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Automated Control of Doping Samples and their Analyses Preparing for Barcelona '92
Part I.Development of a new Laboratory Information Management System (LIMS) for Doping Control

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Introduction

Doping control is a very specialized analytical field which, in addition to sophisticated chemical analysis requires a high degree of control given its administrative or legal connotations. During the Olympic Games, a large number of samples are expected daily. A lot of tasks require urgent response (reporting, possible counteranalysis scheduling, results discussion meetings, etc) and there is a need for direct and secure access to each piece of information related to any sample, or generated by any fraction of any sample. It was always our desire, and will probably be a future mandatory requirement, to use a laboratory information management system (LIMS) able to take profit of the present computer based analytical instrumentation connected throughout the laboratory in the Local Area Network (LAN). In addition, such a system would avoid typing errors and be capable of controlling and labelling each of the more than 6000 tubes and vials which will pass through the laboratory each working day. With these objectives in mind we have developed our new LIMS especially designed to cope with all of the peculiarities of doping control while being simple to use and flexible.

Background

The choice of a LIMS is a complex and somehow risky task due to the number of variables to consider, the investment that becomes necessary and the time required for a deep study. Hardware options, compatibility, deep understanding of each process in the laboratory, flexibility, good laboratory practices (GLP) compliance, etc are some of the requirements to be considered.

Most of the existing software products in the LIMS field have been developed or have proved to be successful for quality control laboratories and it is difficult to make them compatible with the world of doping control. Bearing this in mind, it was decided to define some basic platform requirements and explore the existing commercial products seeking a system able to fulfil them and having the potential of becoming our own "tailor-made" dedicated system for doping control.

The basic platform requirements were defined as:

1. Powerful relational database (e.g. Oracle)
2. Based on Unix operating system
3. Able to understand and handle a predefined subsample tree *(sample, subsample, aliquot, extract, analysis, integration)*
4. High level of instrument interfacing capabilities
5. Affordable cost

From the options available, it was decided to rely on a LIMS product called **LABiX** developed by the Spanish software company "Central de Procesos Informaticos, S.A. (**CPI**)". This product had proved to work well in completely different laboratory environments (process control in nuclear power plants, tobacco or sugar companies, etc.) requiring in each case specific changes and additions to its basic kernel. Thus the new "doping version" of LABiX was developed in cooperation with CPI by modifying, accordingly, that kernel.

System organization and definition

The system is a computerized adapted version of the normal work strategy followed manually in the IMIM laboratory. System modules are based upon, and follow the working scheme shown in ***Figure I.1***. Each module or group of modules has its own capabilities and restricted access depending on privileges assigned by the director of the laboratory.

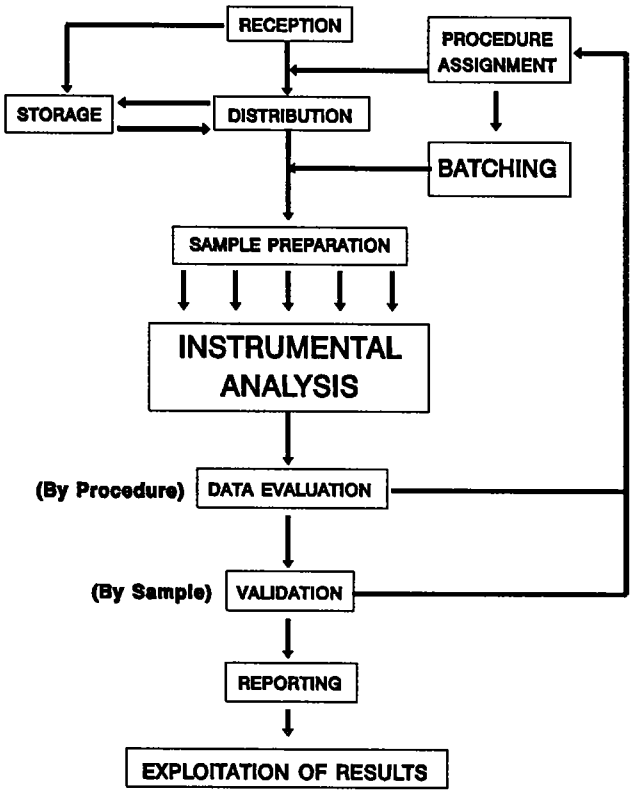

Figure I.1. General diagram showing each step involved in doping control testing. It describes the logical way the LIMS works.

Reception

The chain of events covered at this stage is as follows:

1. Assignment of an **internal laboratory code** to each sample.
2. **Pairing** of each A sample with its corresponding B sample.
3. Generation of **barcoded labels** to identify the external containers.
4. **Registration** of all information and remarks related to each sample, and the reception process (seals, codes, day, time, etc).
5. Automatic assignment of **analytical procedures** to be applied depending on three different fields (origin, sport and sex).
6. Assignment of a "**status**" to the sample allowing it to be traced through the laboratory.

The internal laboratory code must contain enough information to identify any part of the sample that could be handled. This code is described in ***Figure I.2.***

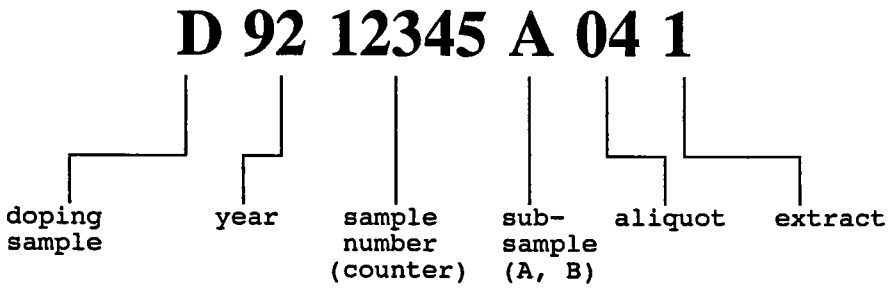

Figure I.2. Description of the internal sample code.

