GCC FORENSICS EXHIBITION & CONFERENCE
معرض ومؤتمر الخليج العربي للأدلة الجنائية
30-31 OCTOBER 2018 | DUSIT THANI, ABU DHABI

Implementation of a Forensic LIMS

Dr. Aaike Oosterkamp
LabWare Spain

LABWARE
Results Count

LABWARE 7

Laboratory Information Management System (**LIMS**), is a software-based system that support a modern laboratory's operations. It tracks samples, manages laboratory work, captures results, and produces laboratory reports.

Electronic Lab Notebook (**ELN**) is a computer program designed to replace paper laboratory notebooks. ELNs are used by scientists, engineers, and technicians to document research, experiments, and procedures performed in a laboratory.

© LabWare

LABWARE Results Count

GCC FORENSICS EXHIBITION & CONFERENCE
معرض ومؤتمر الخليج العربي للأدلة الجنائية
30-31 OCTOBER 2018 | DUSIT THANI, ABU DHABI

LABWARE 7

Connect all Lab Instruments

Instrument Data Capture

Direct bi-directional interfaces

Enterprise Business Systems

LABWARE lims™ laboratory information management system

LABWARE eln™ electronic laboratory notebook

Single Centralized Database and Audit Trail

Device and Browser Independence

LABWARE
Enterprise Laboratory Platform

Reporting

Customer Portal

External Databases

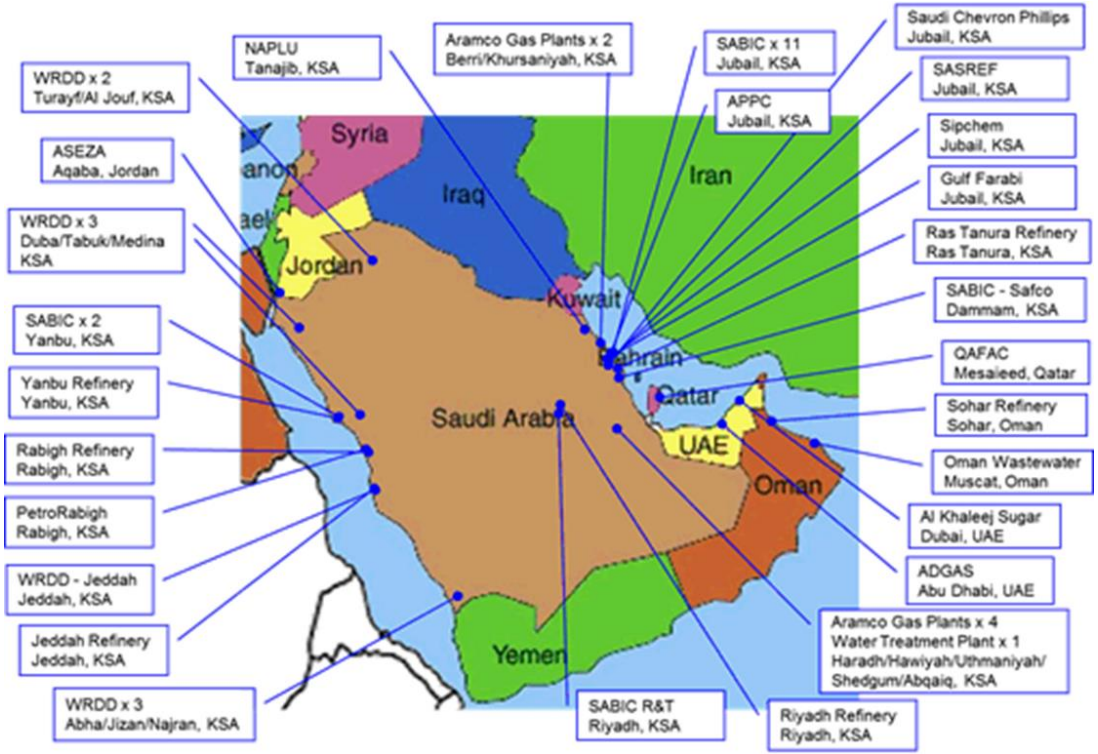
Secure Access and Output

© LabWare

LABWARE Results Count

LabWare – Middle East

- **LabWare – Middle East has a large customer base.**

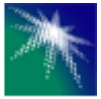


© LabWare

LABWARE Results Count

LabWare – Middle East

- **LabWare – Middle East has a large customer base.**



© LabWare

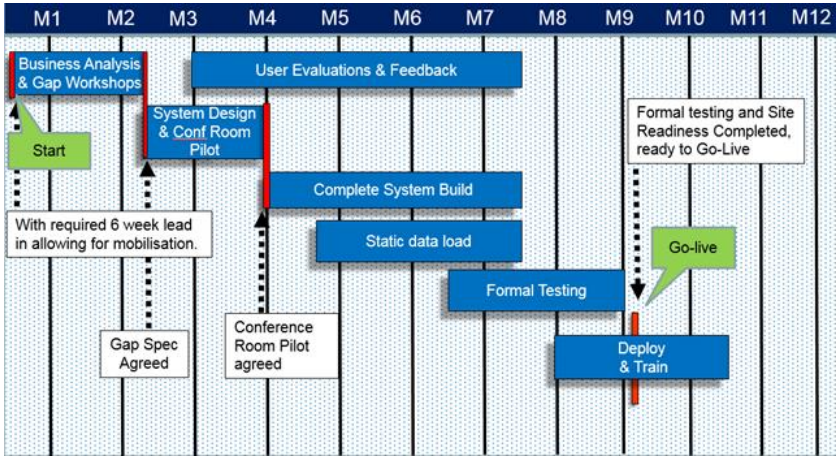
LabWare in Forensics

- **LabWare's has a over 150 customers in Public Health, DNA and Forensics customer base.**

- **Large footprint in forensics**
  - Comprehensive implementations in UK, Spain, Denmark, US, Bulgaria, Colombia, Argentina, South Africa, Botswana, Australia, Singapore.

© LabWare

- ***Based on the several implementations, a set of base requirements was identified.***
  - General Forensic Requirements
  - Forensic DNA Requirements
  - Quality Requirements
- ***LabWare has created a vertical solution that covers the main requirements***
- ***Using this vertical solution, a project plan can be created to implement the solution in customers***



General Requirements for a Forensic LIMS

- ***Case Management***
  - General Case Management for Cases that are received from external customers (police?)
  - Create Subtasks (sub-cases) for departments that are involved in the investigations
  - Workflows to manage subtasks (sub-cases) in the department.
- ***Exhibits Management***
  - Reception of Exhibits by Submissions
  - Chain of Custody of Exhibits throughout its life-cycle in the laboratory
- ***Analysis Management***
  - Assign analyses to exhibits
  - Automated results entry from instruments
  - Approval of results
- ***Report Management***
  - Automated report creation
  - Approval of Reports by several people
- ***KPIs***

© LabWare

LABWARE Results Count

Forensic DNA Requirements

- ***Biological Material Recovery***
  - Identification of biological stains
  - Presumptive and Confirmation tests
  - Creation and Storage of Samples for DNA Analysis
- ***DNA Analyses***
  - DNA Extraction and Concentration Analyses
  - DNA Amplification and Profile Analyses
- ***DNA Profile Management***
  - Cross-contamination checks
  - Profile composition based on several kits
  - LR and Paternity calculations
  - Upload to National Databases

