areas, tests or activities that are not accredited lack a scientific and technical rigor appropriate for guaranteeing "quality" in the reports, as this is certified through the effective establishment of all the Management System requirements in those areas, tests or activities, even though the accreditation is not obtained.

4. STANDARIZATION IN FORENSIC SCIENCES

The forensic process extends from the performance of technical and visual inspection at the scene to the defense of the report or meeting minutes at the moment of the hearings. This procedure can be divided into four stages: technical and visual inspection, laboratory analysis, interpretation of results and defense of the report before the jury or the court.

The standardization or normalization of the work procedures that are developed in each of the stages, which still is not compulsory except for in named cases of DNA and fingerprint matching, can be obtained in compliance with the requirements established in different international-based standards:

- ISO 17020:2012 on "conformity assessment, requirements for the functioning of the different types of bodies that carry out the inspection" for technical and visual inspection.
- ISO 17025:2005 on the "general requirements for the competence of the testing and calibration laboratories", for the analysis and interpretation of results.

- ISO 9001:2008 of general nature for any type of procedure or in accordance with guidelines, guides or recommendations coming from reference Entities or Bodies.

We can highlight among these guidelines or recommendations the recent Guide of ILAC (International Laboratory Accreditation Cooperation) G-19:08/2014 about Modules in the Process of Forensic Sciences.

At a European level, the work developed by the ENFSI network since its creation in 1995 clearly stands out, establishing guidelines, recommendations and manuals regarding good practices in the 17 Work Groups where almost all forensic disciplines that are currently practiced worldwide come together.

The CEN-419 is currently working to develop the first technical specifically European standards (EN) which standardize each one of the stages included in forensic processes and which are mentioned at the beginning of this section. The purpose of these norms is their utilization for the voluntary accreditation of the forensic tests in this geographical area.

Spain participates in that European normative process through AENOR, in which different CTNs (Technical Committee for Normalization, *Comité Técnico de Normalización* in Spanish) are organized. In the case of forensic processes, efforts are focused on the CTN-197 about reports and actions carried out by the experts, and mainly on its Work Group n°3, managed by SECRIM since its creation.

Normalization extends from formal aspects of expert reports' content (for instance, the norm UNE 197001:2011 about "General criteria for the composition of reports and expert's opinions") to technical aspects for the performance of the different activities or tests, result interpretation, conclusion issuance, etc.

The activity of normalizing materializes with the elaboration of normalized work procedures (NWPs), which are included in the QMS and which have as their final aim the accreditation or certification of certain procedures, as well as looking for an external and independent acknowledgement. They can also have the objective of improving the procedures and processes that an entity has defined in its QMS.

When a laboratory establishes quality norms, it obtains the following advantages: (1) the validity of its results is recognized; (2) its technical competence to carry out tasks or tests; (3) its cooperation with other laboratories becomes easier; (4) it is possible to harmonize standards and procedures with other laboratories; and (5) information and experience can be exchanged with other laboratories.

5. EUROPEAN STANDARIZATION IN FORENSIC SCIENCE TESTS: EVALUATIVE CONCLUSIONS OF EXPERT REPORTS

5.1. INTRODUCTION

We find ourselves before a task in the stage of development; in other words, there is not yet a formal European standard about evaluative conclusions of expert reports, but the process inside the CEN-419 has been initiated, so we can expect that in a period of two to three years it will be possible to conclude the first European standard on this subject.

There are no known analogous examples from other places on the globe, although we could make an exception with the recent Australian standard on forensic science, which considers it in part insofar as it focuses on the interpretation of forensic analyses (AS 5388.3-2013). However, its scientific perspective is far from the one considered in European documents, as its scientific methodology is based on statistics typically termed classic, or of general nature.