Two additional digits are used internally by the system to distinguish between different re-analyses of the same extract or their reprocessing (e.g. changes in integration or calibration parameters).

So in the reception step the samples are identified with codes like "D9200001A" and "D9200001B" using labels produced by the system in special DIN A4 sheets containing 100 self-adhesive labels each ***(Figure I.13)***. The labels have been designed to perfectly fit around

both, extraction test tubes and injection vials, to be removable and to withstand low temperatures.

The reception process is performed in two succesive steps. The information common to a set of samples (e.g. by transportation bag) is introduced first. Then, the specific information related to each of the pairs A and B is entered. The whole process is shown in ***Figure I.3*** and ***Figure I.4***.

At this stage the sample is assigned the status "R" (for "Received" indicating that it is pending opening and distribution) but as a result of the reception process another two status codes can be assigned: "H" (for Rejected, in the case of clearly tampered samples, broken seals, etc.) or "S" (for Stopped, in cases where no immediate analysis is required). The list of the status codes that a sample can take is shown in ***Figure I.5***.

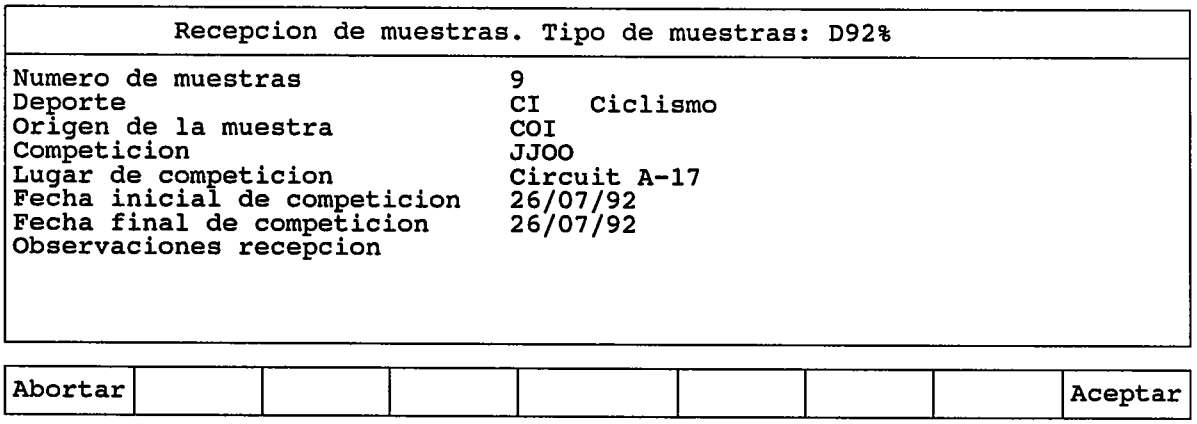

Figure I.3 First system screen in the reception process. Common data for all samples such as sport or competition is requested.

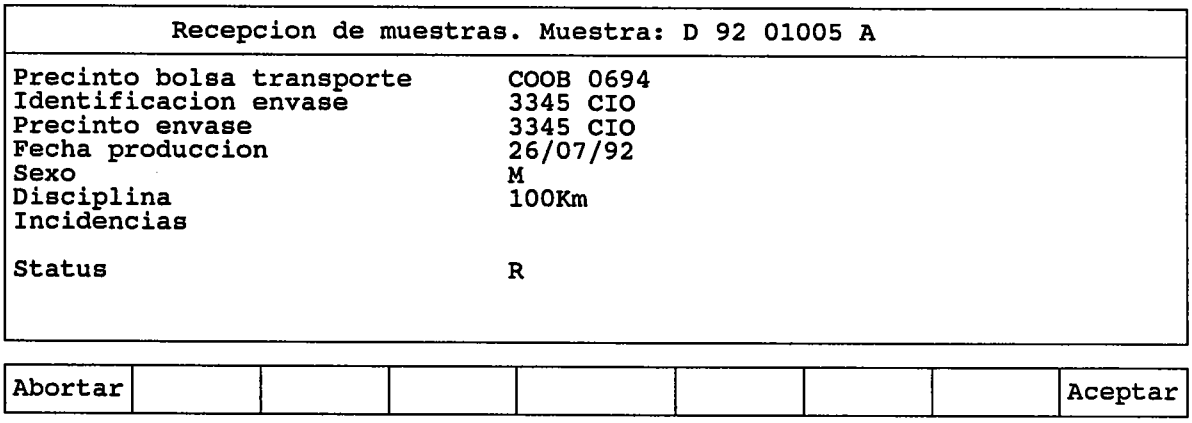

Figure I.4. Second system screen in the reception process. At this moment the link between internal lab code (shown in the upper line) and external sample code (number of container seal: "precinto envase") is made. Another identical screen for the corresponding B sample would end the process.

Storage

Samples are kept at 4°C in a cold room with continuous temperature registry and furnished with a "compactus" archiving system where A and B samples can be locked separately. In the computer terminal located beside the door of the cold room, authorised personnel having their own password must register entries and withdrawals. The system will automatically keep track of the person, time and date in which the process occurs thus maintaining the chain of custody for each sample.

