

## Bika 2 Chemical LIMS customisation

### Functional specification and use cases. Phase 1

version 2.0 , Iemoene, 2 July 2007

---

## Table of contents

1 Purpose of this document	3
2 Document history - Notes to Version 2.0	3
3 Document convention	3
4 Links and Lingo. Html Wireframe model	4
5 Not in the Scope of this document	4
5.1 Phase II development items	4
5.2 Proof of e-mail delivery	4
5.3 Data conversion	4
6 Section removed	4
7 Pastel accounts interface	5
8 General	5
8.1 Prefixes	5
8.2 NB. Links to sensitive information	5
8.3 General lay-out – Tabbed pages per item	5
8.4 NB Logs	6
8.5 All email addresses 'live'	6
8.6 CC recipients and 3rd party invoicees	6
8.7 Anonymous / cash transactions	6
8.8 Recent listings	7
8.9 NAY – not available yet. NR	7
9 Samples	7
10 Chemical Analysis Requests. CARs	8
11 Chemical AR Profiling	11
12 Chemical Worksheets	12
13 Worksheet Templates	12
14 Analysis Specifications	12
15 Quality Control	13
15.1 Standards	13
15.2 Duplicates (Checks)	14
15.3 Blanks	14
15.4 Calibrations	14

15.5 Specifications	14
15.6 QC Workflow	14
16 Orders	16
17 Invoices	17
17.1 Compiling invoice batches	18
17.2 Printing month-end Invoices	19
17.3 Export Invoices	19
17.4 Ad-hoc Invoices	20
17.5 Re-printing Invoices	20
18 Price Lists	20
19 Clients Set-up	22
20 Queries	22
21 Reports	23
22 True Working hours calendar	24
22.1 Calendar management	24
22.2 Calendar view	25
22.3 Late analysis alert customisation	25
22.4 Report - Turnaround times not met	25
23 CSV data import and export	26
24 LIMS Set-up	26
24.1 Analysis Services and Prices	27
24.2 Sample (Product) types	27
24.3 Accounts set-up	27
24.4 Clients	27
24.5 Laboratory Set-up	28
25 Not in Bika LIMS 2. Phase 2 development work	28
25.1 Quotes	28
25.2 Client status checks	28
25.3 Automated Month-end	29
25.4 Trend/Statistical analysis	29
25.5 Bar coding	29
25.6 Instrument interfaces	29
25.7 Radio networked hand-helds	29
25.8 Emailing invoices	30
25.9 Inventory	30
25.10 Instrument Maintenance module	30
25.11 Sample collection workflow	30
25.12 HR module	30
25.13 Validation Calculation	30
25.14 Instrument bias correction	30
25.15 Urgent AR workflow	31

25.16	Sample Chain of custody, COC	31
25.17	Instrument reference testing	32
25.18	Client Reference testing	32
25.19	Logging specification edits	32
25.20	Sub contracting workflow	32
25.21	Spell checking	32
25.22	Specs for Cultures, AntiBiograms, Staff surveys	32
25.23	Proficiency testing workflow	32
25.24	More reports / graphics	33

## 1 Purpose of this document

This document is used to establish a common understanding of what is required from the LIMS application at the laboratory. Cases and functionality in the LIMS are described in layman's language here

It also serves as a functional specification for programmers working on the project and quality management tool

It is used to estimate development cost and establish a quote for the LIMS

## 2 Document history - Notes to Version 2.0

V2.0 Excess text and infotoxin removed

V 1.9 12 March 2007 - for print. Underlined links to the Wireframe have been disabled

V 1.8. 23 November 2006

This document has been reduced from version 1.0 to exclude Micro-Bio functionality

## 3 Document convention

### Important

Only functionality additional to that already available in Bika 1.2 is discussed here

All use cases are acted out by role players which can be the LIMS itself, other interfaced systems or any user authorised as *admin*, *labmanager*, *labtechnician*, *labclerk* or *client*

In most cases *client* refers to the client's *contact* as their representatives are known in the system

For each use case it is assumed the role players are logged-on and authorised to execute the actions required by them

## 4 Links and Lingo. Html Wireframe model

Some texts in this document were at some stage hyper linked to related sections elsewhere in it, or to pages in a wire frame model. Those mostly don't work but the formatting stayed ....

The latter external links are underlined like this and internal links like this

An early html wireframe model, Bika LIMS new functions, can be viewed at <http://bika.sourceforge.net/specs/Wireframe/index.htm>. It includes Microbiological functionality not developed for Bika LIMS 2

### Lingo

- The plural for 1 analysis is many analyses
- Reports – this term in certain contexts refer to analysis results reports as per email, fax or print. A separate paragraph is dedicated to Management reports
- AR - indicates an Analysis Request, the collection of analyses requested per sample
- WS – indicates Worksheet, a collection of analyses grouped together for workflow purposes
- Text in square brackets indicates push buttons, e.g. [Submit]
- Text between vertical lines indicates navigational tabs, e.g. | Home |

## 5 Not in the Scope of this document

### 5.1 Phase II development items

Listed at the end of the document here...

### 5.2 Proof of e-mail delivery

Impossible with current SMTP mail serving technology. Instead the responsibility to report non-delivery are shifted to clients by informing them to “Please contact laboratory if results are not posted within 7 working days”

### 5.3 Data conversion

Importing earlier result data from legacy systems – needs research, Bika will quote if required

## 6 Section removed

Heading kept for maintaining section numbers

## 7 Pastel accounts interface

The purpose of such an interface would be to exchange invoice and client status, credit limits and initially contact and ID details.

