www.Inlims.com

IN NOVATIVE LABORATORY AUT

Online LIMS



What is Online LIMS ?

- A specialized LIMS for mining labs
- Very fast data access and queries
- Very easy to learn, Excel-like spreadsheet
- Color coded "real time" work status
- Integrated with an advanced QA/QC system



Implementation



Online LIMS implementation 1th stage implementation: Online Worksheet 2nd stage implementation: OnLab (full LIMS)



Online Worksheet Concept



OnWSH is an advanced interface between one or more instruments and the LIMS database. Its concept is based on the technician's logbook.



Lab Workflow



28		Dre.	:/w			
- auga 01140	5 000	0.19	. 423	ell	19 - FL	-
- 6501 01120	3 0000	1	- 145	1201	14 /2	
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	1 .		.340	.4172	1-	
· · ·			.332	1220.	1 -usu	
2511 01120	1.0000		.288	.1755	7.92	
		-	.257	3455		
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5Luc 011125	9562	-	.023	1459	.004	
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-						
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A starting	STREET,	-		-		

CONLIMS

Electronic lab Workflow





WSH Modules

OnLINK.EXE

Handles serial communication between the instrument and OnWSH. This small application should be active on the taskbar for On-line reading.

OnLQC.EXE

Quality control module. Manages all control and standard samples and QC statistics.

OnSETUP.EXE

Manages all LIMS configuration tables like the user list, Analysis library, instrument database, etc.

OnWSH.EXE

The Online Worksheet is an advanced link between then instruments and the database.

-DLL – dynamic link libraries This are shared programs that the LIMS uses

08:29

ame	Size	туре 🕰
DII		File Folder
] Tools		File Folder
OnLINK.exe	224 KB	Application
OnLQC.exe	332 KB	Application
OnSetup.exe	224 KB	Application
OnWsh.exe	484 KB	Application
crpaig32.dll	225 KB	Application Extension
crpe32.dll	5,662 KB	Application Extension
implode.dll	18 KB	Application Extension
LimsCR.dll	64 KB	Application Extension
LimsExpo.dll	116 KB	Application Extension
LimsLib.dll	508 KB	Application Extension
og702as.dll	1,336 KB	Application Extension
) p2sodbc.dll	229 KB	Application Extension
) u2lbcode.dll	44 KB	Application Extension
) vpes32.dll	247 KB	Application Extension
formula.cnt	9 KB	CNT File
OnWSH.chm	243 KB	Compiled HTML Help
A FORMULA CID	38 VB	
		ລີ 💭
INK.exe OnLOC.e	exe OnSeti	up OnWsh.exe

The worksheet Browser



Onlims



Browser toolbar menu

Browser Toolbar menu







Select filter selects a group of worksheets Method Env	na. Read/reported and Pb all have high solutions for Total S 513 ad@	The select filter starts with the date criteria. Simply select the work month and how many months back should be included. You do not need to enter the whole name to search. For example for "dmasson" simple type "masson" or "dmas"
Find in Worksheet SampleId sb11 Find Cancel Worksheet Samples AAS0122:SEP05 SB11705; SB11706; SB11707; SB11708; SB11	I@SeICP-MS; read@ Selected work group (Service group) folder INV0019 INV0032 INV0045 INV5002 INV5002	Select Date Work at NOV I 2001 Including 2 month back Supervisor dmasson Chemist Note Note Method Instrument Report
2 Worksheets(s) found	Find a sample tool	Test OK <u>R</u> eset Cancel



Browser file name format



Refresh WSH browser pane. Helps keep the WSH list updated when WSH are created or deleted by other users in other computers

Jump to a WSH

Jump to	
	🗖 Open
	OK Cancel

Type the WSH ID you want to jump to. You can type several formats like NOV21 to go to NV0021.

Browser file name format. Three formats are available:

5014 (Number only)
 NV5014 (Month and Number)
 IMS5014-NOV01 (Workgroup, Number, Month and Year)

0029	0030	NV0022	NV0023
0048	0038	NV0036	NV0037
5013	5014	NV0050	NV0051
IMS0021- IMS0029- IMS0036- IMS0044-	NOVO1 NOVO1 NOVO1 NOVO1	IMS0022-NC IMS0030-NC IMS0037-NC IMS0045-NC	0V01 0V01 0V01

Önlims

Worksheet file

- 🗆 ×

INNOVATIVE LABORATORY AUTOMATION

👼 Online Worksheet - ONREPO

File Edit Format Data Instrument View Window Help

m lig es hhod Sample ID list t list	*J Co mg/L	*K Dil	*L read@CuA Apulp g/t	*M Cu mg/L	*N Dil	*O read@PbA Apulp g/t	*P Pb mg/L	*Q Dil	21:55 ▲ * 5
3 Nt3 Solids SEP10 11:00			9.98	0.4840	1	1.48	0.0098	1	
4 Nt3 Solids SEP10 11:00			9.66	0.4815	1	1.49	0.0101	1	
5 PC44 Pre Cleaner Tail		200	616.03	6.5806	1	222			aboo10 🔺
11 6 PC44 Bulk Ro Tail			288.46	3.2427	1				SPODIE
7 PC45 Pre Cleaner Tail			1648.49	3.3983	5				8000A0
8 PC45 Bulk Ro Tail			330.18	3.6970	1				5P0055
56 9 PC45 Bulk Ro Tail		223	336.38	3.7417	1				3P0070
10 Box 4-C21			50386.24	5.0334	100				3P0085
B 6 11 Box 4-C22			41738.24	4.1760	100				5P0100
12 Box 4-C23			24376.90	2.4586	100				3P0115
6 13 Box 4-C28		223	89357.11	3.5651	250				5P0130
14 Box 4-C29			52994.77	5.3383	100				5P0145
15 Box 4-C30			117921.99	4.6854	250				SP0160
16 Box 5-C31			128145.76	5.1653	250				20170
17 Box 5-C32		223	55674.21	5.5657	100				SP0190
18 Box 5-C33			108498.85	4.3684	250				320200
19 Box 5-C34			117335.55	4.6668	250				3P0235
6 20 Box 5-C36			59740.81	5.9612	100				3P0250
21 Lch Cake SEP10 Day		<u>22</u>				47.01	0.4627	1	002.66
66 22 SU-1a AAS	3.6250	1	9382.13	3.7885	25	58.98	0.5881	1	3P0280
23 MP-2 AAS	0.0557	1	836.25	8.7806	1	426.46	4.2768	1	810205
24 Low Metal 9-8-56 Blank	-0.0036	1	0.00	0.3846	1	0.00	-0.0049	1	AG0004
15 25 ACF SEP10 16:00		222				26.75	0.2698	1	AG0019
20 26 ACD SEP10 16:00						53.57	0.5405	1	4G0034
27 AAS inst blk	0.0045	1	0.00	0.0029	1	0.00	0.0018	1	14(119)
28 QCS-19 & QCS-7	5.0158	20	96.20	3.8482	25	100.05	10.0053	10	19055
29 AAS inst blk	-0.0029	1	0.00	-0.0023	1	-0.01	-0.0088	1	AG0079
30 QCS-19 & QCS-7	4.9698	20	96.04	3.8415	25	100.63	10.0633	10	
Sheet A Test A Sa	mple (Pad (Inst	rument /		•					4G0124
10 AGUINI AGUINI AGUINI	A00144 AG01	45 AGO	146 AGO14	17 200144	40019	9 AG0120	A00151	A00155 A	160153 AG0154 -
			*	Baln-2 r= u= s	d= d= n=?			0.4969 [2]	1.