H	Rejected	(Keep stored)
S	Stopped	(Waiting until status R is assigned)
R	Received	(Pending opening and distribution)
D	Distributed	(Pending batch assignment to begin analysis)
A	Opened	(Sample with new procedures re-assigned)
L	Batched	(Sample being analyzed)
C	Confirm	(Sample being confirmed)
E	Evaluated	(Sample evaluated)
V	Validated	(Sample validated)
F	Finished	(Sample finished and reported)
B	B sample	(No automatic procedure assignment)

Figure I.5. Definition of the different sample status codes.

Opening-distribution

The computer terminals located at the opening-distribution bench allow authorised personnel to make queries of samples pending distribution and/or opening (samples in status R or A). Samples are withdrawn from the cold room, opened and distributed in an interactive process ruled by the system (***Figure I.6***).

The key points at this stage are:

1. **Re-check** seal numbers to verify the link lab code-external code.
2. Generation of **labels** for the sample bottle and for the tubes that will contain each aliquot to be analyzed.
3. **Registration** of all information and remarks related with the bottle, and the opening process (seals, codes, day, time, etc).
4. Registration of the first sample data (volume, colour, sediment).
5. Distribution of the volumes indicated by the system in labelled tubes for analysis.

The opening-distribution screen in fact contains two parts: the upper part corresponding to the "opening" process and the lower part corresponding to "distribution". When a sample has already been opened and a new aliquot for re-analysis is needed (status A), only the part corresponding to required volumes appears. It is important to note that when not enough volume is available a warning message appears with the instructions to follow, subsequently the procedures are de-assigned and no aliquot withdrawal or volume subtraction is registered.

For the calculation of the total volume required for the different analyses, the system uses two parameters. Firstly the individual volumes needed for each procedure are added. Secondly a volume reserved for a potential confirmation procedure or reanalysis is considered (normally set to 15 mL). The sum of the two values gives the total volume needed. If insufficient volume is found, a manual assignment of the desired procedures would be needed to restart the process.

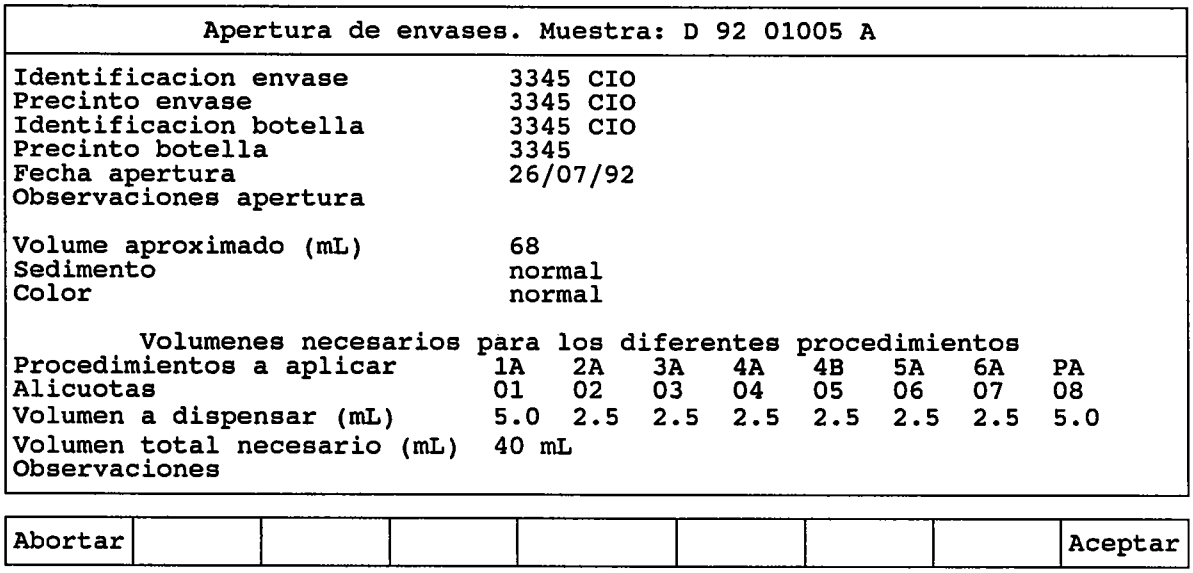

Figure I.6. System screen corresponding to the opening and distribution process.

Although the system is designed to print the labels in the moment they are needed, for the period of the olympic games a separate printing of labels for tubes will be done in advance in order to have them identified and ready to use.

Other information: Medication declared

For the medication, a separate table in the data base has been designed to link each pharmaceutical ("proprietary") name with its actual composition (international non proprietary names (INN) of active principles.

In a first step the declared medication is entered for each sample. Each medicament entered becomes of the table that links the proprietary name with the composition. Only those medicaments not yet entered will need to be searched for the composition. For easy maintenance of that table (***Figure I.7***) a "status code" of each medicament is used. The possible values of the status code are:

- **N** for the medicaments with composition not yet searched.
- **S** for the medicaments with composition already entered.
- **?** for the medicaments not found or understood (unknowns)

When a new medication is entered, the status N is automatically assigned. Only the list of those entries with status N need to be investigated. The update of composition of medicaments in status N is carried out at any moment by pharmacologists fiven privileged access to the corresponding module.

