

The Expanding Role of LIMS in Laboratory Quality Assurance

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L.I.M.S.

Laboratory
Information
Management
System



Motivators for Quality Assurance

- Laboratory's Reputation, Goals and Company Philosophy
- Accreditations and Certifications
- Customer Expectations

Requirements are continually being placed on laboratories whether through advances in process understanding, evolving standards, user specifications or internal improvements.

Requirements are added but rarely subtracted resulting in laboratories having to implement systems for compliance.

Additional requirements necessitate changes in order to continue to operate a successful QA program.



Successful QA programs will be able to

- Adequately assess and monitor the quality of laboratory data
- Efficiently review the analytical process
- Expedite the decision making process
- Maintain productivity
- Ensure adherence with all applicable standards
- Provide the end user with compliant reports

Importance needs to be placed on automating QA functions

Expanding the role of Laboratory Information
Management System (LIMS) in the QA
program provides

- Automation
- Central Storage
- Ability to Correctly Link the
Necessary Information
- Documentation
- Traceability

Integrated Data Assessment in the LIMS

Automated System for Qualifying Data

- System Qualifiers-Built in QC evaluation functions
- Custom Qualifiers – Configurable automated qualifiers
- Extended Qualifiers – Extension and expansion of system qualifiers
- User Qualifiers – Ability to assign additional data flags



Automated qualifiers assist in laboratory data review by allowing expedited assessment of the analytical event, providing necessary information for data acceptance/rejection and enhance the overall quality of laboratory data.

Data qualifiers provide information to the user for interpretation and evaluation of laboratory data.



LIMS systems allow qualifier flags that can be translated into various program requirements that mandate specific flagging characters.

Qualifiers can indicate when sample results exceed a specified limit (regulatory, permit, client designated).



Index
VOA11B BFB 112315
VOA11B ICV 112315
VOA11B LGS 112315
VOA11B RLVS 1123
VOA11B MBLK 1123

QC CustQuals QC SampLimits Update Units
QA SAMP
CALC SEQ 1603359-001C
Test SW_8260A
DF 1
Type SAMP
RType
ARS Qual
Acknowledge Charles O'Bryan