© LabWare

LABWARE Results Count

Quality Requirements

- ***The main quality requirements are based on the ISO 17.025 standard***

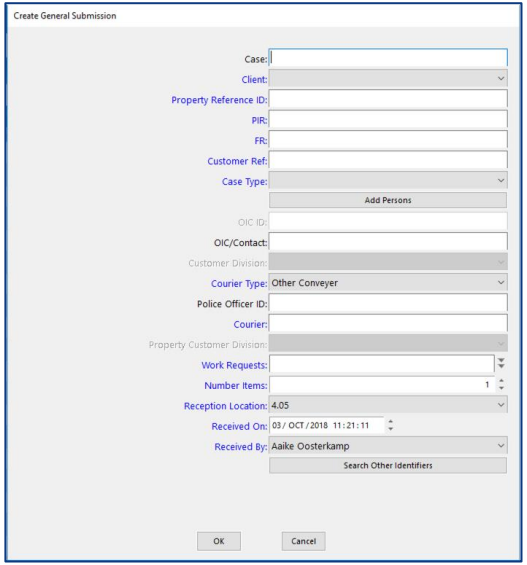
- ***Full Auditing***
- ***Instrument Management***
  - Service, Maintenance, Calibration, Verification
- ***Standards & Reagents Management***
  - Barcode Labels
  - Reception, Opening, Usage
- ***Training***
- ***Document Management***

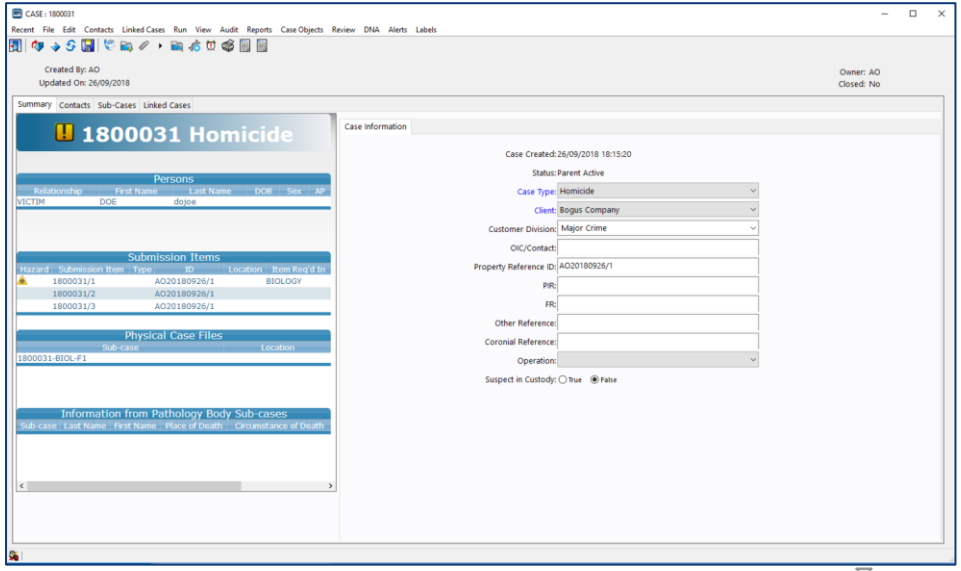
© LabWare

LABWARE Results Count

Case Management

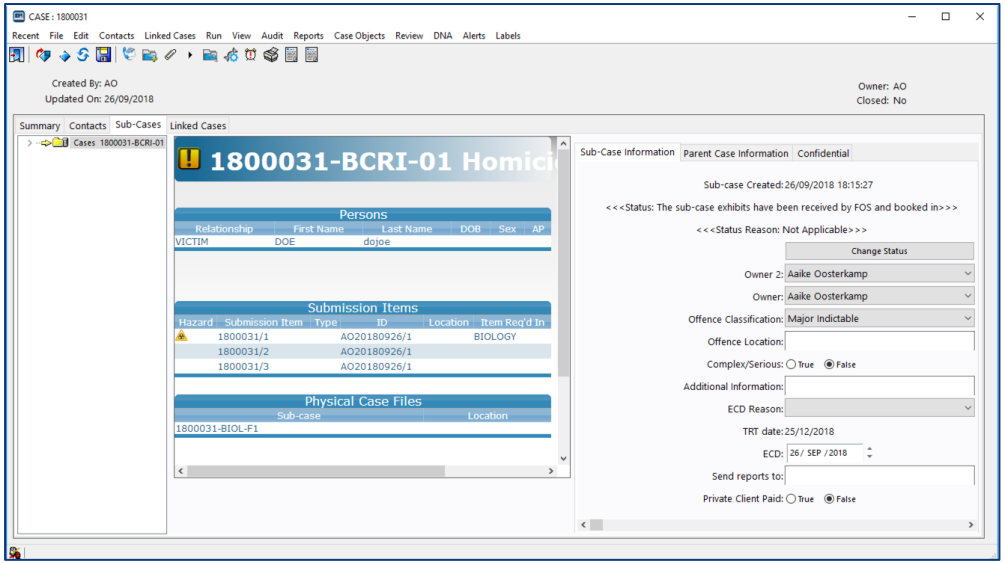
- ***Case Management***
  - ***Creation of cases***
    - General Case Management for Cases that are received from external customers





Case Management

- ***Case Management***
  - **Creation of Subtasks (Sub-cases) for departments**
    - Subtasks are created for the involved departments
    - In LabWare this is done by Subcases



Case Management

- ***Case Management***
  - **Workflows to manage cases**
    - Visual Workflows have been created for several roles in the Labs