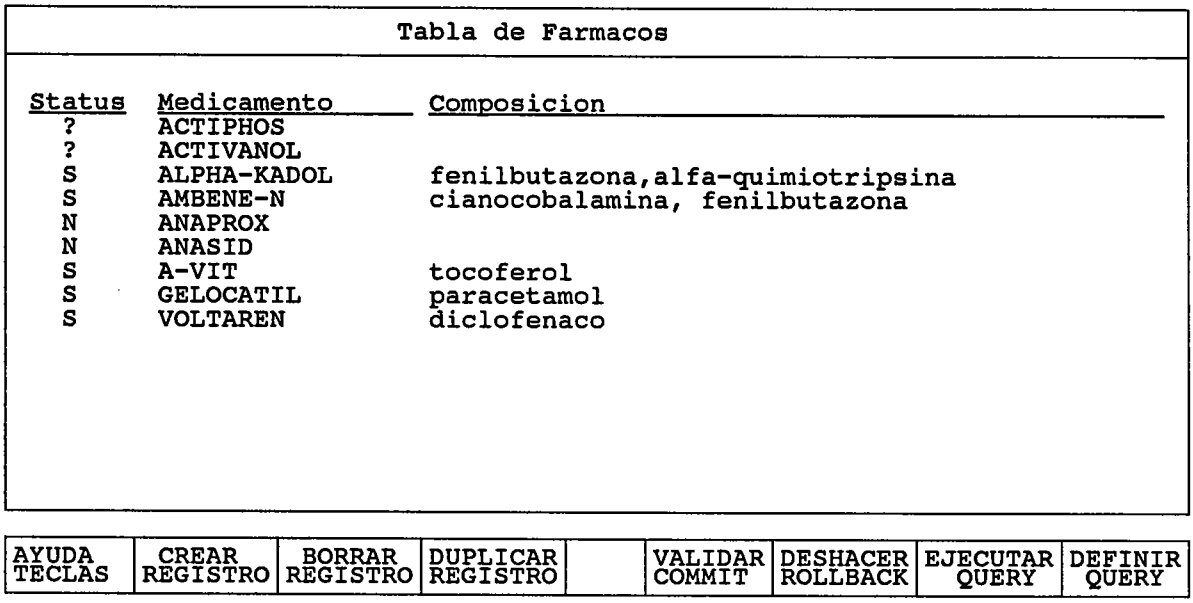

Figure I.7 System screen showing the medicaments table with their status.

Batch assignment

Once a sample has been distributed, its aliquots are pending assignment to a batch (status D). Batches have a code format containing a counter for each procedure (***Figure I.8***). The authorised person can choose one procedure, list all aliquots pending that analysis (***Figure I.9***) and then select the list/range of samples that will be included in the given batch.

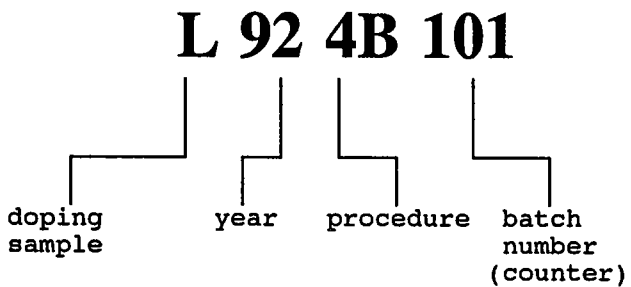

Figure I.8. Description of the batch code.

Using the definition of the procedure, the system adds, as part of the batch, all the control samples that must be analyzed in parallel. Control samples are coded as indicated in ***Figure I.10.***

Each procedure definition has its own "control descriptors" (e.g. BLRE for reagents blank, BLOR for urine blank, CAL1 for first calibration sample, ORP1 for reference spiked urine, etc.). The system treats all controls in the same way that it treats the corresponding sample aliquots.

Generacion de Lotes. Procedimiento 4B

Muestras:_____ Lote: L 92 4B 101 Mx. muestras: 20 Ptes: 21

Num.	Codigo alicuota	Fecha llegada		Depo	Sexo
001	D 92 01001A 05	26/07/1992	12:59	NA	M
002	D 92 01002A 05	26/07/1992	16:09	CI	M
003	D 92 01003A 05	26/07/1992	16:09	CI	M
004	D 92 01004A 05	26/07/1992	16:09	CI	M
005	D 92 01005A 05	26/07/1992	16:09	CI	M
006	D 92 01006A 05	26/07/1992	16:09	CI	M
007	D 92 01007A 05	26/07/1992	16:09	CI	M
008	D 92 01008A 05	26/07/1992	16:09	CI	M
009	D 92 01009A 05	26/07/1992	16:09	CI	M
010	D 92 01010A 05	26/07/1992	16:09	CI	M
011	D 92 01011A 05	26/07/1992	19:03	TO	M
012	D 92 01012A 05	26/07/1992	19:03	TO	M
013	D 92 01013A 05	26/07/1992	19:03	TO	M
014	D 92 01014A 05	26/07/1992	19:03	TO	M
015	D 92 01015A 05	26/07/1992	19:03	TO	M
016	D 92 01016A 05	26/07/1992	19:03	TO	M

Abortar | | | | | | | | Aceptar

Figure I.9. Screen showing the batch assignment process. Batch number to be assigned, maximum number of samples per batch together with number of samples pending are shown in the upper part of the screen.

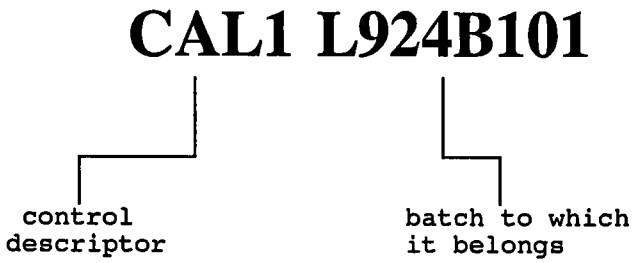

Figure I.10. Description of the control samples coding. The first four characters describe control type.