Two options exist, a dynamic interface whereby the LIMS reads and saves the data directly on the Pastel database or a more static file transfer via comma delimited files, which can also be edited by spread sheet programs

The latter interface per file transfer will be implemented

## 8 General

### 8.1 Prefixes

Generically ID prefixes are designated like this in the LIMS set-up:

abbreviation | year | serial number, e.g. the first sample of 2007 will be ID'd S07-0001

Suggested prefixes:

Sample	S
Chemical Analysis Request	CAR
Chemical Worksheet	CWS
Order	O
Invoice	I

### 8.2 NB. Links to sensitive information

The bika LIMS strives to put as much information possible at the minimum click away for both lab client and personnel, e.g. where analytical services are listed on ARs, they are hyper linked to a page about the service

This access is regulated, clients only get to see public information, unit, method & standards description, interpretation tables and prices & discounts applicable to them (e.g. corporate non corporate)

Anywhere analysis names are shown on pages, the text is linked to any explanatory texts associated with it, e.g. results interpretations and methods explanations

### 8.3 General lay-out – Tabbed pages per item

As per existing AR functionality, many items are managed on tabbed pages dedicated to editing, viewing, managing data, logs and where applicable invoices:

**Edit tab** – while the CAR is still status 'sample due', clients might still edit CARs' header details and add or remove analyses. Once in a higher status, this tab is not available to clients any more

**Manage results tab** – all results entry and analysis status management are done on this tab

**View tab** – this is effectively the Analysis results ‘report’

**Pro-forma invoice tab** - to display the Bika 2 LIMS as scientifically possible, prices are not shown with analysis results, only when the AR is created and on a ‘pro-forma’ invoice tab

**Log tab** – the log for the CAR itself. also see [logs per individual analysis](#)

## 8.4 NB Logs

As in the previous Bika versions, logs were only kept for ‘main’ objects, e.g. ARs & Worksheets and also for individual analyses on ARs

Log items include:

- the username
- action
- date/time stamp
- **NB NB** duration – the time the object spent in the state

## 8.5 All email addresses ‘live’

All email addresses displayed in the system are live – by clicking on it a new mail message is created and opened in the user’s mail client with the ‘To:’ field completed with the address clicked on

## 8.6 CC recipients and 3rd party invoicees

Contacts/Lab staff requesting analysis and other services, may include recipients to be copied the results published and also indicate a ‘3<sup>rd</sup> party invoicee’ other than the organisation requesting the service and providing the sample

Per client, the ‘CC’ recipients are kept in the LIMS with their own set of publication preferences as contacts, some thus without ‘logins’ and any privileges to the web based data

When they are included in communications, e.g. by selecting them to the CC field on ARs, they are published to according the preferences set-up for them, fax and/or email

A [global list of allowed ‘3rd party invoicees’](#) – please somebody a better term! – is kept in the lab accounts set-up. On the [client’s own accounts set-up](#), the labmanager may assign some of these off the global list to be used for the client. Only the client’s own list is presented where the ‘3<sup>rd</sup> party invoicee’ option is presented in client context

## 8.7 Anonymous / cash transactions

Because of the interdependency of invoices on ARs and Surveys, Orders etc, anonymous transactions are not allowed. For any work to be done in the lab for a person or organisation, they must be registered as a client in the system

## 8.8 Recent listings

On many pages where items are listed the items displayed are selected from according there statuses, e.g. CARs, by clicking the corresponding radio button at the top of the page

The first option will always be 'Recent' which is not a status. 'Recent' will list the clients most recent ARs regardless its status. An extra column is then displayed for the status in the listing

The 'Recent' selection is an aid to clients wanting to find their freshest data quickly

## 8.9 NAY – not available yet. NR

Where analyses were requested but results not ready for the particular user, e.g. cannot be shown to clients before verification, corresponding fields are filled with the text 'NAY'

This is because in some tabled views, e.g. WSs and query results, table cells for both unavailable and not requested analyses will be shown empty otherwise and cause confusion

In such views, the text 'NR' is displayed in cells for unrequested services

Both NAY and NR will be in a smaller font and softer colour to reduce visual clutter

## 9 Samples

### Purpose

Samples in the wire frame here

Labs may create multiple ARs per sample, be it separate ARs for chemical and MB analyses, additional or re-tests

Since a sample can be intended for both Chemical and MicroB analyses, no separate prefixes are used for sample serial numbers. All samples are numbered sequentially with the same prefix, e.g. S05-00187

99% Of samples will however remain in a 1 – 1 relationship to ARs. I suggest Sample records be created automatically per AR and having the same serial number as the AR but with a different prefix, See Prefixes

Samples can be looked up in a sample list, but not created there. Sample records are only created when a request for analyses on the sample is created

**Use case:** When an chemical analysis request is created, it is ID'd as CAR-00001. The sample ID S05-00001 is created for the sample

If the user wants to create an AR for an existing sample on the db that was ID'd when an earlier AR was created, she is offered a select facility similar to that used currently to find e-mail addresses on the system for emailing query results

For the above sample S-00001 the system then produces an ID MBAR-00001 for its MB analysis request

Problems remain – how to number secondary ARs requested for re-tests and additional tests on a previously ID'd sample? Is it possible to concatenate

another serial section to the number? ie, after the initial CAR-00001, later CARs requested for the same sample are numbered CAR-00001b, CAR-0001c etc (doubt whether this will go down to 26 ...)

### Re sampling

In rare cases, the lab might re-request a client to re-sample a certain specimen or product. This re-sampled sample enters the system on its own ID but has a reference referring the ID of the original sample

## 10 Chemical Analysis Requests. CARs

CAR wire frame view

### Purpose

Clients and lab staff use this facility to create, edit and manage CARs per sample

### Note – AR profiles

Many of the fields required when creating CARs can be completed easily by using CAR profiles maintained elsewhere. CAR profiles are described in Use case - CAR Profiling Module and is not included in this the paragraph here.

Profile driven fields are styled clearly in the Create CAR page in the wire frame model

### CAR tabs

**Edit** – while the CAR is still status 'sample due', clients might still edit CARs' header details and add or remove analyses. Once in a higher status, this tab is not available to clients any more

**Manage results** – all results entry and analysis status management are done on this tab

**View tab** – this is effectively the Analysis results 'report'

**Pro-forma invoice** - to display the Bika 2 LIMS as scientifically possible, prices are not shown with analysis results, only when the AR is created and on a 'pro-forma' invoice tab

**Log** – the log for the CAR itself. also see logs per individual analysis

### Laboratory Specification additional to Standard Bika

Apart from the standard bika CAR functionality and workflow, the laboratory requires:

#### Profiles

Should the role player select a CAR profile, the fields indicated to be profile driven are loaded with the selection from the profile

The user may still over ride these values

If she on top of that select 'All' on the profile row, the profile is applied for all the AR columns on the Create page. In the fashion describe at ['All' check box. Creating ARS with the same header info](#)

### CC results and invoicing of others

- i) the option to include contacts to be cc'd in emailed results. contacts included here get the result as set up per their own publication preferences, email and/or fax

**use case:** a vet requests a post mortem on a sheep's stomach contents and wants the farmer and feeds supplier cc'd with the results

- ii) if enabled in the client's set-up, the option to indicate a 3rd party, other than the analysis requester, to be invoiced is available