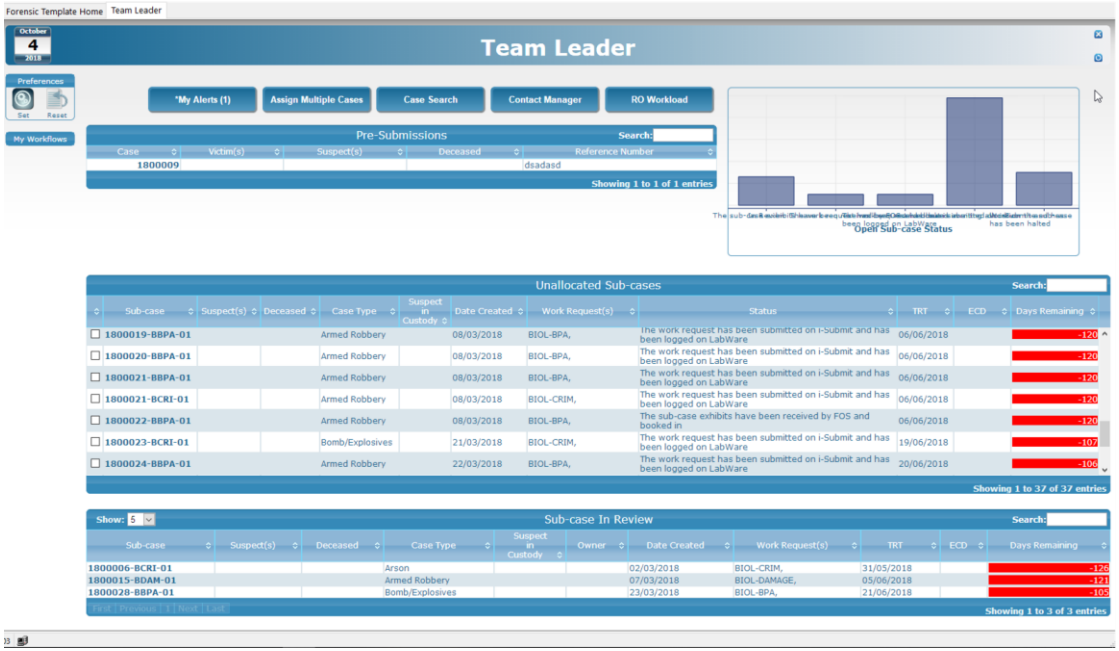
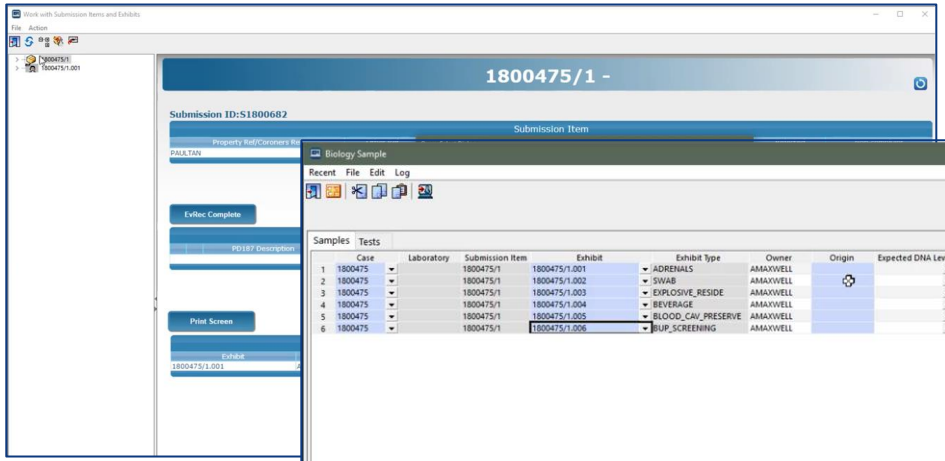
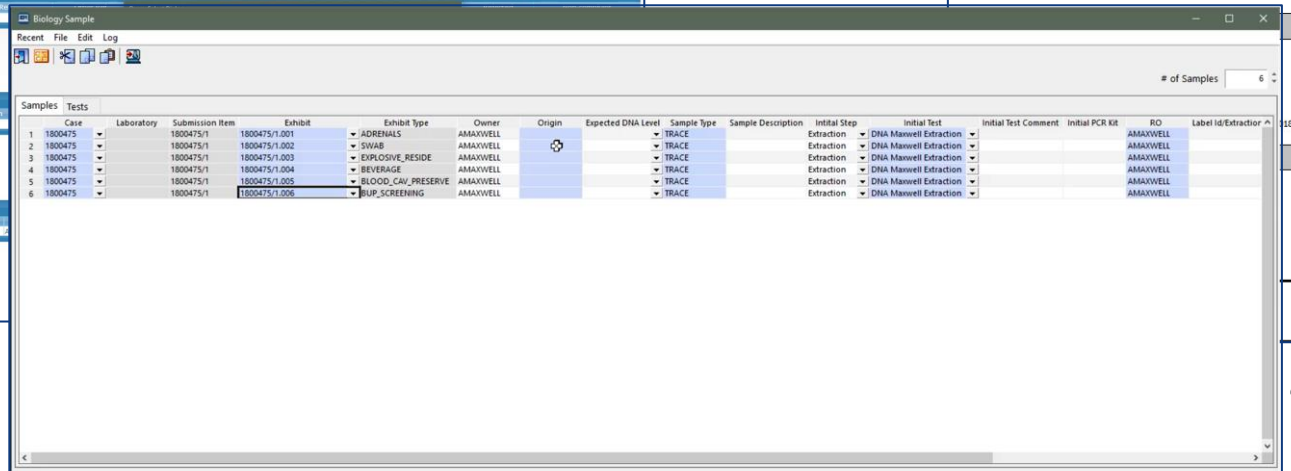
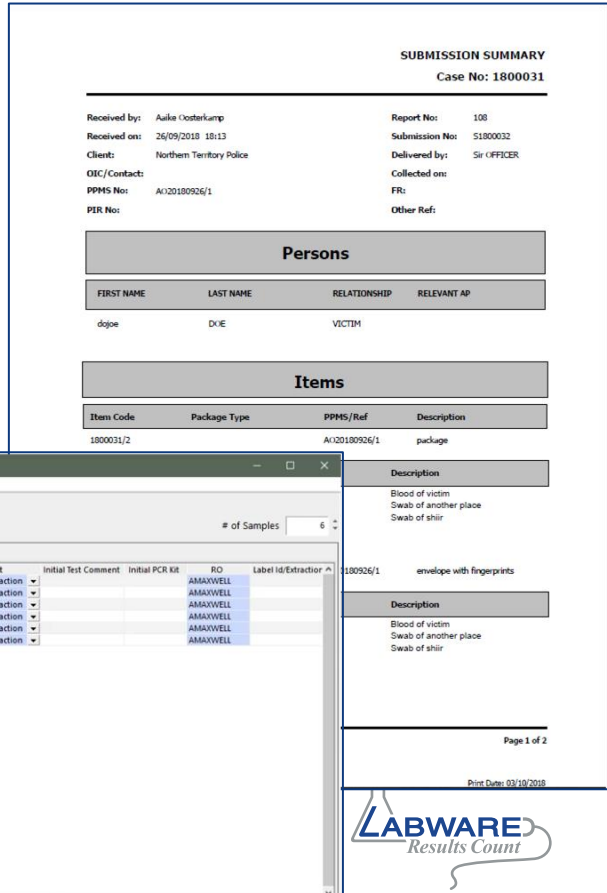


Exhibit Management

- *Exhibit Management*
  - *Reception of Submissions*
  - *Open Packages and create exhibits*
  - *Reporting*







SUBMISSION SUMMARY

Case No: 1800031

Received by:	Aaike Oosterkamp	Report No:	108
Received on:	26/09/2018 18:13	Submission No:	S1800032
Client:	Northern Territory Police	Delivered by:	Sir OFFICER
OIC/Contact:		Collected on:	
PPMS No:	AO20180926/1	FR:	
PIR No:		Other Ref:	