Once a batch code has been assigned to a given number of sample aliquots, the system prints the **"analytical kit"** needed to carry out the analysis of that batch, according to the procedure definition, containing:

1. **a flow-chart diagram** (*Figure I.14*) of the sample preparation procedure containing spaces to tick each step performed, indicate batch numbers for reagents, signature, etc.
2. **a worksheet** (*Figure I.15*) to take note of any remarks during sample preparation and to evaluate results. It is designed to contain, in a barcoded form, all the information needed to prepare the whole "sequence" of sample injections in the corresponding type of instrument. Using a barcode reader (wand) the interface with the instrument is fast and error free.
3. **a labels sheet** (*Figure I.16*)(one row for each sample) containing the labels needed for the tubes and injection vials (one row for each sample).

Instrumental analysis

When each sample extract is analyzed, the instrument creates files with names, size and structure that will depend on the kind of instrument used. The treatment of these files, from local archiving to data reduction (report generation) and local area network configuration is fully explained in Part II of this document.

Evaluation (by procedure)

The results obtained from each analysis can be divided into two types:

1. **Alphanumerical data** (areas, heights, concentrations, expected or real retention times, substance names, etc.) appearing in the printed reports (see Part II of this document).

2. **Graphical data** (e.g. drawings of chromatograms) also included in printed reports.

Alphanumerical data from networked instruments is captured directly by the LIMS and can be retrieved and consulted from any of the Unix instruments or LIMS terminals by authorized personnel. Both alphanumerical and graphical data together are "reduced" to a technical evaluation (comments) by the person responsible for each analytical procedure. As a consequence, a conclusion is given (i.e. re-analysis needed, negative sample, presumptive positive, etc). The comments and the conclusion for each analysis (controls and samples) are entered into the system through the batch number as shown in ***Figure I.11***.

The relevant comments are entered in the field "evaluation" as simple text. The conclusion is entered in the field "eval" and can have four different values:

1. **"empty field"** indicates pending for final evaluation although part of the comments could have been entered.
2. " - " indicating: negative (absence of any banned substance for that procedure).
3. " ? " indicating that further analyses should be performed (i.e. confirmation, repetition).
4. " + " when a clear positive identification is obtained.

According to the evaluations, further analyses may be required. Then the appropriate procedure(s) are assigned to that sample (e.g. a confirmation procedure), a new aliquot will appear as pending for distribution, and the cycle from distribution to results evaluation will be repeated for the new aliquots and batches geerated (see ***Figure I.1***). Once all aliquots of a sample have been evaluated, the sample takes the status E. It can then be validated by the Certifying Scientist.

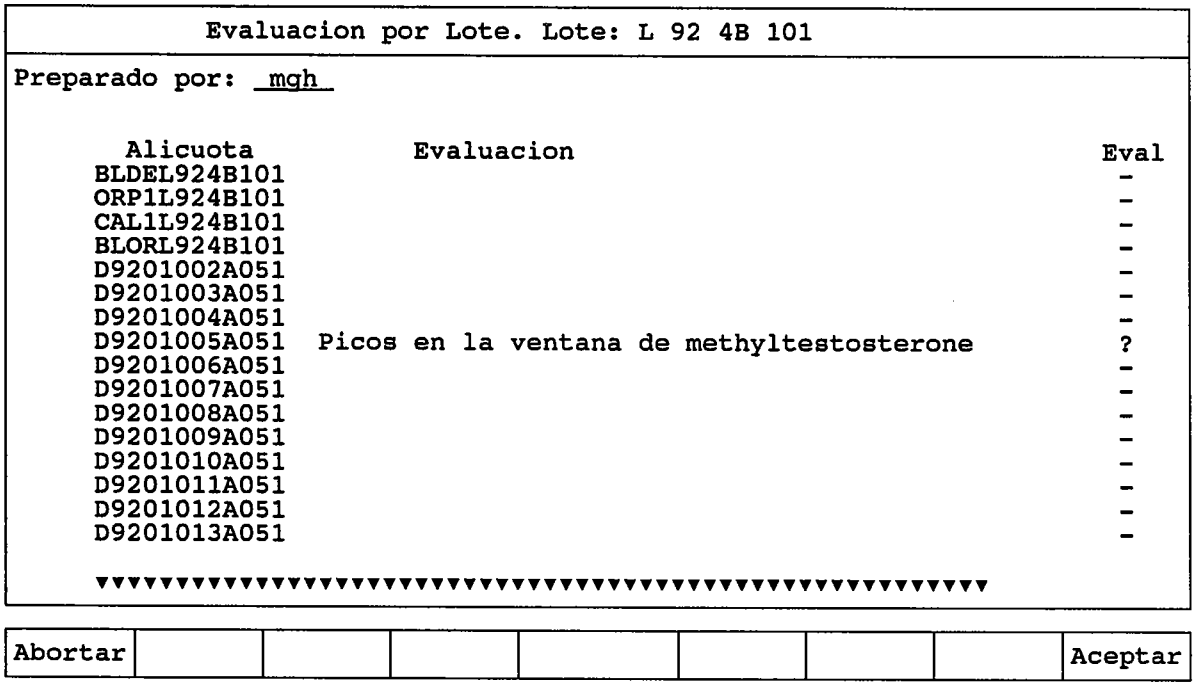

Figure I.11 System screen showing the evaluation data for the sample aliquots analized in a given batch.