**use case:** the vet wants the feed supplier or farmer to be invoiced for the analyses

- iii) a global [list of allowed 3rd party invoicees](#) is maintained in the lab set-up. in the client accounts set-up, labmanagers may assign 3rd party invoicees from this global list to specific clients

### Specifications

the sample type is selected from a list of sample types maintained in the lab set-up – this parameter is used to determine the valid range for analysis results on the CAR for this sample as specified in the [product specification module](#)

### Control samples

if the analyses will be done on a control sample, this option gets checked when creating the CAR

### Blobs

Please see [Blobs - Text insertions](#) and [Calculated Bobs - Interpretation table insertions](#)

"Duplication of these texts on results emails, faxes and pages are prevented"

### Cost codes

Default cost codes are associated with analytical services in the system set-up and these references are maintained for reporting purposes. Since all the analyses on a CAR will be of the same cost code, e.g. 'Chemical analyses', the assigned cost code title is shown, to the labmanager only, on the | invoice | tab of the CAR

### Re-testing of suspect values

At times analyses maybe repeated to confirm suspicious results. These are then marked ['confirmed/retested'](#) on the AR

If the client insist on further retesting, a separate CAR is made out for the same sample and the client charged

### Cancellation of ARs

Clients sometimes cancel ARs for a variety of reasons, even if it has progressed into the lab already. Lab managers may cancel such ARs in the system and they get a 'cancelled' status and are not reported on or invoiced for

### Print as publication option

Some clients require printed and signed copies of AR results. These get printed during publication, stored and attached to the client's monthly statement

Must be 'signed' - a scanned copy of the publisher signature is inserted on the results 'report'

To keep this paper flow separate, these prints are clearly marked 'client copy'

### Re-publication of results

a (re)publish button on CAR lists pages will publish all verified results on the selected ARs. it addresses the use case where a single analysis is delaying publication of other results

its secondary function is to republish the selected ARs where contacts request it (lost the previous email and too lazy to look on the web....

**NB NB** by having this button also on client CAR lists, publication of results per client will also be facilitated in a better way than the current functionality where a specific client's ARs maybe separated over more than one page in the global AR list. Wire frame CAR view here::

### Weight calculations

some analyses require weight calculations and are flagged as such in their set-up pages. For these analyses, normally expressed as percentages e.g. '% moisture', extra fields are added on the Manage Results tab to calculate the result value from some primary measured weights:

use case:

$$\% \text{ moisture} = ((\text{wet mass} - \text{dry mass}) / \text{wet mass}) * 100$$

the weight of the weighing container is captured and used in the primary dry and wet mass calculations

### 'All' check box. Creating ARS with the same header info

Often the batch of ARs being created on the Create AR page, will have the same attributes, e.g. interpretation tables or other blobs to be inserted.

In these cases, the user clicks the 'All' check box on the row under consideration, e.g. next to 'Sample type' if all the samples are from the same type, and provides that entry only for the first AR in column 1

The value then gets repeated for that field for all AR columns. These remain editable and the user may want to edit any deviations

### Turn around times not met

When an analysis is taking longer than its targeted turnaround time, a notification to labmanager and technicians is raised

### Worksheet links

On AR views, hyper linked Worksheet Ids are shown for analyses assigned to Worksheets. This is mainly to assist lab staff trace analyses in the lab

### Diverse

- i) check box to set AR for invoice exclusion - ARs can be checked to be excluded from invoices - typically re-tests done on the lab's own account

- ii) individual analyses statuses are shown and linked to logs of status changes
- iii) often organisations requesting analyses supply an order number and it is captured on the CAR
- iv) prices remain editable for labmanagers on the create and edit pages
- v) designated manager. in the set-up, a table of departmental managers is maintained. all the LIMS publications are related to a department and responsible manager. on the CAR, the responsible manager is shown to everybody incl clients.  
for special cases, the manager responsible for a certain object may be overwritten by the labmanager on the create and edit pages
- vi) apart from the standard information, CARs show:
  - Publish date
  - Sample Type
  - Sample Origin
  - Client reference – this is the field clients maintain themselves for Sample/request ID purposes
  - Worksheet reference link for analyses assigned to WSs
  - ‘A Discount of x% applies’ - if so on all views where prices are shown
  - Remarks field to be used to record reasons for suspended CAR
  - ‘Sample retention of max n days’. The expiry periods are maintained per sample type in the LIMS set-up
  - in results fields still empty (not verified) for client CAR view, ‘TF’ is displayed, indicating results ‘to follow’
  - the lab manager responsible for the result and his (live) email address

## 11 Chemical AR Profiling

### Purpose

In the laboratory workflow, it regularly happens that the same collection of analyses are requested for samples. As an efficiency measure, these ‘standard’ ARs are saved as AR profiles in the LIMS, per client, and are accessed when ARs are created

The CAR so created can still be edited at runtime with analyses added or removed & prices changed

The runtime edited profile, or any CAR, can be saved for later use

### Role players

labmanager, clients. Clients may edit and create their own profiles

## 12 Chemical Worksheets

### Profiles in the wire frame model

These work exactly like existing bika Worksheet functionality, with additions:

- i) % weight calculations for some analyses
- ii) A Remarks field for capturing text remarks pertaining to the WS
- iii) Re-testing of suspect values. At times analyses may be repeated to confirm suspicious results. These are then marked 'confirmed/retested' on the WS (and subsequently) the AR

## 13 Worksheet Templates

The system provides worksheet templates for Protein, Calcium, Phosphorus, Fat, Fibre, Moisture, Ash, Salt and Starch analysis

These worksheets templates include QC controls such as Standard samples and duplicates. Raw results are captured as well as weight/volume of samples where applicable

## 14 Analysis Specifications

### Chemical specifications in the wire frame model

#### **Purpose**

This module enables the system to keep minimum and maximum allowed values for each analytical service offered, and an allowed percentage error, used to highlight and report on out of range values during data capturing

These values may differ between clients and sample types, and specifications are kept per analysis per sample type and per client

Theoretically: a 3 dimensional data cube where the min/max & error % are looked up at every client – product - analysis intersection

Clients are allowed to modify their own parameters

During after data capturing, say on ARs or Worksheets, out of range values are shown in bold red against a pink background, and those out of range but still within the % error allowed are showed bold red against a light yellow back ground

1 specification maintained for the laboratory's own specifications by the labmanager – also per sample type and analysis. On pages where results are shown, users have the option to switch between applying the lab's or the client's specifications: Lab members' the lab's by default, clients their own