Persons

FIRST NAME	LAST NAME	RELATIONSHIP	RELEVANT AP
dojoe	DOE	VICTIM	

Items

Item Code	Package Type	PPMS/Ref	Description
1800031/2		AO20180926/1	package

Description
Blood of victim Swab of another place Swab of shiir

1800926/1	envelope with fingerprints

Description
Blood of victim Swab of another place Swab of shiir

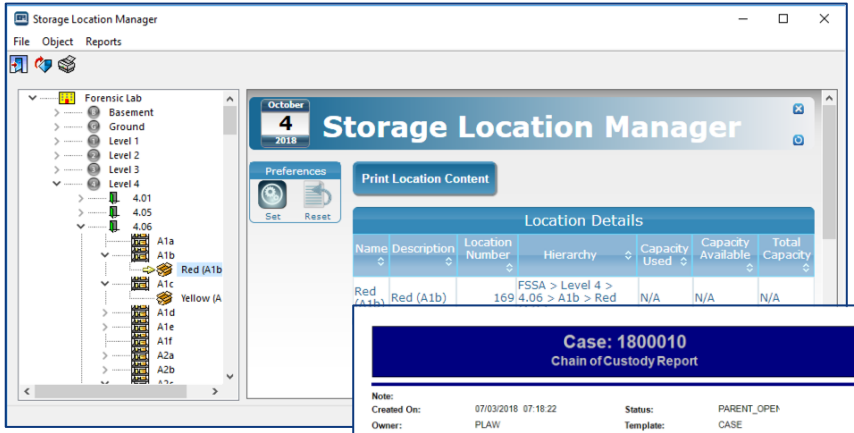
Page 1 of 2

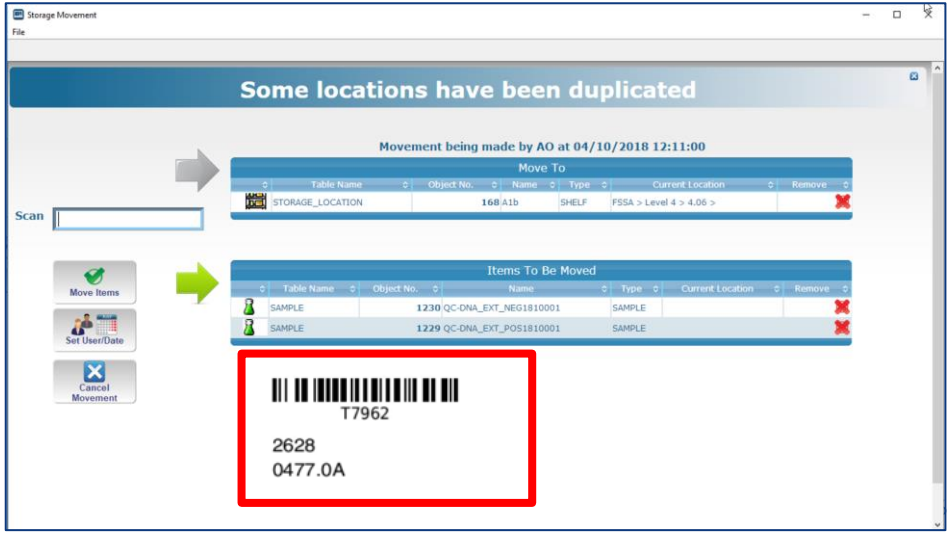
Print Date: 03/10/2018

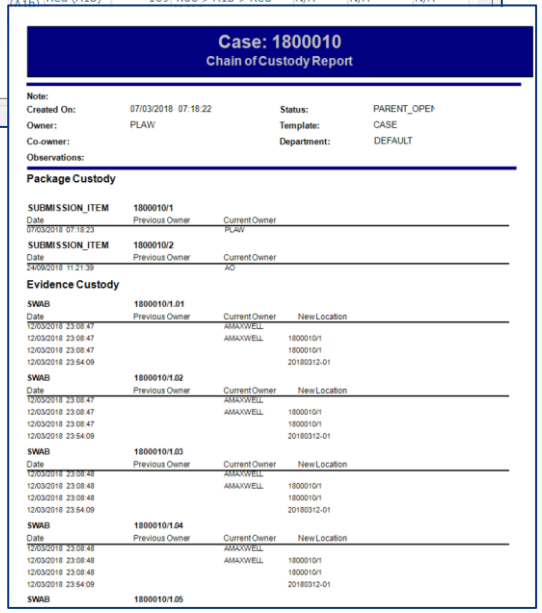
© LabWare

Case Management

- *Chain of Custody Management*
  - *Movement of objects by barcodes (exhibits, bags, samples) through the Labs*
  - *Chain of Custody Reports*

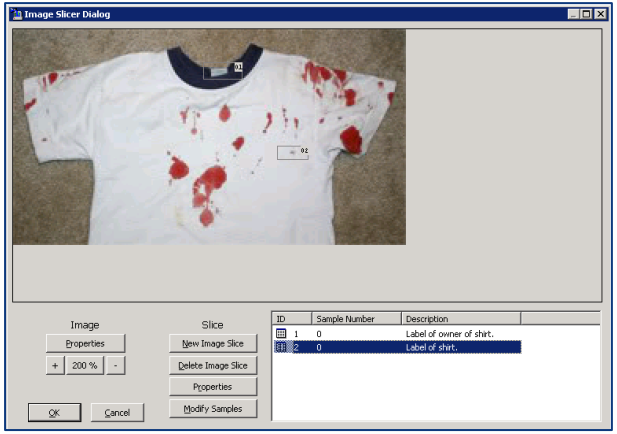


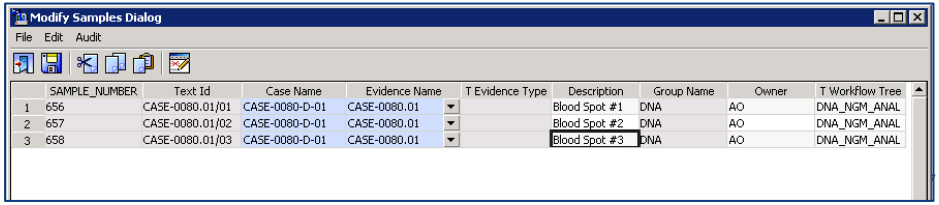


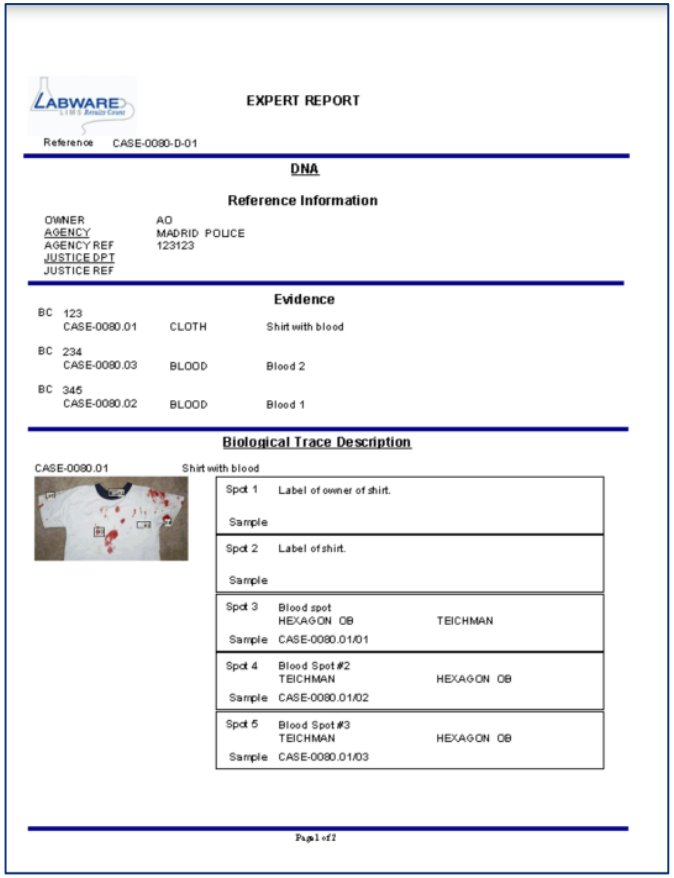


Biological Material Recovery

- ***Biological Material Recovery***
  - Identification of biological stains
  - Presumptive and Confirmation tests
  - Creation and Storage of Samples for DNA Analysis







LABWARE

EXPERT REPORT

Reference CASE-0080-D-01

DNA

Reference Information

OWNER	AO
AGENCY	MADRID POLICE
AGENCY REF	123123
JUSTICE DPT	
JUSTICE REF	

Evidence

BC	123		
	CASE-0080.01	CLOTH	Shirt with blood
BC	234		
	CASE-0080.03	BLOOD	Blood 2
BC	345		
	CASE-0080.02	BLOOD	Blood 1

Biological Trace Description

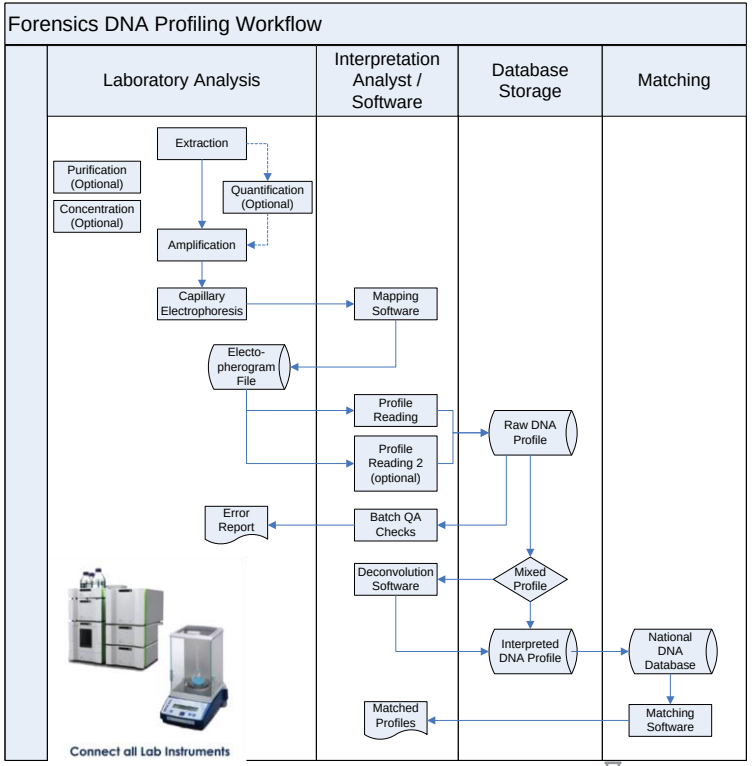
CASE-0080.01 Shirt with blood

Spot 1	Label of owner of shirt.	
Sample		
Spot 2	Label of shirt.	
Sample		
Spot 3	Blood spot HEXAGON OB	TEICHMAN
Sample	CASE-0080.01/01	
Spot 4	Blood Spot #2 TEICHMAN	HEXAGON OB
Sample	CASE-0080.01/02	
Spot 5	Blood Spot #3 TEICHMAN	HEXAGON OB
Sample	CASE-0080.01/03	