Validation (by sample)

A final result (validation) is entered looking at the evaluation (and printed or raw data if needed) for each of the aliquots analyzed. Entering a sample number, the certifying scientist is presented with the required information on the screen and can revise the evaluation of all batches the sample has belonged to. The system shows the evaluation of each aliquot together with the controls of the corresponding batch (***Figure I.12***).

Once all the information has been revised the validation is entered in a way identical to that of the evaluation: a field for comments (the "validation" field) and a final conclusion (the "val" field) expressed as - or +.

Exploitation of results

Since the system has traced completely each sample through the laboratory, any information can be requested later. A list of the different batches a sample has belonged to, the evaluations of these batches, the identification of any person that has participated (reception, distribution, storage, sample preparation, data evaluations, validation) may be retrieved. An example of one of the documents that can be generated (the chain of custody form) is shown in ***Figure I.17.***

Numerical data obtained from the instruments (areas, concentrations, etc.) may be listed or exported to another software package (statistical, spreadsheet, etc) for further evaluation.

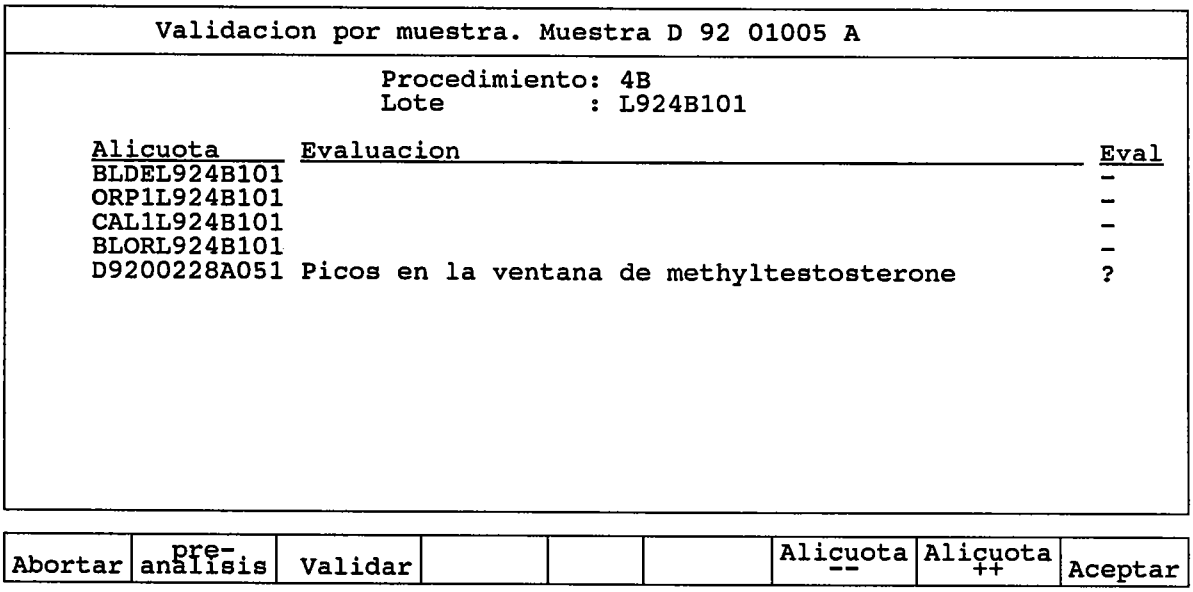

Figure I.12 System screen showing the revision step for one aliquot of a sample during the validation process.

Conclusions

Three main aspects should be highlighted in connection with the LIMS system described in this paper. Firstly it is a very simple-to-use system. Its modules are based on the various functions carried out by personnel in the laboratory. Only those parts relevant to a particular user appear in the corresponding menu and therefore only those parts require training. Secondly, it has been designed to cover each aspect related to a doping control laboratory including all sort of analytical incidences (reinjections, re-extractions, injection of an extract

in a different batch, etc); everything can be not only understood by the system but also guided by it from printing of labels to generation of worksheets. And thirdly, it provides full control on the custody of the sample and the integrity of its data (from the sample reception to the final evaluation and validation of the data obtained from the injection of any of the extracts obtained) thus facilitating in the implementation of Good Laboratory Practices in the Dope Testing Laboratory.

Figure I.13. Example of a labels sheet corresponding to the reception process. These are used to identify the external containers with the internal laboratory code.

Figure I.14. Example of the Flow Diagram followed during sample preparation. This example corresponds to procedure 5A (diuretics, mesocarb and probenecid). The flow diagram is part of the "analytical kit" given to the analyst together with the rack of samples to analyze.

Figure I.15. Example of a Worksheet, in this example corresponding to procedure 4B (anabolic steroids, combined fraction). It is part of the "analytical kit" given to the analyst together with the rack of samples to analyze.

Figure I.16. Example of a labels sheet, corresponding to a batch of procedure 4B (anabolic steroids, combined fraction). It is part of the "analytical kit" given to the analyst together with the rack of samples to analyze.

Figure I.17. Example of a chain of custody form showing the data corresponding to a sample reextracted following the confirmation procedure C441 (clenbuterol).