Open the worksheet by double clicking on the selected file. A window with six tabs represent each one of the worksheet areas



Click here to activate the worksheet header

Worksheet header

Chemistrist	IDTOD MOSTOCIO	Superviser Superv
	kim Ikd Ryan	Template
Notes	Pb - NEEDS AMMONIUM ACETATE-LIMS # 01209 ± 01207	Linked job list : CA01308-SEP05
	Notes for whatever	CA01307-SEP05 CA00092-SEP05
		CA03007-AUG05 CA01305-SEP05
Method	Low Metal Preperation. Aqua-regia, HF Method No. 98,52	LAU1304-SEP05
Log status	12-Sep-05 11:36 - johnstonr : Modified	
-	11-Sep-05 18:25 - cirtwillk : Modified 11-Sep-05 18:25 - cirtwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120-122CU.PRN	
	11-Sep-05 18:23 - cirtwills : monified 11-Sep-05 18:22 - cirtwills : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120-122CU.PF Log stat	us
	11-Sep-05 16:58 - cirtwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120NI.PRN 11-Sep-05 16:42 - cirtwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120PB.PRN	what or who
	11-Sep-05 16:58 - cittwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120NI.PRN 11-Sep-05 16:42 - cittwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120PB.PRN 11-Sep-05 16:32 - cittwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120CD.PRN 11-Sep-05 16:33 - cittwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120ZD.PRN 11-Sep-05 16:33 - cittwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120ZD.PRN 11-Sep-05 16:33 - cittwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120ZD.PRN 11-Sep-05 16:33 - cittwillk : imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120ZD.PRN	what or who It up
jų status	11-Sep-05 18:25 - cirtwills: Modified 11-Sep-05 18:25 - cirtwills: Modified 11-Sep-05 18:23 - cirtwills: Modified 11-Sep-05 18:23 - cirtwills: Modified 11-Sep-05 18:22 - cirtwills: imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120-122CU.PR 11-Sep-05 17:00 - cirtwills: imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120-122CU.PR 11-Sep-05 17:00 - cirtwills: imported FAA-6 <- L:\CHEM\VARIAN\V220 FAA6\SEP11-120-122CU.PR	us



Spreadsheet

🙀 Online LIMS - Online W	orksheet						_ 🗆 ×
File Edit Format Data Ins	strument View Window	Help					
🛛 🖨 🗅 👗 🖻 🛱	(↓) ↓ ≣ ≡ ≡	ви	* 🗄 🐝	8 🎽 🖬 🎫	🖬 🗐 🤹	🔒 🗣 🧌	20 7
Sample ID	A a)PICP mg/L	*B P31 ppb	*C prep blk corr	*D a)CuICP mg/L	E Cu63* ppb	F Cu65 ppb	*G ▲ a)ZnICF mg/L
1 E008-5	-0.00011	-0.114		0.00001	0.00605	0.00736	0.000
2 \$STD-Env Blank	0.00000			1002	0.0203	0.0242	0.000
3 jun7640-60	0.00550	(E	xcel-like	6	1.76	1.77	0.006
4 jun7640-61		f f	ormulas	7	1.07	1.09	0.002
5 jun7640-63		X	\wedge	0296	2.96	3.02	0.008
6 jun7640-5	0.00270	13.9		0.00114	1.14	1.14	0.002
7 jun7640-7	=(B7-C7)/1000	11.6	11.2	0.00106	1.06	1.09	0.002
8 jun7640-9	=(B8-C8)/1000	15.3	11.2	0.00556	5.56	5.62	0.004
9 jun7640-11	0.00170	12.9	11.2	0.00569	5.69	5.75	0.003
10 jun7640-13	-0.00157	9.63	11.2	0.00238	2.38		
11 jun7640-15	38:0.09940 diff=-0	.10097 %err	= -101.5794	18		Type your	•
12 jun7640-17	-0.00394	7.26	11.2	0.00109		comment	\$
13 jun7640-19	0.00200	13.2	11.2	0.00148	1.40		×
14 jun7640-21	-0.00090	10.3	11.2	0.01340	13.4	14	0.003
15 jun7640-24	-0.00010	Automoti	11.2	Error	CHECK	19.4	0.015
16 jun7640-26	-0.00	Autorivati	2	0.01150	11.5	12	0.002
17 blk 2	-0.00	Dups	Jo	0.00002	0.0246	0.143	0.000
18 10ppb delta multi std	0.000	popup	0	0.00995	9.95	10.1	0.009
19 100ppb delta P std	0.10400	· · ·	0	0.00003	0.0294	0.0578	0.000
20 blk 3	-0.00136	-1.36	0	0.00002	0.0184	0.0481	0.000
1 Head Sheet Test	A Sample A Pad A Instru	ument /	11.2	0 00000	0.0	10.2	• • • • • • •
38:0.09940 diff=-0.10097 %err	= -101.57948					ISB	

True electronic equivalent of a technician's log book



Worksheet Template

🙀 LIM0004-DEC01.WSH			1.0	- 10-		111		
Sample ID	A Pb@L %	B Factor	C Pb1 %	D wt gr	E vol ml	F Pb2 %	G wt gr	H - vol ml
1 Pb Proof 1	AVG =	0.0100732	0.01009	0.1776	17.6			
2 Pb Proof 2			0.01005	0.206	20.5			0
3 Pb Proof 3			0.01008	0.2389	23.7			
4 Arm 003	42.55	0.01007	41.54	0.4000	16.5	43.55	0.4000	17.3
5 Sr72 011020 1785	42.55	0.01007	41.54	0.4000	16.5	43.55	0.4000	17.3
6 SR72 011020 1820	43.11	0.01007	43.93	0.4000	17.45	42.29	0.4000	16.8
7 SR72 011020 1821	42.11	0.01007	42.17	0.4000	16.75	42.04	0.4000	16.7
8 SR72 011020 1822	48.52	0.01007	41.92	0.4000	16.65	55.13	0.4000	21.90
9 SR72 011020 1823	54.57	0.01007	53.62	0.4000	21.30	55.51	0.4000	22.05
10 SR72 011020 1824	50.98	0.01007	50.98	0.4000	20.25	50.98	0.4000	20.25
								-
	est 🖌 Sample	APad A Instru	ument /	4				+[

Example of an Lead template from Lory, Teck



Test (analysis) tab

👮 ICP0012-SEP00.₩SH						
Repo-Tag : Sample	A Weight	B Volume	C Dilution	D a)AgICP / g/t	E Ag 328.068 mg/L	2
19 AUG9166.R00-78:	0.2498	100		/		
20 AUG9166.R00-79:	nss	hss	/ /			

This tab is used to configure the **column header (=analysis)** in the OnWSH sheet. Each analysis can have many parameters and the relationship between them is given by the formula.