All	SEL	Rpt	SEL Rpt	Hits	No X Analytes	Spiked Analytes	Qualifiers	AckReq_Quals	Analytical Notes											
SEL	Rpt	AT	Analyte	Units	RawVal	RawSpk	Spike	Calc Val	%Rec	%RPD	%D	TextRslt	UQual	OQual	rawMDL	MDL	Req_MDL	rawLOD	LOD	Req
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,1,1,2-Tetrachloroethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.265	0.265		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,1,1-Trichloroethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.159	0.159		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,1,2,2-Tetrachloroethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.286	0.286		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.265	0.265		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,1,2-Trichloroethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.266	0.266		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,1-Dichloroethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.247	0.247		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,1-Dichloroethene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.193	0.193		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,1-Dichloropropene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.262	0.262		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,2,3-Trichlorobenzene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.382	0.382		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,2,3-Trichloropropane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.794	0.794		1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,2,3-Trimethylbenzene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.188	0.188		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,2,4-Trichlorobenzene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.169	0.169		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,2,4-Trimethylbenzene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.208	0.208		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,2-Dibromo-3-chloropropane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.249	0.249		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,2-Dibromomethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.18	0.18		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,2-Dichlorobenzene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.251	0.251		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	1,2-Dichloroethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.189	0.189		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	4-Chlorotoluene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.722	0.722		1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	4-Isopropyltoluene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.187	0.187		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	4-Methyl-2-pentanone	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.398	0.398		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Acetone	µg/L	1.34	0	0	1.34	0.00%	0.00%	0.00%		J		0.436	0.436		4	4	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Acrylonitrile	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.65	0.65		1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Benzene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.195	0.195		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Benzyl chloride	µg/L		0	0	0	0.00%	0.00%	0.00%		U		1	1		1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromobenzene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.242	0.242		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromochloromethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.196	0.196		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromodichloromethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.185	0.185		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromoform	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.332	0.332		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromomethane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		1.172	1.172		4	4	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Carbon disulfide	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.153	0.153		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Carbon tetrachloride	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.364	0.364		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Chlorobenzene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.225	0.225		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2,2-Dichloropropane	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.436	0.436		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Butanone	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.278	0.278		5	5	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Chloroethyl vinyl ether	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.242	0.242		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Chlorotoluene	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.207	0.207		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Hexanone	µg/L		0	0	0	0.00%	0.00%	0.00%		U		0.206	0.206		0.6	0.6	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Methyl-2-propanol	µg/L		0	0	0	0.00%	0.00%	0.00%		U		7.546	7.546		50	50	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Benzyl chloride	µg/L		9.27	10	0	0	9.27	92.70%	0.00%	0.00%	U			1	1		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromobenzene	µg/L	9.3	10	10	9.3	93.00%	0.00%	0.00%						0.196	0.196		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromochloromethane	µg/L	8.82	10	10	8.82	88.20%	0.00%	0.00%						0.185	0.185		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromodichloromethane	µg/L	6.36	10	10	6.36	63.60%	0.00%	0.00%		S				0.332	0.332		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromoform	µg/L	8.53	10	10	8.53	85.30%	0.00%	0.00%						1.172	1.172		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Bromomethane	µg/L	9.54	10	10	9.54	95.40%	0.00%	0.00%						0.153	0.153		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Carbon disulfide	µg/L	8.78	10	10	8.78	87.80%	0.00%	0.00%						0.364	0.364		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Carbon tetrachloride	µg/L	9.07	10	10	9.07	90.70%	0.00%	0.00%						0.225	0.225		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Chlorobenzene	µg/L	8.51	10	10	8.51	85.10%	0.00%	0.00%						0.436	0.436		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2,2-Dichloropropane	µg/L	8.39	10	10	8.39	83.90%	0.00%	0.00%		J				0.278	0.278		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Butanone	µg/L	8.57	10	10	8.57	85.70%	0.00%	0.00%						0.242	0.242		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Chloroethyl vinyl ether	µg/L	9.43	10	10	9.43	94.30%	0.00%	0.00%						0.207	0.207		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Chlorotoluene	µg/L	8.49	10	10	8.49	84.90%	0.00%	0.00%						0.206	0.206		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Hexanone	µg/L	73.99	50	50	73.99	147.98%	0.00%	0.00%		JS				7.546	7.546		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Methyl-2-propanol	µg/L	43.15	10	10	43.15	431.50%	0.00%	0.00%		S				0.736	0.736		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	2-Methylnaphthalene	µg/L	7.09	10	10	7.09	70.90%	0.00%	0.00%		S				0.21	0.21		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Chlorodibromomethane	µg/L	10.38	10	10	10.38	103.80%	0.00%	0.00%						0.415	0.415		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Chloroethane	µg/L	9.01	10	10	9.01	90.10%	0.00%	0.00%						0.187	0.187		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Chloroform	µg/L	8.15	10	10	8.15	81.50%	0.00%	0.00%						0.225	0.225		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Chloromethane	µg/L	8.86	10	10	8.86	88.60%	0.00%	0.00%						0.168	0.168		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	cis-1,2-Dichloroethene	µg/L	7.58	10	10	7.58	75.80%	0.00%	0.00%						0.169	0.169		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	cis-1,3-Dichloropropene	µg/L	9.38	10	10	9.38	93.80%	0.00%	0.00%						0.208	0.208		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Cumene	µg/L	9.59	10	10	9.59	95.90%	0.00%	0.00%						1	1		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Cyclohexane	µg/L	8.94	10	10	8.94	89.40%	0.00%	0.00%						0.287	0.287		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Dibromomethane	µg/L	6.82	10	10	6.82	68.20%	0.00%	0.00%						0.239	0.239		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Dichlorodifluoromethane	µg/L	9.33	10	10	9.33	93.30%	0.00%	0.00%						0.239	0.239		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Diethyl ether	µg/L	7.29	10	10	7.29	72.90%	0.00%	0.00%						0.18	0.18		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A	Ethyl methacrylate	µg/L																

RTI Laboratories - Analytical Report

WO#: 1603359

Original

Client: Magisterial Environ Inc.