When a new client is created, she inherits the lab's set of specifications

A management report is included to report on the number analyses out of range and in the error % shoulder range per product per client for selected date ranges

#### **Role players**

client, labmanager

**Use case – creating and editing an Analysis specification**

- i) the role player navigates to the Analysis specification page. Lab members have to navigate to the client's first for hers. for the lab's itself, select off the main menu or set-up
- ii) only sample types for which specifications exist, are listed
- iii) she clicks on an existing specification to edit or [add new] to edit new one
- iv) if a spec for that client/product combination exists, its page opens, listing only the analyses and data for which the range data has been entered on its | view | tab
- v) the values may be edited or more analyses added from a pick list on the | edit | tab
- vi) for a new specification select a sample type from a pick list. only sample types without specs are available for selection
- vii) the role player enter min/max values and error % per analysis as required
- viii) or press [apply lab defaults] to copy the lab's specification values to the client's – handy when initialising a client specification and then editing it
- ix) she saves the spec
- x) the saved values are then applied on all ARs for the specific client and sample type combinations as discussed in the AR and WS paragraphs to indicate out of range values and those in the allowed error %

**Use case – creating a specification for a client based on the lab's**  
click the [apply lab defaults] button on the Analysis specification page

**Use case – reporting on product 'aberrations'**

## 15 Quality Control

### 15.1 Standards

A Standard is a sample of which the chemical composition is known and kept in the system

In the terminology used here, such a Standard can be used for QC purposes as

Control samples

Calibration samples

Sometimes the lab will make up it's own Standard in a container and repeatedly use some of it for analyses. Other times it will be ordered from a Standard Supplier and be delivered in a batch of say 24 ampoules, and 1 ampoule is used per analyses

*The above explanation suggests that Standards AND Standard Batches in the system be treated as a Sample on which successive Analysis Requests are performed*

Standards have expiry dates where after the system does not allow analyses on them

Standard Suppliers are maintained in the system per standard Bika 'organisation and contact' model with the addition of a tab listing all the Standards supplied to the lab.

From this listing, links lead to the labs performance stats and graphs on that Standard

All Standards in the system can be listed off a main menu item too, leading similarly to their performance graphs

## 15.2 Duplicates (Checks)

Worksheets often include part of the same sample twice and the system compares their results - the exact same result must be returned for the 2 analyses in the perfect lab. Should they differ more than a specified %, the labmanager is alerted and a 'reject or retest' workflow entered

Duplicates don't have to be Standards. Most of the time labs use any arbitrary sample on the worksheet or instrument tray

## 15.3 Blanks

An empty sample container is put through the analysis process - result must be 0. Above specified % error, alarm is raised and 'reject or retest' workflow entered

## 15.4 Calibrations

Excluded

## 15.5 Specifications

Out of range limits are maintained to measure QC results against and labmanagers alerted when exceeded

Standards have these values stored on their individual records

Fault tolerances for Blanks and Duplicates are set per sample type and analyses in the LIMS set-up

## 15.6 QC Workflow

The laboratory includes a duplicates and control analyses on each worksheet. Should the results returned for it fall outside the allowable tolerance specified

- the result is displayed against red background
- all analyses on the same worksheet are flagged for rejection or re testing and the lab manager alerted

## Reporting

QC results are looked up from a special page 'Control Analyses'

When clicking through to a control analyses, the user sees a page with the analysis' data summarised and graphed. Out of range values are displayed against shaded background

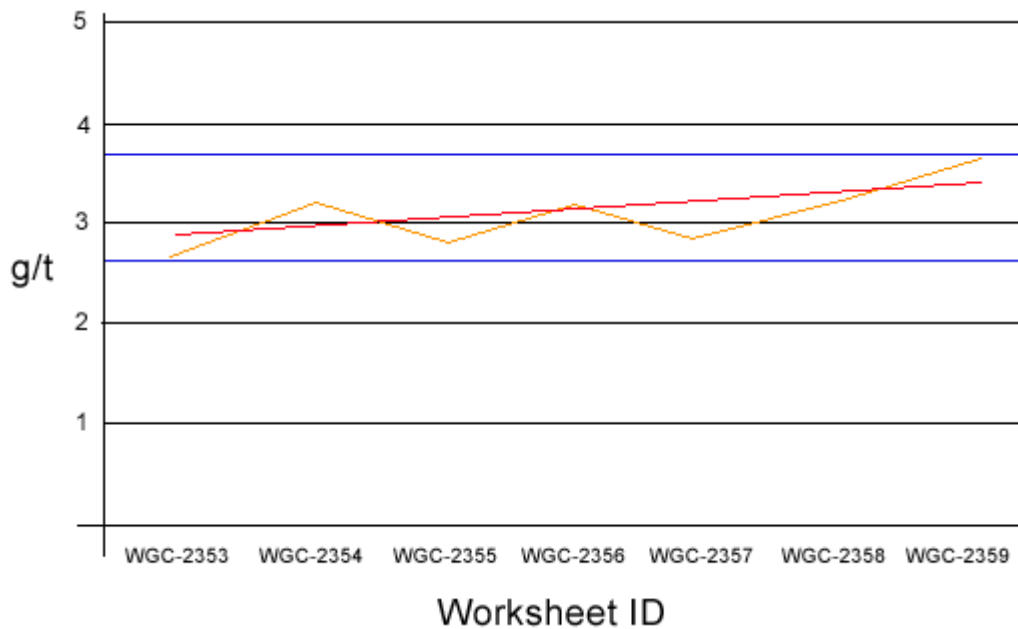
The control analysis result is also statistically compared with previous results for the Standard presented on Performance and Distribution graphs

The default period for statistical analysis is the previous 6 months' data. The user may specify any valid date range on the page and reload it - handy for looking at older analyses

These graphs and tables are also available, per sample type and analysis, from a QC reports menu