As for the rest, some short pieces about expert reports' conclusions are written in other standards of a more general nature and in relation with forensic science, like the previously mentioned G-19 of ILAC. However, they are drawn up in line with the wider outlook of the document in which they are included, although the last version is clearly characterized by the defense of one of the fundamental principles of forensic evaluation: the need for having the evidence assessed in light of two competitive proposals (one from each of the parties).

We would have to go back to the year 2008 in order to find a proposal for a standard in the specified subject in Europe: that developed by the Association of Forensic Science Providers (AFSP) for England, Wales and Ireland.

In addition, with reference to an extensively European area, we must point out the development of the project "Development and implementation of an ENFSI standard for reporting evaluative forensic evidence", inside the Monopoly 2010 program of ENFSI, funded by the ISEC (Prevention and Fight against Crime) program of the European Commission. This project will be finalized in December 2014 with the submission of a guideline for ENFSI about conclusions of evaluative nature. It is seen as the document that could constitute the basis for developing the European standard in this matter, which the CEN-19 aims to draft up in its part 3, in an analogous way to the thematic division of the Australian standard AS 5388.

The previously mentioned project of the Monopoly 2010 program exhibited in the 2.7 version it put forth to the ENFSI network for an internal debate during the first four months of 2014. After the research group received 147 comments from 16 laboratories located in 8 European countries, the 2.8 version was then sent out, which has been spread throughout the network once again so as to raise a new round of discussions. The level of development of the current version and the direct participation of SECRIM in the research group make it possible to bring to the fore the main outlines of the European standard considered as predictable in the evaluative conclusions of expert reports.

5.2. PRINCIPLES OF EVALUATION IN FORENSIC SCIENCE

It appears necessary to start by defining the scope of the document that is being written in the Monopoly 2010 project because its aim, in point of fact, is not one of proposing a future standard for all kinds of forensic sciences answers a laboratory can issue when faced with requests from its clients. It focuses on a certain type of conclusion that it deems to be evaluative.

The work of B. Robertson and G.A. Vignaux, called "Interpreting Evidence. Evaluating Forensic Science in Courtroom" and published in 1995, is normally referenced as the main explicative work of the evaluative conclusion concept in the field of forensic science.

And trying to define that concept as much as we can inside the mentioned field, the document that the ENFI's research group is writing explicitly references the article written by I.W Evett, G. Jackson, J.A. Lambert and S. McCrossan in the magazine Science & Justice, number 40(4), in the year 2000, entitled "The Impact of the Principles of Evidence Interpretation on the Structure and Content of Statements".

The cited article includes the three following precepts, which must be taken into account in order to make an evaluation in forensic science:

- The interpretation of scientific findings is carried out in a series of circumstances. The interpretation depends on the structure and the content of such series.
- The interpretation only makes sense when two or more competitive proposals are made.
- The role of the expert in the forensic science is to consider the probability of the findings, with the given proposals, and not the probability of the proposals.

These three precepts describe the essence of an evaluative conclusion. In practice, they are related to criminalistic comparisons between doubted and undoubted samples: the former are obtained in the crime scene, whether it is from the suspect or from the victim, and the latter are obtained as a consequence of police reviews or undoubted samples deliberately taken for the experts. The aim of these comparisons is for the court to be able to assess to what extent the doubted samples can be connected to the corresponding suspects, taking into consideration the proposals regarding that matter defended by the parties in the trial.

Therefore, it can be said that the matching of DNA, dactyloscopy, shoe or tire prints, handwriting or signatures, glass, paints, fibers, identification ballistics and voice profiles, as well as other profiles of analogous nature, fall within the parameters of the scope covered by the document, and hence their relevance.

It is important to point out the fact that there are 30 years of scientific literature standing specifically related to criminology comparisons of identifying nature in the mentioned disciplines. The most referenced authors can be found in the works of C.G.G. Aitken, D.J. Balding, J. Buckleton, F. Taroni, J.M. Curran, etc.