	*	Column ID	/ Unit	Technician	Note	Source	Dec 🔺
1	*	Weight		Ricardo	calibrated		Decimal precision
2	*	Volume	7/				
3	*	Dilution	1	Tech	nician who locked		
4		a)AgICP	g/t	-this c		*C*B/A	4
5	*	Ag 328.068	mg/L				
6		a)AllCP	g/t	Cant	pe moaifiea nere.	°C*B/A	4
7	*	AI 396.152	mg/L		1		
		a)AsICP	g/t			c*C*B/A	4
olum	n	As3 197.197	mail	<u> </u>			
10	*	As2 193.696	Parameter				Test formula
11	*	As 188.979	eolumn				X owercase is
12		a)BalCP	g/t			a*C*B/A	
13	*	Ba 233.527	mg/L				
14		a)BelCP	g/t			b*C*B/A	result column
15	*	Be2	mg/L				and uppercas
16	*	Be 313.107	mg/L		1		is absolute, li



Sample ID

Sample tab

Sequence ID: Link with the instrument

EIM0004-DEC01.WSH	🧋 L1	IMO	DO4-DECO1.WSH							_ 🗆 X
		*	Sample ID	R.Nu	m R.Tag	Sequence	Type	Qc File	Note	Pre 🔺
Sample ID	1	X	Pb Proof 1				SMP			
	2	X	Pb Proof 2				SMP			
1 Pb Proof 1	3	X	Pb Proof 3				SMP			
2 Pb Proof 2	4	X	Arm 003			As sq 1	SMP		QC ARM	
3 Pb Proof 3	5	X	Sr72 011020 1785	*	2	As sq 2	SMP			
4 Arm 003		X	SR72 011020 1820	*	3	As sq 3	SMP			
5 Sr72 011020 1703		I	SR72 011020 1821	*	4	As sq 4	SMP		1	
6 SR72 011020 1820	8	X	SR72 011020 1822	*	5	As sq 5	SMP		file	
7 SR72 011020 1821	9	X	SR72 011020 1823	*	6	As sq 6	SMP			
8 SR72 011020 1822	10	X	SR72 011020 1824	*	7	As sq 7	SMP			
9 SR72 011020 1823	11	6	E005-4.1			Ac cn 0	STD	E005-4.1	LIMS QC test	
10 SR72 011020 1824	12	lē	E008-5		Report	mber &	STD	E008-5	QC TEST	
11 E005-4.1		1.0	i		tag: link	with the		.1	i	<u>1</u>
12 E008-5					LIMS		J			
										-
♦ Head Sheet Test ,		1	lead 🖌 Sheet 🖌 Test 👌	Sample 🕅	Pad 🖌 Instrume	nt / 🔳				•

The sample tab stores all sample related data. Used to configure the **Row Header** in the WSH Sheet.



Instrument log tab

💆 Online LIMS - Online	• Worksheet	_ 🗆 🗵
File Window Help		
a 🛛		
** Online LIMS :	**	<u>^</u>
0[=====================================	- Online Instrument ==========]
> Inst : Balance > Date : O5 Mar > Chem : fabiole > Test : lec@OX(e 01 20:01 a Ca	
<pre>@[002-001] + @[002-001] + @[002-003] + @[002-002] + @[002-002] +</pre>	0.2502 g 0.2504 g 0.2532 g 0.2518 g 0.2560 g	
> END Balance	Test & Sample & Pa ◀	
Ready	ISB	
	This represents the [Column-Row] where the data was stored in the	

WSH sheet



For auditing purposes, all instrument information, including calibration data is recorded in the WSH log file.

The log file data is read only and can't be modified.



Worksheet configuration

For the login of a NEW worksheet four basic steps are necessary:

- 1. Sample login (ROWS)
- 2. Analysis setup (COLUMNS)
- 3. Formulas (SHEET)
- 4. Formatting (SHEET)



1) Sample login (ROWS)

			_					QC sample pick list	×
				Job	Link			S.Group Create Qc Type Standard T 15-J	ed on or after : Iul -1989 💌
					\sim			Lqc ID Notes	
								\$FurnaceXRF LIMS - Check Min-Max erro \$House	r problem
ws	LA	BO	005-0CT07					\$STD ECRM 328-1	
		*	Sample ID	Туре	File	Tag	Sequence	\$STD_BOD_SEE Uncorrected Value (Day 5-f \$TVX-B	Day 0)
1		0	MR 107046-A	SMP	MR01	*		E005-4.1 LIMS QC test	
2		0	MR 107046-B	SMP	MR01	*		E006-1.3 Qc with outlayer ! E007-10 QC test	
3		0	MR 107047-A	SMP	MR01	*		E008-5 QC TEST	20%/101
4		0	MR 107047-B	SMP	MR01	*		MuReautu Mu Reautu	
5		0	MR 107048-A	SMP	MR01	*			
6		0	MR 107048-B	SMP	MR01	*			
7		0	MR 107049-A	SMP	MR01	*			
8	į	0	MR 107049-B	SMP	MR01	*			
9		٥	CALSTD2 High Vol-E340	STD	CALSTD2 High Vol-E3	9		E3402 Air Filters	
1	0		MR 2XXXXX-1,A,B	SMP	MR02	Formating error MR 2_			
	Si st <[0] 'F	ele an CT EN /er	ct the dard ID RL>+ TER> the E' cell	ple (Pa	d 🖌 Instrument /	This f when instru - like t	ïeld is neede <mark>d</mark> importing datá ment file. the auto sampl	only from an er	

The first step is to login all sample Id information and configure all duplicates and Standard for this batch of samples.