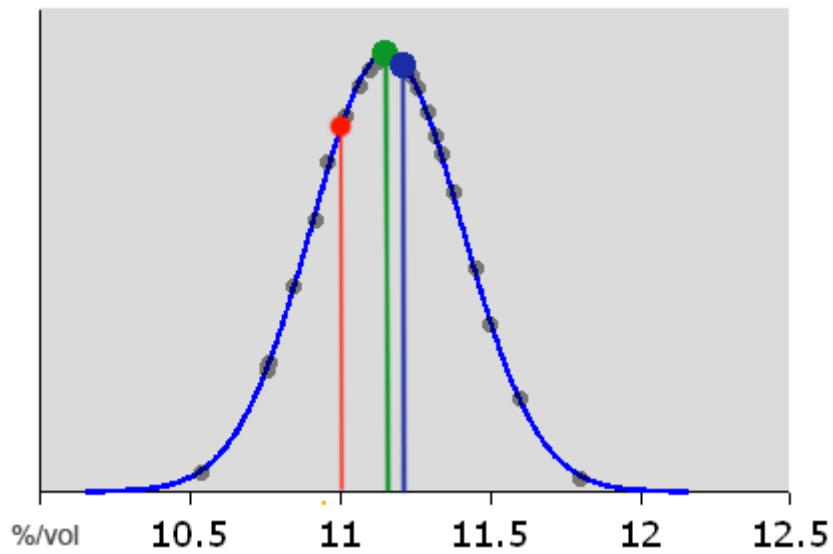
The following graphs are available

**Trend** - showing performance over time. true value, min & max measured and a trend plotted through the data. An example for an standard with true value of 3.00 g/t:

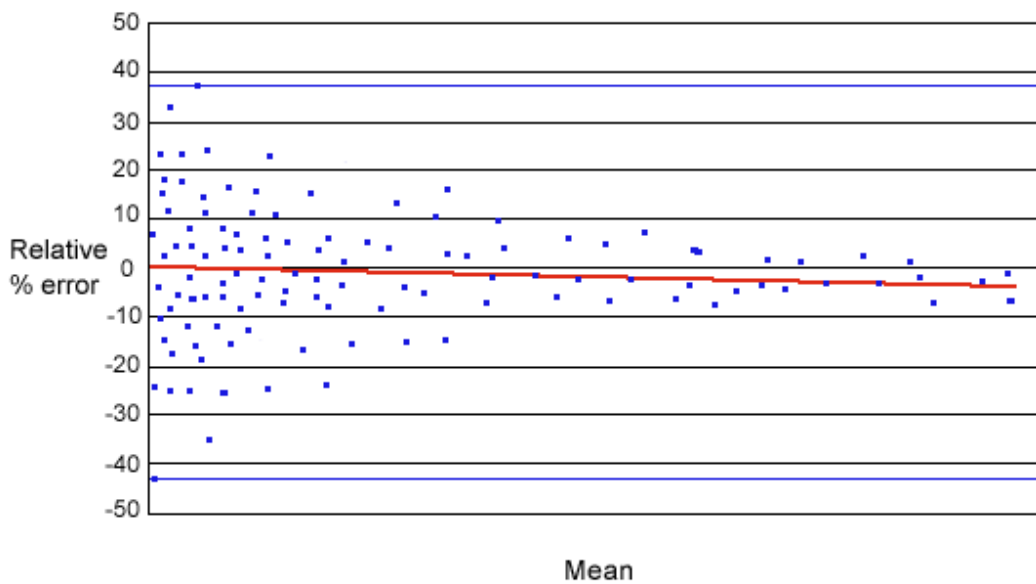


**Distribution** - shows true value, the lab's mean and normal distribution around it

An example for a result of 11.20 %/vol, lab mean of 11.15 and true value of 11.00. The standard deviation is also shown



**QC Duplicates - Relative % error** - the % error on duplicates in the results range tested. An example



## 16 Orders

Standard bika functionality with the addition of add unlisted items on an open order, [see order creation in the wire frame](#)

Similar to submitting Analysis Requests, clients can also place orders for items and non analytical services for sale, remotely

Ordering in advance, has the advantage that lab personnel can make up orders to be ready when the driver arrives at the lab. For this purpose, the system alarms the data clerk when new orders are placed.

Like for the AR use cases, Clients not using the Internet place their orders at reception with the labclerk who then fills out the order form in LIMS

### Use Case - Placing an Order

**Role players:** client contact, lab clerk and manager

- i) the client contact fills out an order form from the 'Orders' item on her main menu
- i) the same client status checks and workflows are carried out as specified for ARs
- ii) she provides quantities for items on order and maintained in the systems set-up
- iii) the form totals the cost for the order at the bottom of the form: total, VAT total, total incl VAT
- iv) the client contact submits the form
- v) the LIMS generates unique serial order number and displays it to the client
- vi) like for ARs a notification of the pending order is posted to lab staff, clerks, and managers
- vii) she navigates to the order and prints it
- viii) the labclerk gets the products ordered ready and packs it
- ix) she hands the products to the client's shipping agent / driver
- x) the driver signs the printed order form as 'delivered'
- xi) the labclerk pushes [delivered] on the order form in LIMS
- xii) LIMS sets the order's status to 'delivered'

### Manually - the data clerk captures the order

For any other orders not submitted by clients themselves, be it telephonically or 'over the counter', the data clerk captures and executes the order as per the above use case

## 17 Invoices

Month end invoices, Ad hoc invoices in the wire frame

### Purpose

- i) To print a date ranged batch of invoices during a month-end run and export the data to Pastel
- ii) To print ad-hoc invoices immediately for walk-in customers
- iii) Items can only be invoiced once – those on these ad hoc invoices are excluded from month-end runs

- iv) However tricky: when batches are exported or printed, ad hoc invoices dated in the same date range as the batch but not actually in the batch, are exported or printed with the batch

### **(Pro Forma) Invoice Tabs**

Click wire frame for [AR invoice tab](#), [Survey invoice tab](#)

The laboratory prefers prices kept from results views to keep it pure science. All 'main' objects do have 'invoice' tabs where associated costs can be viewed. Where, for instance, an AR will appear on an invoice as one line only, a more detailed financial break down is provided on the invoice tab, e.g. for ARs showing costs per analysis and all discounts applied

If the item has not been invoiced, this tab is titled 'Proforma' Invoice. If the item has been invoiced already, the Invoice ID is displayed and hyper linked to the invoice

In the pro-forma case, a button is provided for labmanagers to create an invoice along the [ad-hoc invoicing workflow](#) described elsewhere

### **Invoicable items. Item groups**

These become invoice lines and are grouped and subtotalled together

- i) published ARs. e.g. 1 AR is only 1 invoice line
- ii) MicroB published Worksheets: Where published together as [an MWS](#), the ARs are grouped and subtotalled
- iii) [published](#) Hygiene Surveys (incl surfaces, visuals and staff surveys)
- iv) published Culture reports & Antibiograms
- v) dispatched Orders