RECEPCION

Hoja : 1

Muestras : D 92 01001 .... D 92 01050


D 92 01001 A


D 92 01001 B


D 92 01002 A


D 92 01002 B


D 92 01003 A


D 92 01003 B


D 92 01004 A


D 92 01004 B


D 92 01005 A


D 92 01005 B


D 92 01006 A


D 92 01006 B


D 92 01007 A


D 92 01007 B


D 92 01008 A


D 92 01008 B


D 92 01009 A


D 92 01009 B


D 92 01010 A


D 92 01010 B


D 92 01011 A


D 92 01011 B


D 92 01012 A


D 92 01012 B


D 92 01013 A


D 92 01013 B


D 92 01014 A


D 92 01014 B


D 92 01015 A


D 92 01015 B


D 92 01016 A


D 92 01016 B


D 92 01017 A


D 92 01017 B


D 92 01018 A


D 92 01018 B


D 92 01019 A


D 92 01019 B


D 92 01020 A


D 92 01020 B

D 92 01021 A

D 92 01021 B

D 92 01022 A

D 92 01022 B

D 92 01023 A

D 92 01023 B

D 92 01024 A

D 92 01024 B

D 92 01025 A

D 92 01025 B

D 92 01026 A

D 92 01026 B

D 92 01027 A

D 92 01027 B

D 92 01028 A

D 92 01028 B

D 92 01029 A

D 92 01029 B

D 92 01030 A

D 92 01030 B

D 92 01031 A

D 92 01031 B

D 92 01032 A

D 92 01032 B

D 92 01033 A

D 92 01033 B

D 92 01034 A

D 92 01034 B

D 92 01035 A

D 92 01035 B

D 92 01036 A

D 92 01036 B

D 92 01037 A

D 92 01037 B

D 92 01038 A

D 92 01038 B

D 92 01039 A

D 92 01039 B

D 92 01040 A

D 92 01040 B

D 92 01041 A

D 92 01041 B

D 92 01042 A

D 92 01042 B

D 92 01043 A

D 92 01043 B

D 92 01044 A

D 92 01044 B

D 92 01045 A

D 92 01045 B

D 92 01046 A

D 92 01046 B

D 92 01047 A

D 92 01047 B

D 92 01048 A

D 92 01048 B

D 92 01049 A

D 92 01049 B

D 92 01050 A

D 92 01050 B

IMIM	DEPARTAMENTO DE FARMACOLOGIA Y TOXICOLOGIA LABORATORIO DE CONTROL ANTIDOPAJE	DIAGRAMA DE FLUJO

PROCEDIMIENTO: 4B	PNT: MS002E03	LOTE:	

GRADILLA 8x6 conteniendo muestras (2.5 mL)

(Identificada: "# lote")

1 __ Adjuntar tubo con 2.5 mL ORP1 4B e identificar [LOTE:]
2 __ Adjuntar tubo con 2.5 mL CAL1 4B e identificar [LOTE:]
3 __ Adjuntar tubo con 2.5 mL BLOR 4B e identificar [LOTE:]

4 __ + 25 µL ISTD 4B2 [LOTE:]
5 __ vórtex 3 seg

PROCESADOR ESL

6 __ identificar: "# lote"

7 __ colocar columnas identificadas como los tubos

8 __ eluir 2mL MeOH
9 __ eluir 2mL H_2O Q

10__ decantar muestras →

11__ + 2 mL de H_2O *(desechar eluato)*
12__ rotular los tubos de elución y ponerlos bajo las columnas respectivas

13__ + 2 mL de MeOH (elución)

GRADILLA 8x6

14__ identificar: "# lote"

TUBOS

15__ identificar como los otros ←

16__ transferir (decantar) →

17__ evaporar bajo N_2 a 50°C
18__ + 1 mL T.F.S. 0.2M pH7 [LOTE:]
19__ vortex 10 seg
20__ + 30 µL ß-Gluc. E.Coli
21__ vortex 3 seg
22__ Baño agua 55ºC, 1h
23__ Dejar llegar T.A.

23__ + 250 µL sol. 5% K_2CO_3 [LOTE:]
24__ vortex 5 seg

MUESTRAS HIDROLIZADAS

(. . . SIGUE)

NOMBRE: FIRMA:

IMIM	DEPARTAMENTO DE FARMACOLOGIA Y TOXICOLOGIA LABORATORIO DE CONTROL ANTIDOPAJE	DIAGRAMA DE FLUJO

PROCEDIMIENTO: 4B	PNT: MS002E03	LOTE:	

. . . SIGUE

GRADILLA 8x6 conteniendo "MUESTRAS HIDROLIZADAS"
(identificada: "# lote")

25__ + 5 mL éter dest. [LOTE:]
26__ agitador basculante 20 min, 40 mov/min
27__ centrifugar 3500 rpm, 5 min

GRADILLA 8x6
28__ identificar: "# lote"

TUBOS
29__ identificar como los otros

30__ transferir fase orgánica

31__ evaporar bajo N_2 a T< 40ºC

TUBO
32__ identificar: **BLDE**

33__ desecador sobre P_2O_5/KOH 30 min (destapar)

34__ + 50µL MSTFA/NH_4I/Dithioerythritol [LOTE:]
35__ tapar
36__ vortex 10 seg
37__ Termoblock 60ºC, 15 min

CAJA SOPORTE VIALES
38__ identificar: "# lote"

VIALES (con microvial)
39__ identificarlos como los tubos

40__ transferir contenido tubos

41__ capsular (poner hoja aluminio)