2) Test login (COLUMNS)

🙀 🗛	5000	02-NO¥00.WSH								×	
	*	Column ID	Unit	Technician	Note		Source		Dec		
1		rd@MoGRAV1	%	Grav	imetric	(.2	.613*b/a)*10040	0	2		
2	*	wt Smp	gr								
3	*	wt Cal	gr								
4		rd@MoAAS	ppm	AAS		a*	b/c		2		
5	*	AAS	mg/L								
6	*	Vol	ml								
7	*	wt	AA50002-NOV0	D.WSH						_10	1 >
4 F	\ He	ad 🖌 Sheet 🔪 Test	Sample ID	A d@MoGRAV1 %	B wt Smp gr	C wt Cal gr	D rd@MoAAS ppm	E AAS mg/L	F Vol ml	G wt gr	-
			1 LOT MAD/AND	48.45	0.2603	0.4866	121.96	2.98	20	0.4887	
			2 LOT LR Nº 252	53.71	0.2586	0.5355	69.39	1.85	20	0.5332	
			3 LOT LR Nº 253	53.74	0.2607	0.5402	50.76	1.36	20	0.5359	
			4 LOT LR Nº 254	53.84	0.2576	0.5347	45.46	1.22	20	0.5367	
			5 LOT LR Nº 255	53.24	0.2591	0.5319	61.38	1.65	20	0.5376	
			6 LOT LR Nº 256	53.13	0.2606	0.5339	55.56	1.46	20	0.5256	
			7 LOT LR Nº 266	52.00	0.2600	0.5214	57.98	1.51	20	0.5209	
					0.0000	0 4020			00	0 4000	

The second step is to login all required analysis (Test) and parameters. The red columns are the Test or result columns, this can be picked from the report or typed in. Result column data is usually populated using the formula for that column. Parameter columns data can be either instrument or manually entered data.

🙀 A/	1500	02-NO¥00.₩5H									Â	
	*	Column ID	Unit	Technici	an Note		Source		Dec 🔺			
1		rd@MoGRAV1	%			(.2613*	[*] b/a)*100	40	2		orm	nulas
2	*	wt Smp	gr			/						
3	*	wtCal	gr									
4		rd@MoAAS	ppm			a*b/c			2			
5	*	AAS	mg/L							11		
6	*	Vol	ml 📑 aasi							11		
7	*	wt	ar	1002-N0100.W3F				C	D	E	r l	
- F	Νн	ad (Sheet) Test	/ San		A rd@MoGRAV	1 w	Smn w	t Cal	rd@MoAAS	AAS	Vol	wt
	11.0		Sar	nple 1D	%		gr	gr	ppm	mg/L	ml	gr
Cale	ulat	e selected cells										
				AD/AND =	(0.2613*C1/B1)*1	100-0.4	0.2603	0.4866	=E1*F1/G1	2.98	20	0.4887
E F	ormula	(.2613*b/a)*10040		2 ^{KN°} 252 =	(0.2613*C2/B2)*1	100-0.4	0.2586	0.5355	=E2*F2/G2	1.85	20	0.5332
	ecima	ls 🛛 enter (-1) for	no truncation	KNº 253 =	(0.2613*C3/B3)*1	100-0.4	0.2607	0.5402	=E3*F3/G3	1.36	20	0.5359
	como		no daneadori	RNº 254 =	(0.2613*C4/B4)*1	100-0.4	0.2576	0.5347	=E4*F4/G4	1.22	20	0.5367
	í	OK	Coursel 1	KN° 255 =	(0.2613°C5/B5)*1 (0.2613*C6/B6)*1	100-0.4	0.2591	0.5319	=E5^F5/G5	1.65	20	0.5376
	,		Cancel	Nº 266 -		100-0.4	0.2000	0.5559	-E7*E7/G7	1.40	20	0.5209
1			8 CMF	L101 =	(0.2613*C8/B8)*1	100-0.4	0.20	0.3214	-Lr 1 //0/	1.31 	20	0.3203
				Head) Sheet [T	est I Sample I P	Pad I Instrum	nent / 4			<u>.</u>		
The	e LII	MS formula (1) is	💆 AA5000	2-NO¥00.W5H								
cor "ex Lov	iveri cel l verc	ted (2) into an like" formula. case characters	Si	ample ID	A rd@MoGRA V1 %	B wt Smp gr	C wt Ca gr	l rd(@MoAAS ppm	E AAS mg/L	F Vol ml	G wt gr
are	RE	LATIVE to the	1 LOT M	AD/AND Nº 149	< 50	0.260	3 0.4	866	121.96	2.98	2	0 0.4887
res	ult c	olumn.	2 LOT LE	RNº 252	53.71	0.258	8 0.5	355	69.39	1.85	2	0 0.5332
UP	PEF	RCASE character	S 3 LOT LE	RNº 253	53.74	0.260	7 0.5	402	50.76	1.36	2	0 0.5359
are	AB	SOLUTE to the	4 LOT LE	RNº 254	53.84	0.257	6 0.5	347	45.46	1.22	2	0 0.5367
firs	she	eet column	5 LOT LE	RNº 255	53.24	0.259	1 0.5	319	61.38	1.65	2	0 0.5376
	On		6 LOT LE	RNº 256	53.13	0.260	6 0.5	339	55.56	1.46	2	0 0.5256
			7 LOT LE	(Nº 266	52.00	0.260	0.5	214	57.98	1.51	2	0 0.5209
			8 CMR-1		< 50	0.260	J 0.4	959	[2	0 0.4900



4) Formatting (SHEET)



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Worksheet Templates

Sample ID	A Count	B Hole #	C Ore Wt. g	D H2O mls	E Floc mls	F Aliquot Wt. g	G NaOH mls	H B2O3 %	I Smp Wt g	
1	grams of sta	andard borio	: acid:		1.0033	Standard	Factor =	2.09517		
2	mL of stand	ard NaOH to	titrate star	ndard boric	26.96	Normality,	NaOH =	0.60189		
3	_									
4 Sample # 1	Count	Hole #	Ore Wt.	mis H2O	mis Floc	Aliquot Wt.	mis NaOH	% B2O3	Small	
5 Sample # 2	1	123	100	425	10	5	9.96	19.696	Sele	ct a template
6 Sample # 3	2	124	100	425	10	5	9.96	19.696	and o	create a new
7 Sample # 4	3	125	100	425	10	5	9.96	19.696	work	sheet 💊
8 Sample # 5	4	126	100	425	10	5	9.96	19,696		
9 Sample # 6	5	127	100	425	10	Lreat	te a new work sneet			
IO Sample # 7	6	128	100	425	10		reate new WorkSheet from			Work Sheet
1 Sample # 8	7	129	100	425	10		Templete	I Mathead	Data	
2 Sample # 9	8	130	100	425	10		* CREATE NEW *	Create a new WorkSheel	Date	0002 0012 0022 0032 0042
13 Sample # 10	9	131	100	425	10		+ LABU425-MAYU7 <	Create a copy	00 N - 2005	0004 0014 0024 0034 0044 0005 0015 0025 0035 0045
4 Sample # 11	10	132	100	425	10		AC.GRADO A, MEN - SEM AC.GRADO A-DIARIO		02 Nov 2005 14 Nov 2005 99 Nov 2005	0006 0016 0026 0036 0046 0007 0017 0027 0037 0047
15 Sample # 12	11	133	100	425	10		AC.SEMANAL EFLUENTE:	5	14 Dec 2005	0008 0018 0028 0038 0048 0009 0019 0029 0039 0049
16 Sample # 13	12	134	100	425	10		BALANCE DIA NORMAL CABACTERIZACIÓN ACID	ANALISIS POR AA - VOL	07 Sep 2005	0010 0020 0030 0040 0050
<u></u> Head λ She	eet (Test (S	Sample 🖌 Pad	🖌 Instrume	nt /	1.		COMP SEMANAL NORMAI CONCENTRADO FAENAS CULARZOS - A. QUIMICOS ESPE GRANULM. S.PEDRO GRANULM. GREDA GRANULM. MIGRIN MUESTREO ESCORIAL NVO TEMPLE PLOVOS P.MOLDEO - REFINO PIRITA POLVOS PENDIMIN	IR - Humedad IR - Humedad IR - Humedad Cu y Fe por AA AA - IR (LECO) AAJR,	-: 07 Sep 2005 07 Aug 2005 14 Nov 2005 21 Nov 2005 13 Sep 2005 13 Dec 2005 13 Sep 2005 13 Aug 2005 28 Dec 2005 21 Nov 2005 21 Nov 2005 08 Sep 2005 18 Jung 2005	Start number 1 Create date 06-Nov-07 I

Templates are used to save a lot of time when creating routine worksheets. Templates are created as a worksheet and then saved as a template and stored in the workgroup folder root directory.