### **Not in the scope of the invoices module**

- i) Corrections to invoices are not allowed, these are carried out via credit and debit notes in the accounting system Pastel
- ii) Invoices cannot be deleted – but are corrected per credit and debit notes in Pastel
- iii) Emailing invoices

## **17.1 Compiling invoice batches**

### **Use case**

#### **Role player - labmanager only**

- i) the role player navigates to the [Invoice batching page](#) and clicks [[add new batch](#)]
- ii) she enters the 'Invoice date' to be shown on the invoice itself
- iii) she completes fields to enter the begin and end date/time for items to be included in the run
- iv) she enters the remarks to go into the comment field on all invoices

- v) the invoices are compiled from all the items published during the date range
- vi) invoices are sequentially and uniquely numbered, prefixes to be supplied in the prefix set-up page
- vii) once included in an invoice, the item is flagged as 'invoiced' and the ID of the invoice it appears on is displayed on the item itself
- viii) for items where a 3<sup>rd</sup> party invoicee is specified, her address and VAT details etc, are used off the invoicee's set-up pages
- ix) apart from address details, dates, prices & VAT, etc, the invoices show:
  - o Unique serial number
  - o if any discount applies, a note to indicate what type of discount and how much
  - o The laboratory's Banking details
  - o Remarks
  - o Client VAT nr

## 17.2 Printing month-end Invoices

Tricky: the print run includes ad-hoc invoices not physically in the batch but produced during in the same date range as the batch, even those printed already

Alternatively – a date range for the print could be supplied on separate page, printing both ad hoc and invoice batches in the range

### Use case

Role player - labmanager only

- i) the role player navigates to the Invoice batches page and opens the batch to be printed
- ii) she clicks [print] on that page

## 17.3 Export Invoices

Tricky: the export includes ad-hoc invoices not physically in the batch but produced during in the same date range as the batch

Alternatively – a date range for the export could be supplied on separate page, exporting both ad hoc and invoice batches in the range

### Use case

Role player - labmanager only

- i) the role player navigates to the Invoice batches page and opens the batch to be exported
- ii) she clicks [export] on that page
- iii) she specifies the file name and network folder for the export file

- iv) the invoices are exported in comma delimited file formatted to be read by accounts software Pastel
- v) the accountant imports the invoice export file into Pastel

## 17.4 Ad-hoc Invoices

### Use case

#### Role players - labmanager only

the role player navigates to the client's Ad hoc Invoices page and clicks [add new]

she enters the 'Invoice date' to be shown on the invoice itself

she selects the items to be included on the Invoice

she enters the remarks to go into the comment field on the invoice

she clicks [create invoice]

items included on invoices are flagged as 'invoiced' and the ID of the invoice it appears on is displayed on the item's pages

apart from standard address details, dates, prices & VAT, etc, the invoices show:

- if any discount applies, a note to indicate what type of discount and how much
- The laboratory's Banking details
- Comments as described above
- Client VAT nr

the manager pushes the [print] button

the invoices are printed

the invoice status goes to printed

## 17.5 Re-printing Invoices

### Use case

#### Role players - labmanager and labclerk

the role player navigates to the invoices screen and finds the invoices to be printed

the manager pushes the [print] button

the invoices are printed

## 18 Price Lists

[Pricelists in the wire frame model, click here](#)

## Purpose

To compile price lists from the services and products listed in the system

## Notes

Price lists are not shown to clients or anonymous visitors but can be printed or e-mailed by the labmanager

Since prices are kept separately for corporate and non-corporate clients, two separate price lists for these two groups can be created. This is not indicated on the eventual price list

As in the standard Bika, separate price lists are used for Analytical services and products

For pseudo-quoting and promotions etc, it is possible to apply a discount percentage on all of the price list or any sub-section of it

## Creating price lists

### Use case

#### Role players labmanager

prices themselves are maintained in the LIMS set-up on the list of analytical services, surveys, culture reports etc. all price updates are done there, see [Analysis Services and Prices](#)

the role player navigates to [the price lists page](#)

she presses [create price list]

on the [price list creation page](#) she gives the price list a name, e.g. Chemical Analyses 2005 and

she enters a start and end date

she completes a field to indicate whether it is a corporate or non-corporate price list

she select the groups of items to be included, e.g. surveys, inspections, culture reports etc.

for, e.g. a promotional price list, a discount percentage can be applied per price group or all items

remarks about the prices can be entered in a remarks field

as well as selected from the global insertion list

she presses [save]

the price list is compiled off the list of analytical services and their prices, discounts applied and kept in the LIMS set-up

- for a corporate price list, the corporate prices are used
- for a non-corporate price list, the non-corporate prices are used

## Emailing and printing price lists

### Use case

- i) the role player navigates to the [price lists page](#)
- ii) she opens the [pricelist](#) to email/print
- iii) to print it, she presses print in the browser's menu system
- iv) she may also email the price list to any of the contacts on the system – their addresses are available to lab staff off a pick list, clients and other users type in e-mail addresses
- v) once the email address field is completed, she presses [email]
- vi) the LIMS delivers the price list to the addressee

## 19 Clients Set-up

All of the above requires set-up data to be maintained for clients. These are best illustrated by the wire frame model, please [see the client's page](#) and explore all tabs in the set-up structure

Note the [survey data kept per plant](#) and also explore the [client's contacts page](#)

### Purpose

Also see [Invoices](#)

Pending the Pastel interface specification, client credit limits, balances and statuses are exchanged with the LIMS at regular intervals to facilitate alarms and notifications by the LIMS to the labmanager where specified

## 20 Queries

Query forms are available to query each of the following on any their attributes:

- o Analyses - on Analysis Requests and Worksheets
- o Orders
- o Invoices

Query results can be emailed

In tabular layouts for query results, where results were not requested or are not available yet, this is indicated to prevent confusion. Also read [NAY – not available yet. NR](#)

### ie, Query invoices

**Purpose** Lab personnel might want to view invoices to field queries

### Use case

Role players - labmanager and labclerk

- i) the role player navigates to the 'query invoices' screen
- ii) she completes fields to select invoices:

- iii) client or all clients and/or date range and/or AR ID and/or Analyses
- iv) she presses [submit query]
- v) all the invoices complying to the search terms are listed
- vi) 1 Invoice per line, showing the Invoice number and its main
- vii) the role player may drill down to any of these by clicking on it
- viii) she may also email the query result to any of the contacts on the system – their addresses are available to her off a pick list
- ix) alternatively she may type in an email address