ANALISIS INSTRUMENTAL

FECHA: **NOMBRE:** **FIRMA:**

IMIM	*DEPARTAMENTO DE FARMACOLOGIA Y TOXICOLOGIA* **LABORATORIO DE CONTROL ANTIDOPAJE**	HOJA DE TRABAJO

LOTE : L924B101 MUESTRAS : 20 PNT : MS002E03 MET.INSTR : SCR4B004 FECHA : 26/07/92 HORA : 20:46

PREFIX 4B101 DIRECTORY L924B101 SEQUENCE L924B101 HOJA: 1 DE: 2

MUESTRA (extracto)	INCIDENCIAS DURANTE LA PREPARACION	EVALUACION
BLDEL924B101		
ORP1L924B101		
CAL1L924B101		
BLORL924B101		
D9201002A051		
D9201003A051		
D9201004A051		
D9201005A051		
D9201006A051		
D9201007A051		
D9201008A051		
D9201009A051		
D9201010A051		

IMIM	*DEPARTAMENTO DE FARMACOLOGIA Y TOXICOLOGIA* **LABORATORIO DE CONTROL ANTIDOPAJE**	HOJA DE TRABAJO

LOTE : L924B101

HOJA: 2 DE: 2

MUESTRA (extracto)	INCIDENCIAS DURANTE LA PREPARACION	EVALUACION
D9201011A051		
D9201012A051		
D9201013A051		
D9201014A051		
D9201015A051		
D9201016A051		
D9201017A051		
D9201018A051		
D9201019A051		
D9201020A051		
D9201021A051		

FECHA:	PREPARACION:	EVALUACION:
HORA:	FIRMA PREP:	FIRMA EVAL:

ANALISIS Lote : L 92 4B 101 Hoja : 1
Muestras : D 92 01002 A 05 1 .... D 92 01021 A 05 1

L 92 4B 101	L 92 4B 101	L 92 4B 101	L 92 4B 101
B LDE L924B101	B LDE L924B101	B LDE L924B101	B LDE L924B101
O RP1 L924B101	O RP1 L924B101	O RP1 L924B101	O RP1 L924B101
C AL1 L924B101	C AL1 L924B101	C AL1 L924B101	C AL1 L924B101
B LOR L924B101	B LOR L924B101	B LOR L924B101	B LOR L924B101
D 92 01002 A 05 1	D 92 01002 A 05 1	D 92 01002 A 05 1	D 92 01002 A 05 1
D 92 01003 A 05 1	D 92 01003 A 05 1	D 92 01003 A 05 1	D 92 01003 A 05 1
D 92 01004 A 05 1	D 92 01004 A 05 1	D 92 01004 A 05 1	D 92 01004 A 05 1
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D 92 01007 A 05 1	D 92 01007 A 05 1	D 92 01007 A 05 1	D 92 01007 A 05 1
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D 92 01009 A 05 1	D 92 01009 A 05 1	D 92 01009 A 05 1	D 92 01009 A 05 1
D 92 01010 A 05 1	D 92 01010 A 05 1	D 92 01010 A 05 1	D 92 01010 A 05 1
D 92 01011 A 05 1	D 92 01011 A 05 1	D 92 01011 A 05 1	D 92 01011 A 05 1
D 92 01012 A 05 1	D 92 01012 A 05 1	D 92 01012 A 05 1	D 92 01012 A 05 1
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D 92 01015 A 05 1	D 92 01015 A 05 1	D 92 01015 A 05 1	D 92 01015 A 05 1
D 92 01016 A 05 1	D 92 01016 A 05 1	D 92 01016 A 05 1	D 92 01016 A 05 1
D 92 01017 A 05 1	D 92 01017 A 05 1	D 92 01017 A 05 1	D 92 01017 A 05 1
D 92 01018 A 05 1	D 92 01018 A 05 1	D 92 01018 A 05 1	D 92 01018 A 05 1
D 92 01019 A 05 1	D 92 01019 A 05 1	D 92 01019 A 05 1	D 92 01019 A 05 1
D 92 01020 A 05 1	D 92 01020 A 05 1	D 92 01020 A 05 1	D 92 01020 A 05 1
D 92 01021 A 05 1	D 92 01021 A 05 1	D 92 01021 A 05 1	D 92 01021 A 05 1

IMIM	*DEPARTAMENTO DE FARMACOLOGIA Y TOXICOLOGIA* **LABORATORIO DE CONTROL ANTIDOPAJE**	CONSULTA

CADENA DE CUSTODIA

DIA: 27/07/1992 HORA: 19:11

MUESTRA: D9201005A

ID. ENVASE : 3345 cio
PRECINTO ENVASE : 3345 cio

ID. BOTELLA : 3345 cio
PRECINTO BOTELLA: 3345

FECHA PRODUCCION: 26/07/92

FECHA RECEPCION : 26/07/92, 16:09

VOLUMEN RECIBIDO (mL): 68

ENTRADA	*NOM BRE*	*SALIDA*	*NOM BRE*	*ALIQ*	*VOL (mL)*	*RAZON*	*- VOL (mL)*
26/07/92, 16:40	*pbc*	*26/07/92, 18:22*	*mms*	*01*	*5.0*	*1A 1B*	*63.0*
				02	*2.5*	*2A*	*60.5*
				03	*2.5*	*3A*	*58.0*
				04	*2.5*	*4A*	*55.5*
				05	*2.5*	*4B*	*53.0*
				06	*2.5*	*5A*	*50.5*
				07	*2.5*	*6A*	*48.0*
				08	*5.0*	*PA*	*43.0*
26/07/92, 19:19	*mms*	*27/07/92, 11:03*	*mva*	*09*	*5.0*	*P4B1*	*38.0*
27/07/92, 11:38	*mva*						

Fecha de emision: 27/07/1992 19:11

imicc