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Service Group

root folder



This menu is used for the creation of new worksheets.

Be sure to have the right "service group", "Month" and "year" selected

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Templates



Instruments



Worksheet
Instrument
QA & Validation
Exporting
QA/QC



Instrument link

Online instruments are connected through a RS232 (serial cable) **IMPORT INSTRUMENTS** to the computer. **ICP ONLINE INSTRUMENTS** PLASMA **Balances** XRF LECO OES AAS Mainly single element Mainly multi element Import Instruments instruments Instruments are instruments that at the end of a analysis Uses a cable to Uses a file to session generates an connect to the PC be imported to the PC file with the analyte data. This file is imported and parsed by OnWSH.



Online Instrument setup

nline Instr	ument se	tup		×	
- Instrument	Inst ID	BALA1	•		Instrumen driver
		Jennessen			
Rad Cr	nd 🛛	bP\r\n			
- Log file	OUTEM	-			
File	OnLink	og.csv			
			 OK		
			-		

Instrument

On-line Instruments allows you to read data directly from the instrument into the worksheet.

To open the 'on-line instrument' setup dialog select the menu : Instrument->Setup

- 1. Pick up the instrument driver
- 2. Select the instrument ID for the attached instrument. This data should be already in the Instrument database (OnSETUP).
- 3. Enter any read command if required

The instrument log file is generated by the instrument. The log file is usually stored in the local drive and can be used to recover readings after a power failure or a system crash.



	Dnline LINK	×	
Rx terminal to see incoming			
data <	==> Error: WSH Link broken 120.73 mg		
	==> Error: WSH Link broken		
	==> Error: WSH Link broken		
Current port configuration	==> Error: WSH Link broken 1413.7412.42 mgholhh-aaoiaoex134567		
	COM1, bd=19200, p=None db=8 🔲 Log file C:\Link.rec		
This string can be sent to the instrument. Used	I 2.12 mg ✓ Add CR ✓ Add LF Send		
for bi-directional communication	Setup Play Clear Close]	

Online LINK

Port	COM1	
Baud rate	19200	-
Data Bits	8	-
Stop Bits	1	-
Parity	None	•
E DTI E RTS E XOI	R / DSR S / CTS N / XOFF	

The serial port configuration is launched with the setup button. Please refer to the instrument documentation for serial communication settings for the instrument.

> OnLINK should be active on the taskbar

OnLINK is a application that handles the serial communication between the instrument and OnWSH. This is a module that stays resident in memory (stays always open in the Windows Taskbar).





Instrument import



The instrument import dialog is used to browse and select the instrument file to be imported. The file will be parsed by the selected instrument driver and the readings send to the worksheet.

0[001] QCA, 7, A1, 394.407, mg/L, 5.06646991, 0.9820010726, 3/17/01, 9:26:07 AM, 0[001] QGA,7,A1,396.156,mg/L,4.875939406,0.8149905072,3/17/01,9:26:07 AM, 0[001] QC1, 7, As, 197.197, mg/L, 4.969305633, 1.443804132, 3/17/01, 9:26:15 AM, 0[001] QCA 7, As, 198.694, mg/L, 4.904255797, 1.575324959, 3/17/01, 9:26:15 AM, 0[001] QCA, 7, As, 188, 978, mg/L, 5.061482923, 0.1914401474, 3/17/01, 9:26:15 AM, 0[001] mg/L, 5.128514699, 0.3744635591, 3/17/01, 9:26:15 AM, QCA, 7, B, 182.5 2

The lines try to expla how data is parsed from the instrument into the worksheet.

Because this is very hard to understand a harder to explain it, better follow the line

🗑 LIM0003-MAYO

X QCB X 0-1 X 6077-8 X 6077-9

X 0-2

X 6077-110

X 6077-107 X 6027-107

A Sheet & Tes

Impo

5

6

8

9

to explain	1 📝	LIMOOO	03-MAY01.WSH								
barsed		*	Column ID		Unit	Tec	hnician	Note	9	Sourc	e 🔺
rument file sheet.	1		AI@ICP AI 394.4] ma/L		Ricard	0		b.		
is very	3	*	AI 396.1	mg/L							
rstand and	4	*	As 197.1	mg/L							
olain it, we	5	*	As 193.6	mg/L							
the lines	6	*	As 188.9	mg/L							
	4	▶ \ He	d (Sheet) Test	, Samp	le (Pac	Instrum			İ		
03-MAY01.W9	5H	la T		_	_			$\langle \rangle$	\mathbf{n}		
Sample ID	R.Num	R.Tag	Sequence	Type	Q						
	*	-	QCA	SMP		LIM0003-	MAY01.WSH	a			
JCB 14	*			SMP		-	*A	В	C	D	-
5077-8	*		6077-8	SMP	S	ample ID	Al@ICP	AI 394.4	AI 396.1	As 197.1	1
6077-9	*	1	6077-9	SMP				Nng/L	mg/L	mg/L	<u> </u>
J-2	*		0-2	SMP	Ē	F QCA	4.88	5.0665	4.8759	4.9693	
6077-110	*		6077-110	SMP	2	2 QCB	0.10	0.0099	0 0990	-0.0158	
6077-107	*		6077-107	SMP	3	i 0-1	0.00	0.0008	0 0005	0.0148	
6027-107	*	Ī	6027-107	SMP	4	6077-8	0.00	0.0007	0.0001	0.0072	
neet (Test)	Sample /	(Pad)	In 🔺		5	6077-9	0.19	0.1906	0.1912	0.2831	
					6	i 0-2	-0.01	-0.0060	-0.0074	-0.0042	
					7	6077-11	0.02	0.0029	0.0237	-0.0077	-
port	d	ac	iram '	1	4	▶ \Head	Sheet T	est 🖌 Sam; 🔺		ĺ	· [//

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. . .