5.3. SOME NOTEWORTHY ASPECTS OF THE ENFSI GUIDE

5.3.1. Typology of expert report conclusions

The guideline acknowledges that a laboratory can respond to a petitioner for an expert report with a varied typology of conclusions, given that the logical nature of responses depend on which questions have been asked. There is a distinction among conclusions of factual or technical, investigative or operational, intelligent or evaluative nature. While the document only interprets evaluative conclusions, it is compelled to define all those that it considers to be possibilities. The two conclusions that have not yet been touched on in this paper are the following:

Technical or factual conclusions do not require any further interpretation of the results beyond a purely technical one. For instance, when a professional measures the noise level

of a noise source with a sound-level meter from a certain distance, all that must be interpreted is the meaning of the data collected in its unit of measurement and its associated uncertainty. And that interpretation is, as it has been previously pointed out, merely technical.

Investigation conclusions require a context in which the detective of a criminal offense is in a phase that we can describe as explicative. There is a need to formulate hypotheses in order to explain the facts which are already known and which deserve our attention. For instance, when an expert investigates a fire, he tries construct a mental idea of what could have been the cause of the fire and its possible propagation in the light of what he observes at the scene and, of course, his knowledge and experience.

Thus, it is possible to find factual, investigative and evaluative conclusions in an expert report submitted to a judicial authority depending on the questions asked. That division has a specifically logical nature and, therefore, a degree of abstraction can be found that makes them compatible with any legal system in which they are used.

5.3.2. Determining the proposals in the evaluative reports

The document highlights the need for close communication with the legal authorities in question (or with the parties of the trial in the Anglo-Saxon system) so that the expert can determine the proposals that must be taken into consideration in their evaluative expert review, in order to provide the court with the best information possible when it comes to the decision-making process.

Evaluative reports depend on the context of the information in a specific criminal case–which in our Criminal Procedural System can only be fully known by the legal authority–, consequently, the key concept of “determining information” is defined in the document’s glossary.

The document’s Guidance Note No.2 is focused on an innovative concept for many forensic experts, which is the hierarchy of proposals. The basic idea is to recognize that the proposals that the experts consider in their evaluative report may need to be described in the context of an activity and not in that of a mere origin of doubted samples. For instance, the absence of fibers in the seat of a vehicle where there is evidence of a struggle between the attacker and the victim can be relevant inasmuch as, due to the circumstances of the fact (nature of the struggle, time passed, etc.); a great number of them could be expected. In this regard, the transference concepts, persistence and levels of context acquire special importance.

5.3.3. Pre-assessment in evaluative reports

The concept of pre-assessment is not just something related to the English-speaking countries’ practice that consists expert reports drawn up by the laboratories which are part of the market economy, a form of criterion for an economy of means in a legal system where the practice of the experts’ tests are not usually free of charge.

The concept of pre-assessment aims to prevent the experts from making evaluative expert reports in contexts previously unexplored; that is to say, in cases where the strength of the test expressed through a connection of numerical probabilities does not have a foreseeable reference.

The concept of pre-assessment prevents the proposals from being formulated led by data, even though it is admitted that in the early stages of the investigation it is not possible to avoid it.

The given reasons stand to recommend that the practice of pre-assessment be present in the document, as it is a document that must meet the requirements of all legal systems existing in the European Union.

The pre-assessments are established when the proposals must be formulated at an activity level, as the mechanisms of transference, persistence and context levels are considered to be relevant for determining the importance of the scientific findings as a form of evidence. This is explicitly included in the document's Guidance Note No.3.

5.3.4. LRs in absence of data or data insufficiency

This has been one of the most discussed issues by ENFSI members after receiving the 2.7 version of the document. Many argued that it was not possible to apply the technique of the LR in its field due to the lack of databases or probabilistic models suitable for its casuistry. The research group has suggested a change–reflected in the 2.8 version, the second most recent one foreseen by its creators–by which the document highlights the fact that a basis on data LR is the logical way in which evaluative reports must be concluded. However, in the absence of data or if they are insufficient, it is possible to give the conclusions with verbal expressions of non-numerical LR's. The reason behind all this is that the LR mainly reflects a logical reference framework for assessing a scientific finding as evidence.