Page 1 of 2

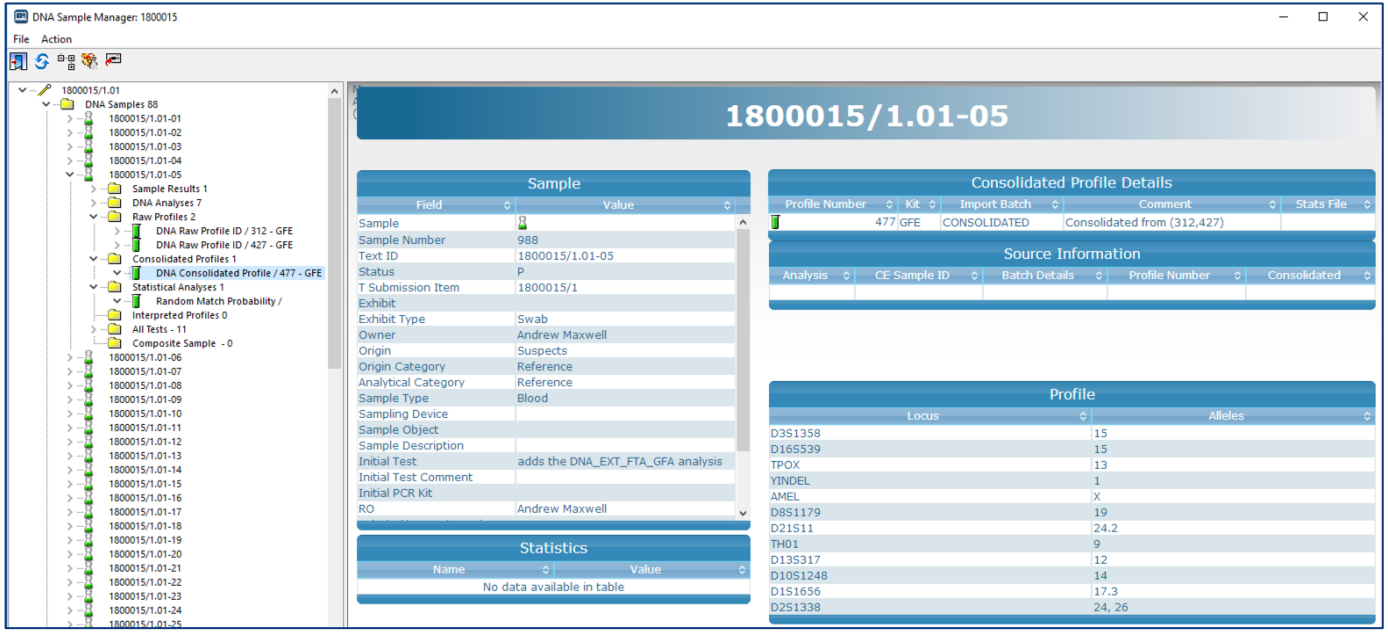
Forensic DNA Workflow

- ***Workflow***
  - ***Laboratory Analysis***
    - Extraction, DNA Quantification
    - DNA Amplification, CE
  - ***Interpretation Analyst Software***
    - Profile Readings
    - QC Checks
  - ***Database Storage***
    - DNA Profile storage
  - ***Matching***
    - Upload into National Database, such as CODIS.
    - Run daily match reports.
    - Recover matches and report to case



DNA Analysis Assignment

- ***DNA Analysis Assignment***
  - The Expert assigns Analyses to the exhibits
  - These are then passed to the lab
  - The analysis process should run in an automated manner

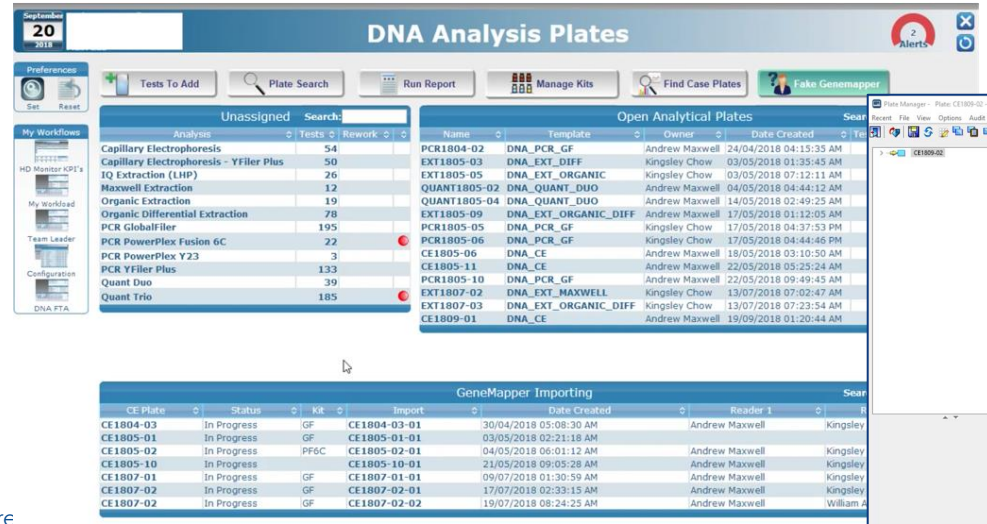


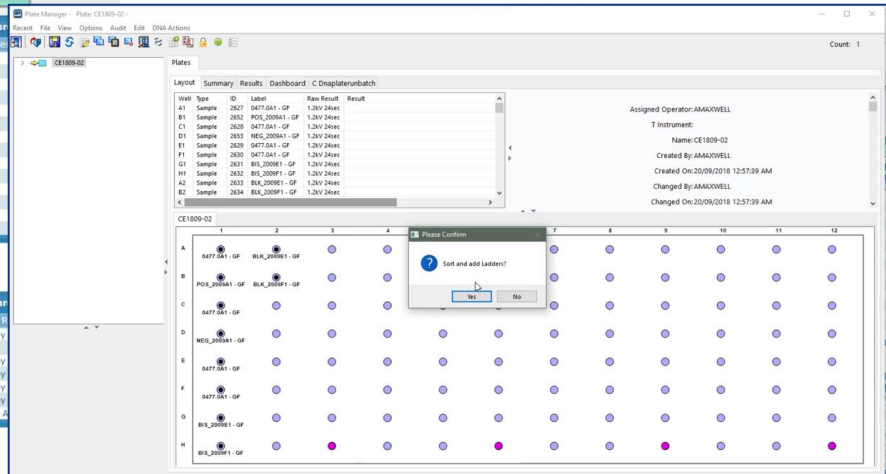
© LabWare

LABWARE Results Count

DNA Analysis in the Lab

- ***DNA Analysis in the Lab***
  - DNA Extraction and Concentration analysis
    - Organic Extraction,
    - Quant Duo, Quant Trio
  - DNA Kits Analysis
    - GlobalFiler, PowerPlex, Identifiler, YFiler