Import diagram 2

The instrument "Sample ID" must match the "Sequence" column in the worksheet and the Instrument "Analysis Id " must match the "Test Id" column in the worksheet. This is very important in Order to correctly link the instrument data with the worksheet.

	Th ho nai	e Sample ID w the Client mes it.	In au in ta	eque ostrui s ent ostrui oble	ment's "Sam rered in the ment auto-sa	mpler
w	.IMO	DO3-MAYO1.W5H Sample ID	R.Num	R.Ta	Sequence	Type A
1	X	QCA	*		QCA	SMP
2	X	QCB	*		QCB	SMP
3	X	0-1	*		0-1	SMP
1	X	6077-8	*		6077-8	SMP
5	X	6077-9	*		6077-9	SMP
ì	X	0-2	*		0-2	SMP
7	I	6077-110	*		6077-110	SMP
3	I	6077-107	*		6077-107	SMP
-		6007 407	+	*****	8007 407	CMD -

worksheet with the LIMS. More on this later...

	*	Colum	n ID		Unit	Technician	<u> </u>
1		AI@ICP	month			Ricardo	
2	*	AI 394.4		mg/L		<u> </u>	
3	*	AI 396.1		m <u>a/</u> L	"Test	Id" in workshee	t must
4	*	As 197.1		mg/L	matc	h the "Test Id" or	n the
5	*	As 193.6		mg/L	instru	iment	1 110
6	*	As 188.9		mg/L	113610		
7	*	B 182.5		mg/L			
8	*	B 208.8		mgiL			
9	*	B 249.7	23	mq/L		1	-
4 1	\ Hea	ad A Sheet	Test	A Samp			• /

💆 LIM0003-I	MAY01.VSH				
Sample ID	*A Al@ICP	B Al 394.4 mg/L	C Al 396.1 mg/L	D As 197.1 mg/L	E As 193.6 mg/L
1 QCA	4.88	5.0665	4.8759	4.9693	4.9043
2 QCB	0.19	0.0099	0.0990	-0.0158	0.0040
3 0-1	0.00	0.0008	0.0005	0.0148	0.0038
4 6077-8	0.00	0.0007	0.0001	0.0072	-0.0039
5 6077-9	0.19	0.1906	0.1912	0.2831	0.2387
6 0-2	-0.01	-0.0060	-0.0074	-0.0042	-0.0007
7 6077-11	0.02	0.0029	0.0237	-0.0077	-0.0067
8 6077-10	0.02	-0.0018	0.0187	-0.0026	-0.0080
9 6027-10	0.01	0.0077	0.0147	0.0078	-0.0026
10 6024-10	0.01	0.0091	0.0149	-0.0003	0.0082
11 5510-10	0.02	0.0068	0.0166	-0.0069	-0.0084
12 6021-10	0.27	0.2549	0.2732	0.0058	0.0094
13 6021-10 Head	0 <u>01</u> λ Sheet λ Te	n.nn.51 st 🖌 Sample	1 .0145	0.0056	-0.0030 •

CONLIMS

E 0 0 0

Instrument Database

💕 🖬 🖪 🎒 🖪 🖷 🖷 X 🔉 🛃 👫 🐗 => 1 Instid Model Туре SerialNu lient Group Delesse BALN-1C × Instrument properties BALN-1 Baln-2 Price Library BALN-34 Inst Id BALN-2I Tharge Library BALN-2 43 Balance Туре Jser List BALN-2 ervice Group Denver Inst. XS-210 Baln-25 Model Instrument BALN-2 121212-321 Serial # BALN-2 Baln-28 Link Balance com1: bd=2400 even BALN-3 Area GAA + Baln-30 Baln-31 - Dates Baln-32 28-Jan -2001 Expiration 30-Nov-2001 Calibration --BALN-3: . BALN-3 21 01-Jun-2001 Expiration 31-Dec-2001 -Service Baln-5 Baln-50 Baln-51 Service : BALN-8 Never serviced IIII BATH-1 Blan-13 CDMT-2 CODR-1 DIL-1 Notes : DOMT-1 Rush please !!!! DOMT-2 EDL-1 FAA-2 FAA-3 FAA-4 OK Cancel New FAA-5 FAA-6

Varian Cne

-tv 0 0 54

Use this field to document the instruments communication properties.

The main purpose of the instrument database is to track the calibration and service dates. If one of this dates expired, the Worksheet will warn the user by displaying the instrument properties window.

Additional fields are available to store pertinent information.

The instrument database is maintained using the OnSETUP module.



Instrument Database



- Worksheet
 Instrument
 QC & Validation
- •Exporting





QC file browser

	Contine LIMS QA/QC File Edit Data Help Image: Control of the system Image: Control of the system Image: Control of the system \$0.1AU \$ASIS4 Image: Control of the system Image: Control of the system \$0.1AU \$ASIS4 Image: Control of the system Image: Control of the system Image: Control of the system \$0.1AU \$ASIS4 Image: Control of the system Image: Control of the system Image: Control of the system \$40.1AU \$ASIS4 \$Store of the system Image: Control of the system Image: Control of the system Image: Control of the system \$40.1AU \$ASIS4 \$Store of the system \$Store of the system Image: Control of the system \$40.1AU \$ASIS4 \$Store of the system \$Store of the system \$Store of the system \$50.1AU \$Store of the system \$Store of the system \$Store of the system \$Store of the system \$50.1AU \$Store of the system \$Store of the system \$Store of the system \$Store of the system \$50.1AU \$Store of the system \$Store of the system \$Store of the system \$Store of the system \$50.1AU \$Store		cld S	I & IS		Notes Locatio Refere	CCRM on Fireas nce CCU1	IP Copper Co say room	oncentrate				QC Header pane
QC file	E007-10 E008-5 HP QCS-19&QC5-7 MyBeauty SQ3 STD CCU1b STD, CZN-1	Cre Up Chi	eated 28 idated 15 emist: d	3 October 5 Novembe onald	1994 er 2001	Status	15-No 08 Oc 10 Se	w-01 13:32 - t 00 10:12 - p 00 09:14 -	Ricardo : Ur daniel : Qc D Ricardo : Ur	nlocked ata load(L locked	Jpdate 0, Adde		
(index)	STD WQB-1	Tes	at ld	Elem	Unit	SGroup	Cert Val	Cert Min	Cert Max	Count	Notes		
pane	SIDEEL	► AgA	APulp	Ag	g/t	AAS	178	169.1	186.9	1			QC
		AgF	A	Ag	g/t	FAS	178	169.1	186.9	8			Test
		AgG)FAA	Ag	g/t	AAS	178	160.2	195.8	1			
		AI20	O 3AA	AI203	%	AAS	0.100000	0.095000	0.105000	21			pane
		AIA	A.	Al	%	AAS	0.100000	0.095000	0.105000	46			•
		AIA	Арир	Al	%	AAS	0.100000	0.095000	0.105000	51			
	Ready		2F		yn.		0.098999	10.003033	10.100039	3	1		
	Incody											111	

The OnLQC browser helps to navigate trough all QC files and to edit QC data. QC files are made up by tree groups: QC Header data, QC Test data and QC Raw data (the only one not accessed by the browser). The browser is divided by tree panes









Validating data



Test Id, the cell value is out of specs for the QC
 14 Met 10
 0.03

 15 Polymet Au Pt Pd
 1.55

 16 FASBLK
 0.01







51 4906	1.31	1.31
52 STD-2 BUZON	0.64	0.64
53 STD-4 BUZON	1.65	1.65
54 STD-5 GEO	2.04	2.04

When performing data validation in the worksheet and a QC value is found to be outside the certified rage for the QC then the "QC statistic" window is open.