Collection Date: 3/9/2016 7:00:00 AM

Project: Antepenuit

Lab ID: 1603359-001

Matrix: Aqueous

Client Sample ID: OR6-0096

Analysis	Result	Qual	DL	LOD	LOQ	Units	DF	Date Analyzed
Molybdenum	5.0	U	1.3	5.0	10	µg/L	1	3/13/2016 1:51 PM
Nickel	20	U	16	20	100	µg/L	1	3/13/2016 1:51 PM
Potassium	200	U	100	200	400	µg/L	1	3/13/2016 1:51 PM
Selenium	30	U	23	30	40	µg/L	1	3/13/2016 1:51 PM
Silver	5.0	U	2.6	5.0	20	µg/L	1	3/13/2016 1:51 PM
Sodium	100	U	85	100	1,000	µg/L	1	3/13/2016 1:51 PM
Thallium	20	U	15	20	40	µg/L	1	3/13/2016 1:51 PM
Vanadium	20	U	9.8	20	50	µg/L	1	3/13/2016 1:51 PM
Zinc	10	U	6.8	10	100	µg/L	1	3/13/2016 1:51 PM

Volatile Organic Compounds

Method: SW8260C

Analyst: AS1

1,1,1,2-Tetrachloroethane	0.60	U	0.26	0.60	1.0	µg/L	1	3/13/2016 9:37 PM
1,1,1-Trichloroethane	0.60	U	0.16	0.60	1.0	µg/L	1	3/13/2016 9:37 PM
1,1,2,2-Tetrachloroethane	0.60	U	0.29	0.60	1.0	µg/L	1	3/13/2016 9:37 PM
1,1,2-Trichloroethane	0.60	U	0.27	0.60	1.0	µg/L	1	3/13/2016 9:37 PM
1,1-Dichloroethane	0.60	U	0.25	0.60	1.0	µg/L	1	3/13/2016 9:37 PM
1,1-Dichloroethene	0.60	U	0.19	0.60	1.0	µg/L	1	3/13/2016 9:37 PM
1,1-Dichloropropene	0.60	U	0.26	0.60	1.0	µg/L	1	3/13/2016 9:37 PM
1,2,3-Trichlorobenzene	0.60	UQ	0.38	0.60	1.0	µg/L	1	3/13/2016 9:37 PM
1,2,3-Trichloropropane	1.0	U	0.79	1.0	5.0	µg/L	1	3/13/2016 9:37 PM

LIMS can be used to store and maintain information pertaining to the accessory information required for assessing the analytical process.

- Initial calibration data linked to the associated sample analysis
- Continuing calibration samples (ICV, CCV, CCB, Tune) included in the data set and referenced to the associated samples
- All batch QC samples associated and referenced to the samples

LIMS can be used to store and maintain information pertaining to the accessory information required for assessing the analytical process.