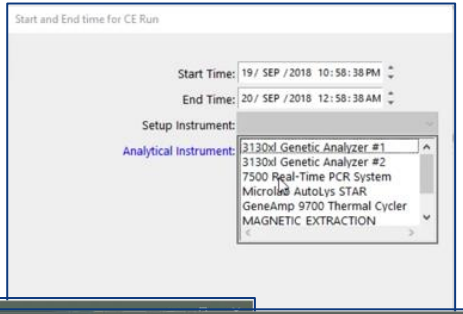


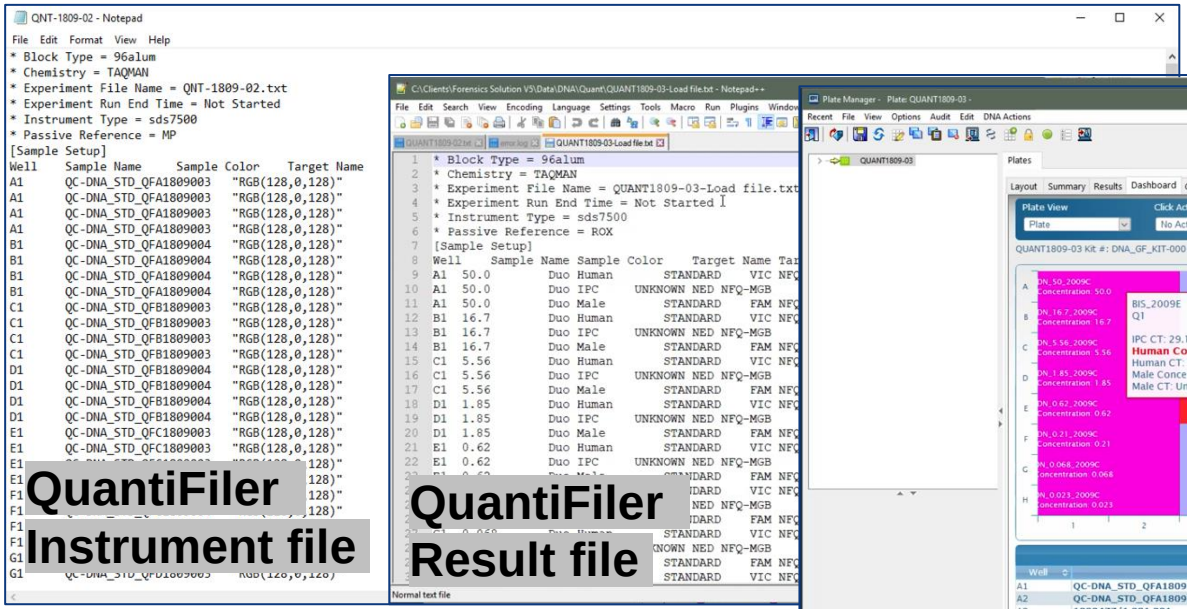


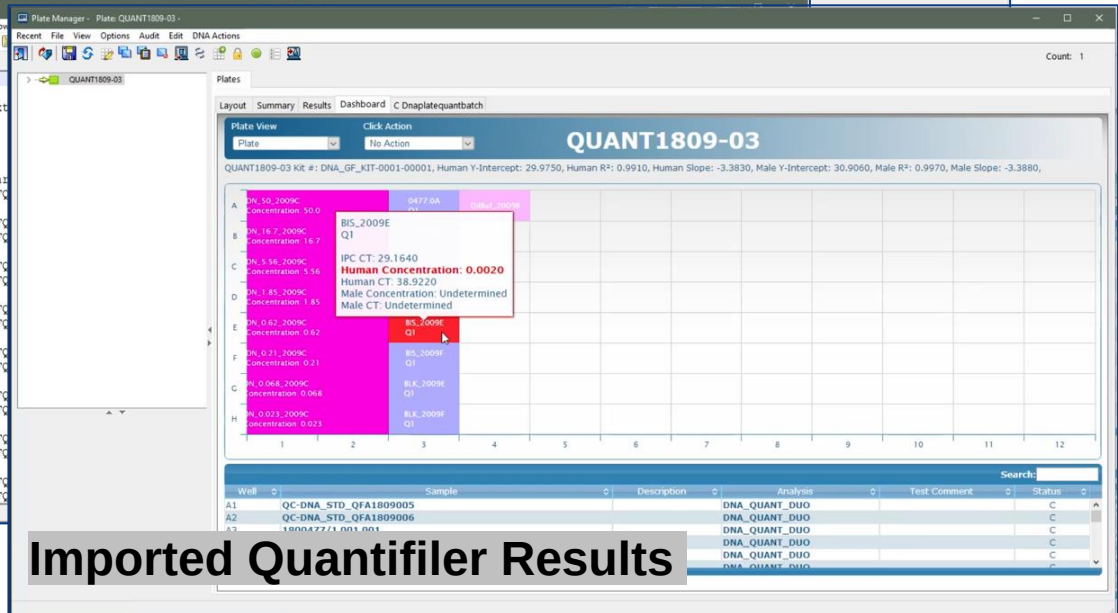
© LabWare

Instrument Integration

- ***Extraction and DNA Quantification***
  - Extraction Robots
  - Export and Import to QuantiFiler by files
  - Options to decided to rework samples



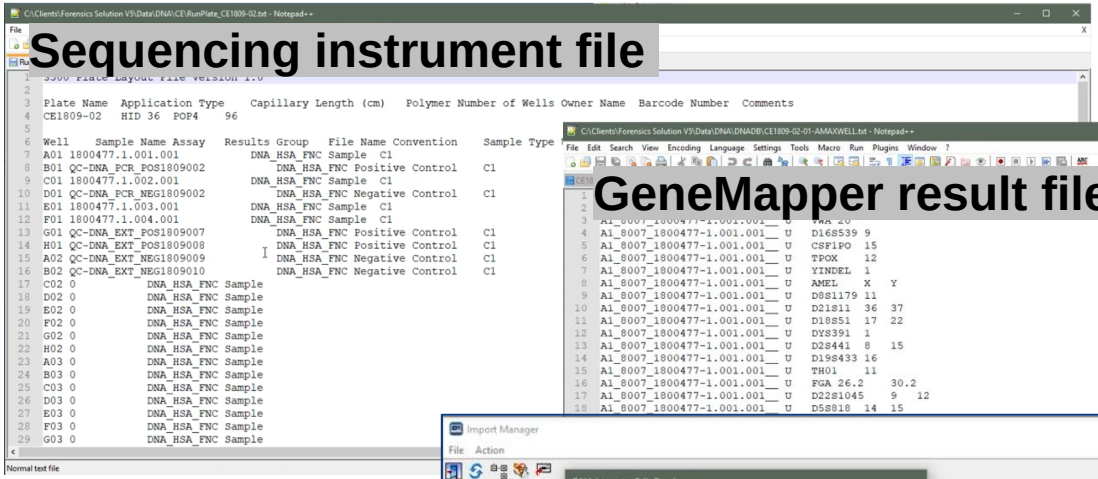


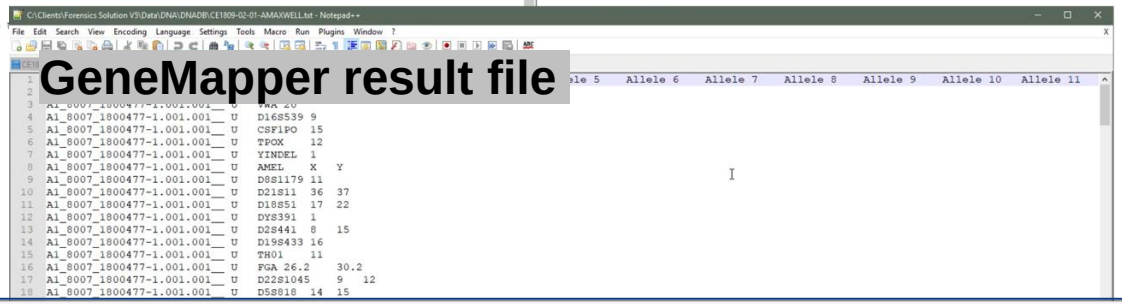


© LabWare

Instrument Integration

- ***Sequencing information***
  - Export to Sequencing Instrument
  - Import from GeneMapper