Only the last 40 values are displayed in the QC validation window. To view the whole population, use the OnLQC module. However, the statistics shown are for whole population, including the last data as 'live data'. If <accept> is pressed, the data point and the note, if any, are sent to the QC database.



Validation log

Status	14-Nov-01 21:54 02-Nov-01 11:11 02-Nov-01 11:11	 Ricardo : read@Au ashfordd : Modified ashfordd : Exported 	FA unlocki I to report	ed	Lock and val	te 💌
Instruments	02-Nov-01 11:09	- stonek : imported IC	Cell propert	\CHEM\vista\nov:	Unit Source Validation – Note	g/t G/F*H AAS Calibrated Ricardo
0.00 0.00 96.30 0.00 0.00 0.00 *FAA-1	Sheet (Test (S 0.6338 1 -0.0043 1 3.8522 25 -0.0025 1 2.0404 26 6r= u= sd= d= n=?	ample (Pad (Inst		=== CELL PROPERTIES === est = Al2O3 ell [3,2] = 12.2 alue = 12.2 ource = ~Daniel og: 4-Nov-07 22:35 - Daniel : Loci 4-Nov-07 22:35 - Daniel : Loci OK	ked ked ked	It Cancel

Once the data is validated (locked) with a password, it can only be modified by unlocking the column using the same password that was locked with or by using the super-password. Every time a column is lock or unlock the action is logged in the status field in the header tab.