- Calibration and QC standards applicable to the analysis with direct access to the stock standards and certificates of analysis
- Equipment (balances, pipettes, etc.) used during the specific analytical process
- All raw data linked to the analytical results form and readily available for review

LAB ID: GLEN01

Instr. ID:

Index

84597 VOA11B_160311A

Run ID: VOA11B_160311A

RunNo: 84597

Use Other Labs Data

Minimize Omega: ☐

Main

CAL Stds

Reagents / Chemicals

Equipment

Linking / Updating

Linked Files

Lab ID: GLEN01

Instrument ID: VOA11B

Run Start Date/Time: 3/11/2016 12:53 PM


Analyst: Ashley Spears

Ical: 82523 Ical RunNo: 82523

Column ID: RTX-624 30m

Comments:

Analytical Curve Equation



CurveFromRun

CAR's

New

View

Analytical Reports

Report Type: Analytical Run Results

Report Name: AnalRunSeq

Report Preview

Update Analysis Date

Data Checker

Analysis Groups

Refresh SEQno Info

Reload H

Dup. Prep

Dup. Ref.

VIEW / EDIT Data

SINGLE ANALYTE WorkSheet

View By ANALYTE

Data Import

Load Samples

LINK Sequence QC

QA Run

UnQA Run

QA Authority

QA	ACK	CALC	SEQ#	Order	Sample ID	Test Code	Type	Batch ID	BLKref	SPKref	RPDref	CCVref	DF	RType	PFac	SpkFac	OFac	SeqQua
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1642769	1	VOA11B BFB 112315	BFB_TUNE	TUNE	R84597	0	0	0	0	1		1	1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1642777	2	VOA11B ICV 112315	SW_8260A	ICV	R84597	0	0	0	1642777	1		1	1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1642778	3	VOA11B LCS 11231	SW_8260A	LCS	R84597	1642780	0	0	1642777	1		1	1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1642779	4	VOA11B RLVS 1123	SW_8260A	RLVS	R84597	0	0	0	1642777	1		1	1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1642780	5	VOA11B MBLK 1123	SW_8260A	MBLK	R84597	0	0	0	1642777	1		1	1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1642781	6	1603359-001C	SW_8260A	SAMP	R84597	1642780	0	0	1642777	1		1	1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1642782	7	1603359-001CMS	SW_8260A	MS	R84597	1642780	1642781	0	1642777	1		1	1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1642783	8	1603359-001CMSD	SW_8260A	MSD	R84597	1642780	1642781	1642782	1642777	1		1	1	1	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1642792	9	VOA11B END CCV 11231	SW_8260A	CCVE	R84597	0	0	0	1642792	1		1	1	1	

Automated systems that facilitate data evaluation are incorporated in the LIMS

Data Checker Programs

- Consolidate and display exceeding results
 - Summarize QC data
 - Focused assessment – CCV, LCS
 - Allow evaluation of impact on sample data

Automated systems that facilitate data evaluation are incorporated in the LIMS

Data Checker Programs

- Evaluate QC results (both Cal Data and Batch QC) against specific requirements
 - Method criteria
 - Program requirements (drinking water/wastewater)
 - Quality control specifications (DoD QSM/SW-846)
 - Project QA Plans (QAPP)

LIMS usage for Quality System Functions

- Corrective action reports
 - Ability to associate situations requiring corrective actions to specific analytical runs, sample batches, instruments, analysts
 - Allow assessment of effectiveness
 - Identify reoccurrences
 - Create reports for submitting to requesting parties

LIMS usage for Quality System Functions

- Traceability
 - Chemicals, Standards and Reagents
 - Instruments
 - Equipment

LIMS usage for Quality System Functions

- Control Charting
 - Automatically generate control limits
 - Assess method performance
 - Trend analysis

LIMS usage for Quality System Functions

- Automated Information Updating
 - Readily update control limits
 - Automatically assign current detection limits (DL, LOD, LOQ)
 - Easily add required QC sample types

LIMS usage for Quality System Functions

- Analyst Training Status
 - Maintain analyst method approval status
 - Assign tests to approved analysts
 - Associate demonstration of capability records

LIMS usage for Quality System Functions

- Accreditation Status Reporting
 - Maintain multiple accreditations
 - Associate method/analyte accreditation status to the individual programs
 - Generate reports displaying accreditation status for each analyte

Thank you for your Attention to
this Presentation!

Questions or Comments are
Welcome!