© LabWare

Profile Management

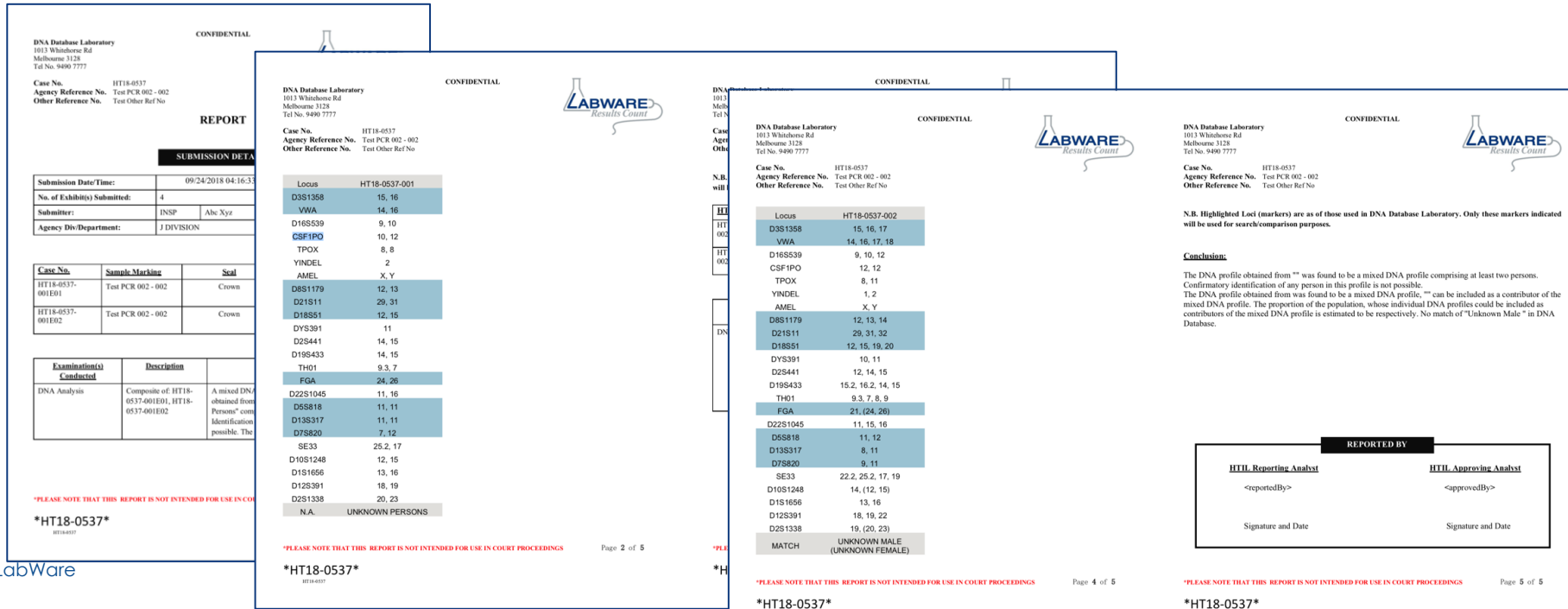
- ***Profile information***
  - Revise Profiles
  - Interprete difference between two independent reads
  - Unite profile based on different kits
- ***Calculations of Match Probabilities***
  - Random Match Probabilities based on population
  - Parentage calculations
- ***Cross-contaminations***
  - Run queries on cross-contaminations (optional)
    - This is optional, as it may be chosen to be performed in other software
- ***Upload profiles to National Database***
  - Define export formats to National Databases
- ***Receive Matches from National Database***
  - Receive Matches of National Database
  - This information can be incorporated in the final report that is sent to the customer

© LabWare

LABWARE Results Count

Case Reporting

- ***Final Report Creation***
  - Based on the results that have been imported, automated final reports can be created that comprise Case Information, Exhibit Information and Analytical Results. As well final conclusions can be added.



CONFIDENTIAL

DNA Database Laboratory
1013 Whitehorse Rd
Melbourne 3128
Tel No. 9490 7777

Case No. HT18-0537
Agency Reference No. Test PCR 002 - 002
Other Reference No. Test Other Ref No

REPORT

SUBMISSION DETA

Submission Date/Time:	09/24/2018 04:16:33	
No. of Exhibit(s) Submitted:	4	
Submitter:	INSP	Abc Xyz
Agency Div/Department:	J DIVISION	

Case No.	Sample Marking	Seal
HT18-0537-001E01	Test PCR 002 - 002	Crown
HT18-0537-001E02	Test PCR 002 - 002	Crown

Examination(s) Conducted	Description	
DNA Analysis	Composite of: HT18-0537-001E01, HT18-0537-001E02	A mixed DNA obtained from Persons" com Identification possible. The

*PLEASE NOTE THAT THIS REPORT IS NOT INTENDED FOR USE IN CO

HT18-0537
HT18-0537

CONFIDENTIAL

DNA Database Laboratory
1013 Whitehorse Rd
Melbourne 3128
Tel No. 9490 7777

Case No. HT18-0537
Agency Reference No. Test PCR 002 - 002
Other Reference No. Test Other Ref No

Locus	HT18-0537-001
D3S1358	15, 16
VWA	14, 16
D16S539	9, 10
CSF1PO	10, 12
TPOX	8, 8
YINDEL	2
AMEL	X, Y
D8S1179	12, 13
D21S11	29, 31
D18S51	12, 15
DYS391	11
D2S441	14, 15
D19S433	14, 15
TH01	9.3, 7
FGA	24, 26
D22S1045	11, 16
D5S818	11, 11
D13S317	11, 11
D7S820	7, 12
SE33	25.2, 17
D10S1248	12, 15
D1S1656	13, 16
D12S391	18, 19
D2S1338	20, 23
N.A.	UNKNOWN PERSONS

*PLEASE NOTE THAT THIS REPORT IS NOT INTENDED FOR USE IN COURT PROCEEDINGS Page 2 of 5

HT18-0537
HT18-0537

CONFIDENTIAL

DNA Database Laboratory
1013 Whitehorse Rd
Melbourne 3128
Tel No. 9490 7777

Case No. HT18-0537
Agency Reference No. Test PCR 002 - 002
Other Reference No. Test Other Ref No

Locus	HT18-0537-002
D3S1358	15, 16, 17
VWA	14, 16, 17, 18
D16S539	9, 10, 12
CSF1PO	12, 12
TPOX	8, 11
YINDEL	1, 2
AMEL	X, Y
D8S1179	12, 13, 14
D21S11	29, 31, 32
D18S51	12, 15, 19, 20
DYS391	10, 11
D2S441	12, 14, 15
D19S433	15.2, 16.2, 14, 15
TH01	9.3, 7, 8, 9
FGA	21, (24, 26)
D22S1045	11, 15, 16
D5S818	11, 12
D13S317	8, 11
D7S820	9, 11
SE33	22.2, 25.2, 17, 19
D10S1248	14, (12, 15)
D1S1656	13, 16
D12S391	18, 19, 22
D2S1338	19, (20, 23)
MATCH	UNKNOWN MALE (UNKNOWN FEMALE)

*PLEASE NOTE THAT THIS REPORT IS NOT INTENDED FOR USE IN COURT PROCEEDINGS Page 4 of 5

HT18-0537
HT18-0537

CONFIDENTIAL

DNA Database Laboratory
1013 Whitehorse Rd
Melbourne 3128
Tel No. 9490 7777

Case No. HT18-0537
Agency Reference No. Test PCR 002 - 002
Other Reference No. Test Other Ref No

N.B. Highlighted Loci (markers) are as of those used in DNA Database Laboratory. Only these markers indicated will be used for search/comparison purposes.