The document also notes that LR's verbal expressions that arise from numerical LR's using the correspondent scales should be used (the use of different scales depending on the characteristics of each criminalistic discipline should be justified), but it underlines the fact that numerical LR's cannot be lawfully assigned where they are based on the scales of verbally expressed LR's wherein there is insufficient or lacking data.

In any case, laws and theorems on the probability theory must be respected in any assignation of the probability to a proposal. Regarding this matter, we recommend consulting the work of O'Hagan along with other authors: "Uncertain Judgments, Eliciting Expert's Probabilities", published in 2006 by the publishing house Wiley.

5.4. IMPLEMENTATION PROBLEMS OF THE GUIDANCE NOTE IN THE JURISDICTIONAL FIELD

It is clear that the interpretative modifications exposed of the expert reports' conclusions produce, in the first place, a serious problem within each one of the laboratories. This is why there is a need for a specific training scheme in order to adapt to the requirements of a predictable future standard. These Interpretation modifications also create a problem – that is potentially even more serious – in the realm of jurisdiction.

The research group has designed a roadmap that allows the implementation of an itinerary of educational nature in each laboratory, with the aim of achieving an effective implementation of the future standard. It is without a doubt the field in which to begin and SECRIM has already initiated its own implementation plan.

The comprehension difficulties of the predictable standard in jurisdictional forums should also be alleviated with specific training schemes for its groups. This has already been implemented in some parts of Europe: Sweden, United Kingdom, Belgium, Switzerland, The Netherlands and Spain.

6. CHALLENGES AHEAD

For the past three decades, the international forensic community has clearly supported the establishment of a culture of quality in the laboratories that issue opinions before legal authorities.

The main challenges that, according to the authors, should be facing the Criminalistics Service of the Guardia Civil in the short and medium term are laid out below:

- Implementation of the financial mechanism for providing facilities adapted to the current and future development of Criminalistics inside the Central Laboratory (with European funds).
- Possible acknowledgment of Criminalistics as a differentiated specialty inside the Organization, as it is closely related to operational police investigation that various Units of the Guardia Civil carry out: Judicial Police, Information Service, Traffic, Fiscal and Borders, Disarmament of explosive devices (SEDEX), SEPRONA, etc., which make current Criminalistics a transversal area that gives a sense of cohesion and integrity to many tasks carried out by the Guardia Civil.
- Accreditation of other activities that are a part of forensic services such as technical and visual inspection at the crime scene, both general and specialized (fire investigation, operational ballistics, etc.).
- Establishment of an integral Management System (IMS) through which the requirements that rule the following normative references, among others, can be fulfilled:
    1. ISO 17020 (inspection entities, applied to technical and police inspection).
    2. ISO 14000 (environmental management, preferably regarding waste management).
    3. ISO 9001 (Process certification, regarding primarily evidence and report management).
    4. Legal regulation related to Occupational Risks Prevention and Information Security.
    5. Implementation of the management of procedures and an indicator system that would allow for an efficient laboratory management system and ease the decision-making process based on objective data.

NORMATIVE REFERENCES

UNE-EN-ISO 17025:2005 Standard. “General requirements for the technical competence of test and calibration laboratories”.

UNE-EN-ISO 17020 :2012 Standard. “General criteria for the functioning of different types of bodies that carry out inspections”.

UNE-EN-ISO 9001:2008 Standard. “Quality management system”.

ILAC GUIDE (International Laboratory Accreditation Cooperation) G-19 :082014 about Modules in the Forensic Science Procedures.

Quality of the Criminalistics Service of the Guardia Civil Manual, Magazine No. 12 (Rev. 12)

Version 2.8 of the future ENFSI Guide about evaluative conclusions on expert reports.

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