### Printing AR Query results

For financial auditing purposes it is an requirement to produce parts of the audit trail on paper. It is an option to print the ARs listed in the AR Query results sequentially and in the format specified for publication by print

## 21 Reports

[Reports menu in the wire frame – click here](#)

Various management reports are built into the system. These are used on ad hoc basis for any date range provided

Later to be included in the month-end run

They include:

### General

[Analyses totals \(incl turnaround summary\)](#)

[Analyses totals per client](#)

[Analyses requests per client](#)

[Analyses totals per sample type](#)

### Efficiency

[Analyses repeated](#)

[Control analyses](#)

[must allow for expected value to be captured](#)

[Turn around times not met](#)

### Accreditation

[Analyses out of range](#)

### Accounting

Analysis Requests not invoiced

Client statuses, balances & credit limits

## 22 True Working hours calendar

For the calculation of late analyses, current Bika design uses total elapsed time between sample reception and results publication. Not actual elapsed working hours

This results in analyses being flagged late incorrectly after weekends and public holidays

The functionality proposed here will use only true lab working hours for these alerts and turn around reports

The maximum time allowed for analyses are configured in the analysis services' set-up

### 22.1 Calendar management

The labmanager configures the lab's working days and hours for any future period

#### Use case - setting up the calendar

Role player - labmanager

- i. The role player navigates to the calendar and is shown the current calendar. By default all future dates have no working hours assigned to them until edited
- ii. she selects edit

#### 1) Calendar period

- iii. she keys in a start and end date for the period to be edited

- 2) she is not allowed to modify working hours for past dates

#### 3) Regular working weekdays

- iv. she selects the lab's working weekdays from a panel
  - typically Monday, Tuesday, Wednesday, Thursday and Friday
  - and not Saturday and not Sunday
- v. she then sets working hours for all these working days, allowing for breaks
  - e.g. 9:00 to 12:30, 13:15 to 17:00
- vi. the role player may edit each weekday individually, say to use shorter working hours for Fridays 9:00 to 12:30, 13:15 to 15:00
- vii. she clicks [save]
- viii. all regular working weekdays, in the selected calendar period, are populated with these data
- ix. the calendar is displayed

#### Holidays

- x. the role player now access individual days on the calendar to indicate them as holidays, public or otherwise

- xi. a 'repeat holiday' function is used to enter holiday breaks of longer than one day, e.g. a 14 day end of year recess
- xii. holidays have title fields - the role player enters any text here, e.g. Youth day.
- xiii. The holiday title text is displayed on the calendar in the standard weekly or monthly views
- xiv. she saves her edits
- xv. no working hours are allowed on holidays. If a day has working hours assigned to it and then gets marked as a holiday, its working hours are set to zero

#### 4) Irregular days

- xvi. individual days may be edited to reflect half days etc, e.g. Friday 13 March 9:00 to 12:00
- xvii. she saves her edits

## 22.2 Calendar view

Weekly & Monthly calendar views are available, indicating holidays and non-working regular weekdays

One-click 'next' or 'previous' buttons allow for easy navigation to the next week or month

## 22.3 Late analysis alert customisation

These will now be triggered by true working hours elapsed since sample reception when compared to the allowed period specified in their set-up. Ditto for analyses listed on the late analyses page

## 22.4 Report - Turnaround times not met

A new report, reflecting late analyses per analysis service for any specified period. To be used by managers to manage bottlenecks and client queries

For

selected date range  
per client or 'All'

Columns per analysis service :

Weekly sub totals: analyses late | average time late | max time late  
Grand totals

An example:

NB Columns for 'maximum hours late' to be added, for the totals and each week - too cramped here

Cells are left empty, e.g. not filled with zeroes, where there were no late analyses for a given analysis service

<b>Late analyses from 1 January 2006 - 1 March 2006</b>											
<b>Client: Farmers co</b>											
Number of analyses late and average time late											
Analysis	Total	Ave hrs late	Weeks starting:								
			1 Jan 06	8 Jan 06	15 Jan 06	....	21 Feb 06				
Ash	36	4 hr	5	4 hr	6	4 hr	3	3 hr	....	5	3 hr
Cu	6	3 hr					3	5 hr	....	2	3 hr
Fat	12	8 hr					3	4 hr	....	5	2 hr
Moisture	3	1 hr	1	3 hr					....	1	5 hr
....	....	....	....	....	....	....	....	....	....	....	....
Protein	15	3 hr	12	4 hr	3	1					

## 23 CSV data import and export

Lab clients may request analyses by mailing the requests per predefined csv formatted file attachment to the lab. Lab staff then import the file and the ARs enter the system with status 'Sample due'

When the samples arrive at the lab they are received in the normal Bika workflow

Similarly, clients may want to receive results in tabular format on publication. They do so by selecting 'file' as a publication preference - the LIMS then publish the results as a CSV attachment to their emailed results

Both import and export formats are illustrated in an OpenOffice file that can be requested from [lemoene@bikalabs.com](mailto:lemoene@bikalabs.com)

## 24 LIMS Set-up

### Purpose

To set constants such as percentages and limits for system wide use. For all of them the use case is the same and may only be executed by the lab manager. She navigates to the lab set-up and edit the set-up item. All saved changes take immediate effect

**For this document's purposes only the set-up items' attributes are discussed here.** The wire frame model set-up is a very good record of what is required per item

## 24.1 Analysis Services and Prices

Both chemical and microbiological:

- i) The bika standard attributes kept for each analytical service: title, description, unit of measure, measurement, VAT %, price
- ii) 2 prices are kept for each service, a corporate and non corporate price
- iii) Turnaround time target - for productivity management
- iv) Sub-contracted yes/no – set to yes if sub contracted
- v) Sub contractor
- vi) Analysis type: chemical or microbiological
- vii) procedure/method to be used
- viii) instructions – these are shown/hyper linked in Worksheets for labtechnicians and not shown to clients
- ix) instrument to be used
- x) any of the general text blobs that must be shown/hyper linked when the analysis' results are shown, e.g. standards, disclaimers, results interpretation etc
- xi) cost code – each analysis is assigned to a cost code used for financial reporting

### Extra attributes for chemical analyses

- xii) indication whether the analysis requires a weight calculation. this is later used to add extra rows/columns for all the different weights on ARs and WSs

## 24.2 Sample (Product) types

List of sample types, e.g. dairy, animal feed, poultry ...