Conclusion:

The DNA profile obtained from "" was found to be a mixed DNA profile comprising at least two persons.
Confirmatory identification of any person in this profile is not possible.
The DNA profile obtained from was found to be a mixed DNA profile, "" can be included as a contributor of the mixed DNA profile. The proportion of the population, whose individual DNA profiles could be included as contributors of the mixed DNA profile is estimated to be respectively. No match of "Unknown Male " in DNA Database.

REPORTED BY

HTIL Reporting Analyst	HTIL Approving Analyst
<reportedBy>	<approvedBy>
Signature and Date	Signature and Date

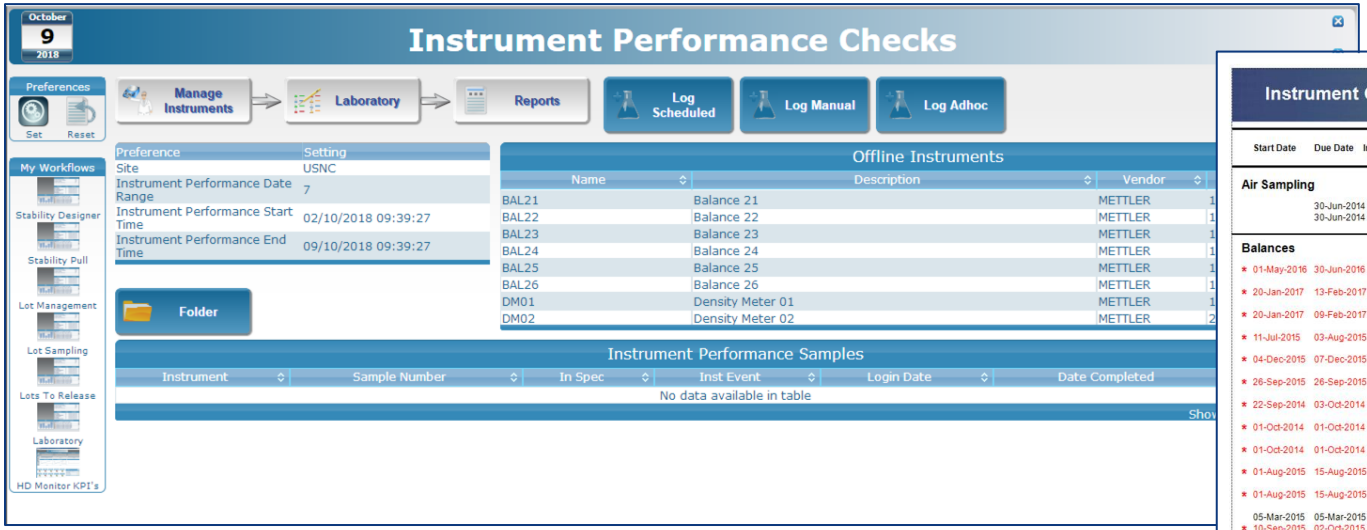
*PLEASE NOTE THAT THIS REPORT IS NOT INTENDED FOR USE IN COURT PROCEEDINGS Page 5 of 5

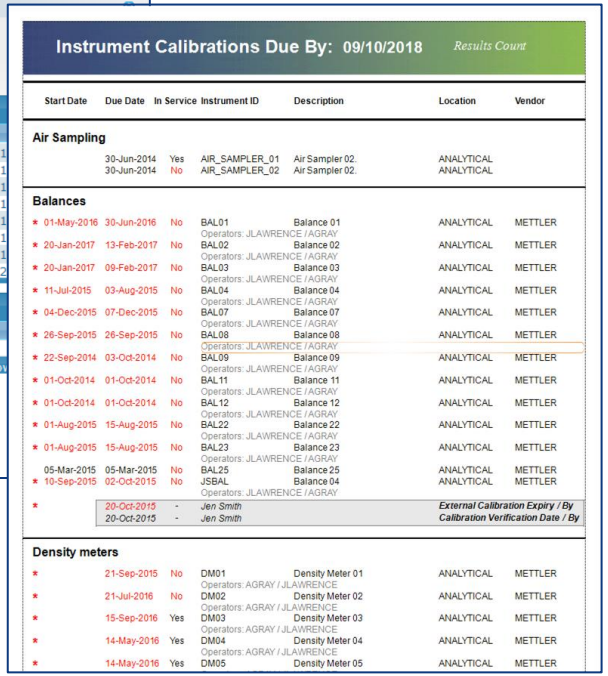
HT18-0537
HT18-0537

© LabWare

Quality: Instrument Management

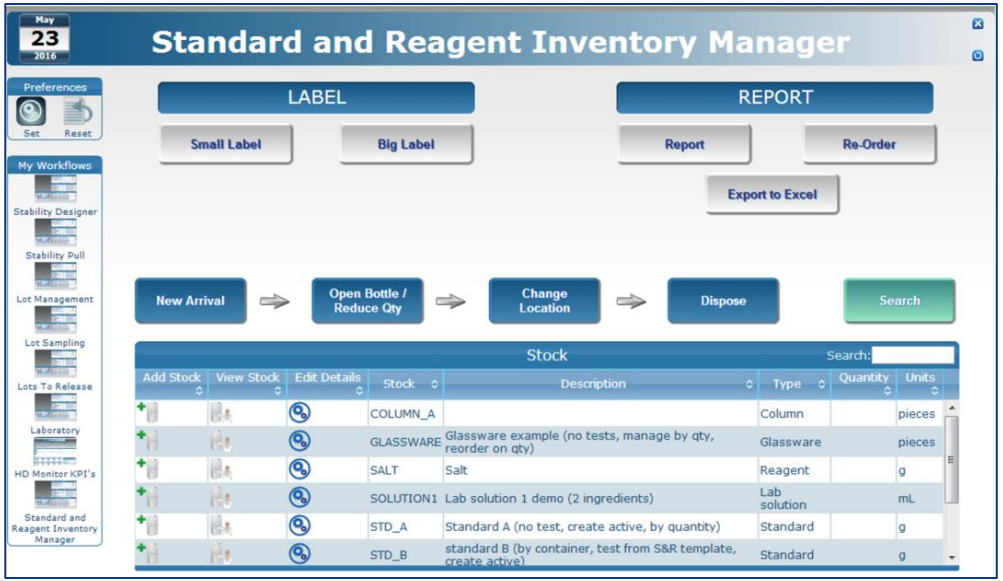
- ***Instrument Management***
  - Maintain events to keep instruments in service
    - Service, Maintenance, Calibration, Verification





Quality: Standards & Reagents

- ***Standards & Reagents Management***
  - Barcode Labels
  - Reception, Opening, Usage



Conclusions

- ***Together with its customers, LabWare has created a comprehensive Vertical Solution that helps to automate forensic DNA laboratories.***

- ***It comprises the main forensic requirements***
  - Case Management
  - Exhibits Management
  - DNA Analyses
  - Profile Management
  - Quality Requirements according to ISO 17.025
- ***High volumes of sample throughput are achieved***
  - > 200.000 samples / year have been achieved by our customers
  - Using a secure and validated system.

© LabWare

LABWARE Results Count

Questions?

LABWARE
Results Count