Attributes include:

- i) Sample type expiry period – to raise alarms for sample

## 24.3 Accounts set-up

- i) list allowed 3rd party invoicees
- ii) Terms of payment types – e.g. 30, 60 days etc
- iii) Statures – e.g. 'past due', paid up

## 24.4 Clients

Apart from the standard, also:

- i) List of 3rd party companies allowed to be invoiced

- ii) Client type – e.g. corporate non corporate, etc

## 24.5 Laboratory Set-up

See wire frame for details

### Laboratory

Analytical services - Chemical

Instruments

Products

Sample types

Sub contracting labs

Lab manager responsibilities

### Specifications - Lab's own

This is where the lab's own set of specifications are maintained, Client specifications are initialised with these and lab staff has the opportunity to apply either the lab's or the client's when screening data form out of range values

Analyses - Chemical

### Accounts Set-up

Accounts constants

Cost Codes

Invoictees

Terms of payment

## 25 Not in Bika LIMS 2. Phase 2 development work

Apart from standard bika AR features, other laboratory use cases form sub-flows in the AR workflow. For easier facilitation in a phased implementation and budgeting they are listed here

### 25.1 Quotes

Quotes were specced in details in version 1.5 of this document. It can be included from there again when necessary

### 25.2 Client status checks

No requests are allowed for 'blocked' clients – they are shown a message telling them why before being returned back to their previous page. Blocking a client gets done by the labmanager in the client set-up

'past due' clients and those overstepping their credit limits who place CARs are still allowed to do so but a notification is raised for the labmanager. Setting these statuses and limits are done in the client set-up and are regularly updated via imports from Pastel

After the CAR is created, the AR's prices are brought in calculation against the client's credit limit and the labmanager notified if the client had gone over

### **25.3 Automated Month-end**

#### **Purpose**

A month-end run is scheduled by the labmanager but by default takes place on the 25th of every month

Once scheduled, the system executes the month-end run in macro without operator assistance at night so as not to interfere with system performance during normal business hours

Actual printing of invoices and month-end reports best be supervised and can be done the day after

It is also possible to run these reports on an ad hoc basis for any given time period

It includes:

- invoices

- monthly audit reports

- monthly QC reports (to be listed by the laboratory, mock lay-outs will be super)

### **25.4 Trend/Statistical analysis**

Either by exporting data to 3<sup>rd</sup> party analysis package or writing the more popular methods in Bika herself. Will have capability to graph data

### **25.5 Bar coding**

Sample and analysis data and specifically statuses will be available on hand helds after reading sample bar code. This will require radio networking

### **25.6 Instrument interfaces**

The 'old' instrument, is it a spectrometer, 1 value at a time analogue output will be interesting but expensive, especially if you are going to replace it

### **25.7 Radio networked hand-helds**

Also see Bar coding

## 25.8 Emailing invoices

## 25.9 Inventory

## 25.10 Instrument Maintenance module

## 25.11 Sample collection workflow

Including notifications of samples to be fetched

## 25.12 HR module

Training schedules and Competency records

## 25.13 Validation Calculation

### Purpose

For some analyses, e.g. weight calculations, 'validation calculations' must be carried out using constants and known results to ensure the procedure is in good order

### Role players

labtechnician, labmanager

### Use case

The labtechnician enters the constants and presses [validate]

The system responds with a result which the technician checks against a printed list

She presses [correct] or [incorrect] pending her judgement

If the validation failed, the labmanager gets notified

The LIMS locks the procedure and does not allow the labtechnician to proceed

All validation calculations are logged with their constants, result and success/failure indication, for look-up and reporting on later

## 25.14 Instrument bias correction

### Purpose

At times the labmanager will want to implement bias correction on results obtained from certain instruments

Correction factors are maintained by the labmanager in the LIMS Set-up

Where bias corrections are applicable, the technician is prompted during data capturing to confirm or reject the correction.

The correction is logged and can be viewed on a 'Corrections applied' page, queried and reported on

## 25.15 Urgent AR workflow

### Purpose

For various reasons management will want to push some ARs through the lab ahead of others. These be brought to all staff attention and the urgent ARs be given preferential treatment

### Role players

labtechnician, labmanager

### Use case

to be detailed

Urgent requests get flagged 'Urgent' by the labmanager.

she may decide to apply premium price or not

Notifications are sent to technicians and clerks.

Urgent ARs show in a different colour when displayed amongst other data

Urgent ARs can be viewed on an 'Urgent' page, showing the status of each and linked to the corresponding AR en WS pages

## 25.16 Sample Chain of custody. COC

### Storage and disposals

This functionality enables lab personnel to establish

- i) where samples are kept
- ii) when and how samples were disposed of
- iii) a 'disposal' notification/alarm is sent to the labmanager for samples older than its specified shelve life
- iv) a date ranged report is available to report on sample disposals

### Work flow hazardous samples

**Purpose** To warn lab staff handling staff of the hazardous nature of samples.

Sample hazardous state gets determined by the sample type, maintained in the LIMS set-up

### Use case

Role players labtechnician

When a hazardous sample is received, the systems warns the labclerk and she puts a Hazardous sticker on the sample

## 25.17 Instrument reference testing

Also see [Client Reference testing](#)

### Purpose

To determine the reliability of instruments/ methods, whenever control analyses with standard samples are done, these results are marked as 'control' and save in the LIMS together with their expected results

These results may then be viewed, queried, graphed and reported on

Additionally, data obtained from here may be used to calculate [bias corrections](#) for application during results data capturing

## 25.18 Client Reference testing

### Purpose

In the product specification module, in addition to the min and max values per product, the labmanager maintains reference values per client product, e.g. expected values as displayed on commercial packaging.

A %error allowed for each is also maintained here

Should during data capturing a result stray further than the allowed %, the result is highlighted and the labmanager notified

It is possible to query results and plot them against expected reference values

### Role players

labtechnician, labmanager

## 25.19 Logging specification edits

## 25.20 Sub contracting workflow

Currently only a rider: 'The laboratory may sub-contract analyses'

## 25.21 Spell checking

For entered texts

## 25.22 Specs for Cultures, AntiBiograms, Staff surveys

## 25.23 Proficiency testing workflow

Fields

Organiser

Schema

Round

Total number of participating labs

Sample No

Sample type

Analysis

Method

Method code

AOAC 16th

Date

Pass

Number of participating labs

Grand average

Standard deviation

Average range of dups

## 25.24 More reports / graphics

On Efficiency and productivity