Worksheet
Instrument
QC & Validation
Exporting



CONTINUE

OnWSH data exporting



CONTINUE LABORATORY AUTOMATION

Printing

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d Y200 200 200 50 0.251 19,200 19,200 T Y 200 5.00 5.00 50 1.043 220,005 90,720 B AAS matchik 50 40,001 50,0037 40,001 50,0037 40,001 B GOS/B & GOS/T 50 2,240 0,0081 51,003 10,003 YU GOS/B & GOS/T 50 2,240 51,003 49,400 Sangle ID G H 51,003 49,400 Y V00 1,0 51,003 49,400 3 Y /0 1,0 51,003 49,400 3 Y /00 1,0 51,003 51,003 3 Y /00 1,0 51,003 51,003 3 X/00 1,0 51,003 51,003 3 X/00 1,0 51,003 51,003 3 X/00 1,	d Y200 200 200 200 30 0.221 9.200 19.200 T Y200 5.00 5.00 50 1.04 20.010 9.1.200 8 AAS matchik 0 30 4.000 50.0301 4.0201 9 GCS/9.8 GCS/T 50 2.230 0.0301 4.0207 9 GCS/9.8 GCS/T 50 2.240 51.2000 49.400 YU GCS/9.8 GCS/T 50 2.440 51.2000 49.400 YU GCS/9.8 GCS/T 51.2000 49.400 51.2000 49.400 YU GCS/9.8 GCS/T 10 51.2000 49.400 51.2000 49.400 YU GCS/9.8 GCS/T 10 51.2000 49.400 51.2000 49.400 YU GCS/9.8 GCS/T 10 10 51.2000 49.400 YU GCS/9.8 GCS/T 10 10 51.2000 49.400 YU GCS/9.8 GCS/T 10 10 51.2000 10.100 YU GCS/9.8 GCS/T 1 10 10 10.100	d Y200 200 200 200 90 0.221 92004 192004 <t< td=""><td>d Y 200 200 200 50 0.031 9.200 9.200 T Y 4.00 500 500 50 4.020 50.200 9.720 B Addimit bits 50 4.020 50.200 9.720 9.720 B GOSYB & GOSYT 50 2.202 0.0201 51.2020 B GOSYB & GOSYT 50 2.202 0.0201 51.2020 VU GOSYB & GOSYT 50 2.202 0.0201 51.2020 VU GOSYB & GOSYT 51 51.202 40.400 Y 400 1.0 91 91.2020 40.400 2 Y 4.02 1.0 91 91.2020 40.410 3 Y 7.00 1.0 91 91 91.2020 40.410 3 Y 7.00 1.0 1.0 1.0 1.0 1.0 1.0 3 Y 7.00 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 <t< td=""><td>d Y 200 200 200 200 50 0.025 9.200 9.200 T Y 400 500 500 50 1.45 22.0105 9.1720 B AKS mat bit 50 50 22.020 9.0201 6.0201 50.0201 6.0201 9 GCS-VB & GCS-T 50 2.222 0.0201 51.2020 9.2020 10 GCS-VB & GCS-T 50 2.222 0.0201 51.2020 9.2020 10 GCS-VB & GCS-T 50 2.222 0.0201 51.2020 49.4100 10 GCS-VB & GCS-T 10 10 11</td><td>4 9 0.80</td><td>020</td><td>020</td><td>50</td><td>510.0 2000.0</td><td>5.7242</td><td>0.0222</td></t<></td></t<>	d Y 200 200 200 50 0.031 9.200 9.200 T Y 4.00 500 500 50 4.020 50.200 9.720 B Addimit bits 50 4.020 50.200 9.720 9.720 B GOSYB & GOSYT 50 2.202 0.0201 51.2020 B GOSYB & GOSYT 50 2.202 0.0201 51.2020 VU GOSYB & GOSYT 50 2.202 0.0201 51.2020 VU GOSYB & GOSYT 51 51.202 40.400 Y 400 1.0 91 91.2020 40.400 2 Y 4.02 1.0 91 91.2020 40.410 3 Y 7.00 1.0 91 91 91.2020 40.410 3 Y 7.00 1.0 1.0 1.0 1.0 1.0 1.0 3 Y 7.00 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 <t< td=""><td>d Y 200 200 200 200 50 0.025 9.200 9.200 T Y 400 500 500 50 1.45 22.0105 9.1720 B AKS mat bit 50 50 22.020 9.0201 6.0201 50.0201 6.0201 9 GCS-VB & GCS-T 50 2.222 0.0201 51.2020 9.2020 10 GCS-VB & GCS-T 50 2.222 0.0201 51.2020 9.2020 10 GCS-VB & GCS-T 50 2.222 0.0201 51.2020 49.4100 10 GCS-VB & GCS-T 10 10 11</td><td>4 9 0.80</td><td>020</td><td>020</td><td>50</td><td>510.0 2000.0</td><td>5.7242</td><td>0.0222</td></t<>	d Y 200 200 200 200 50 0.025 9.200 9.200 T Y 400 500 500 50 1.45 22.0105 9.1720 B AKS mat bit 50 50 22.020 9.0201 6.0201 50.0201 6.0201 9 GCS-VB & GCS-T 50 2.222 0.0201 51.2020 9.2020 10 GCS-VB & GCS-T 50 2.222 0.0201 51.2020 9.2020 10 GCS-VB & GCS-T 50 2.222 0.0201 51.2020 49.4100 10 GCS-VB & GCS-T 10 10 11	4 9 0.80	020	020	50	510.0 2000.0	5.7242	0.0222
T Y 3/01 5/00 5/00 5/00 2/00 2/00/00 </td <td>T Y 300 500 500 500 70.400 B AAS mak bik 50 50 40.001 50.0001 B 000000 50 50 70.0001 51.0000 B 000000 50 50 24.000 51.0000 B 000000 51.0000 51.0000 40.4100 B 000000 51.0000 60.1 60.1 B 000000 51.0000 60.1 60.1 B 1 100000 60.1 60.1 60.1 B 1 100000 74.000 10.1 60.1 B 1 100000 10.1 10.1 60.1 B 1 20000 10.1 10.1 10.1 B 1 200000 10.1 10.1 10.1 B 1 200000 10.1 10.1 10.1 B 1 2000000 10.1 10.1 10.1 B 1 200000000000000000000000000000000000</td> <td>T Y 3/02 5/0 5/0 5/0 2/</td> <td>T Y 3/0/ B AAS mat bits 5/00 S 0 5/0 S 0 5/0 S 0 5/0 S 0 2/0 S /td> <td>T Y 3/00 5/00 5/00 5/00 5/00 2/00 2/000 B AAS mat bits 50 4/001 50 4/001 5/0001 4/001 B GOSAY & GOSAT 50 2/202 0.0001 5/1000 5/1000 W GOSAY & GOSAT 50 2/401 5/1000 4/001 W GOSAY & GOSAT 50 2/401 5/1000 4/001 W GOSAY & GOSAT 10 10 10 10 2 Y 1/00 10 10 10 10 3 Y 1/00 10 10 10 3 Y 1/00 10 10 10 3 Y 1/00 10 10 10 3 W 1/00 10 10 10 3 W 1/00 10 10 10 3 W 1/00</td> <td>8 ¥ 200</td> <td>2.00</td> <td>2.00</td> <td></td> <td>0.252</td> <td>19.2504</td> <td>15.8058</td>	T Y 300 500 500 500 70.400 B AAS mak bik 50 50 40.001 50.0001 B 000000 50 50 70.0001 51.0000 B 000000 50 50 24.000 51.0000 B 000000 51.0000 51.0000 40.4100 B 000000 51.0000 60.1 60.1 B 000000 51.0000 60.1 60.1 B 1 100000 60.1 60.1 60.1 B 1 100000 74.000 10.1 60.1 B 1 100000 10.1 10.1 60.1 B 1 20000 10.1 10.1 10.1 B 1 200000 10.1 10.1 10.1 B 1 200000 10.1 10.1 10.1 B 1 2000000 10.1 10.1 10.1 B 1 200000000000000000000000000000000000	T Y 3/02 5/0 5/0 5/0 2/	T Y 3/0/ B AAS mat bits 5/00 S 0 5/0 S 0 5/0 S 0 5/0 S 0 2/0 S	T Y 3/00 5/00 5/00 5/00 5/00 2/00 2/000 B AAS mat bits 50 4/001 50 4/001 5/0001 4/001 B GOSAY & GOSAT 50 2/202 0.0001 5/1000 5/1000 W GOSAY & GOSAT 50 2/401 5/1000 4/001 W GOSAY & GOSAT 50 2/401 5/1000 4/001 W GOSAY & GOSAT 10 10 10 10 2 Y 1/00 10 10 10 10 3 Y 1/00 10 10 10 3 Y 1/00 10 10 10 3 Y 1/00 10 10 10 3 W 1/00 10 10 10 3 W 1/00 10 10 10 3 W 1/00	8 ¥ 200	2.00	2.00		0.252	19.2504	15.8058
3 Account all (Costri) 20 2000	3 According to the subscript a decisity 30 22,300 20,0001 51,3002 40,2100 10 OCS-19,8,00057 30 2,470 31,3000 40,4100 10 OCS-19,8,00057 30 2,470 31,3000 40,4100 10 OC H dil Uti pH 0,0 10 2,4700 40,4100 11 V,400 10 0 10 2,4700 10 </td <td>3 Activity C<</td> <td>3 4 5 5 3</td> <td>3 4 5 5 3</td> <td>TYAU</td> <td>5.00</td> <td>5.00</td> <td>50</td> <td>1,045</td> <td>23.0105</td> <td>91.7220</td>	3 Activity C<	3 4 5 5 3	3 4 5 5 3	TYAU	5.00	5.00	50	1,045	23.0105	91.7220
Yu goosya goosya Sangia IU G H Singia IU G H gH Yu yu yu G H H Yu Goosya a Goosya G H Yu Goosya a Goosya H H	Yu Gosvya Gost Sangla IU G H Sangla IU G H ddi pH V VU V V V V V Y VU V V V V V V Y VU V	YU GCS/94 GCS/T Single IU G H Single IU G H ddi pH VI M U G H H gdi	YU GCSYBA GCSYT S0 2.470 S1.8020 49.4800 Samplu IU G H did pH VA U G H did pH VA U G H did pH VA VA G H did did did VA VA G G H did	YU GCS/9.8 GCS/T YO YO <thyo< th=""> YO YO</thyo<>	9 GCS/98 GCS-T			20	2.500	0.0201	51.3823
Single ID G H dit gH dit gH Lit Lit 2 Y (d) C0 3 Y (20) C0 4 Y (d) C0 4 Y (d) C0 3 Y (20) C0 4 Y (d) C0 3 Y (20) C0 3 Y (20) C0 3 Y (20) C0 3 X (20) C0	Sample ID G H ddi pH ddi pH LNI LNI 2 Y 3.03 LO 3 Y 4.04 LO 3 Y 4.05 LO 4 Y 0.00 LO 4 Y 2.00 LO 3 Y 4.00 LO 3 Y 4.00 LO 3 Y 4.00 LO 3 Y 4.00 LO 3 Y 5.00 LO 3 Y 4.00 LO 3 Y 4.00 LO 3 M 55 mob bits I 9 GOSP/9 & GOSPT I	Sample ID G H ddi pH LM LM 2 ¥ 3.00 1.0 3 ¥ 7.00 1.0 3 ¥ 7.00 1.0 4 ¥ 0.90 1.0 4 ¥ 0.90 1.0 3 ¥ 7.00 1.0 4 ¥ 0.90 1.0 3 ¥ 7.00 1.0 3 ¥ 3.00 1.0 7 ¥ 4.00 1.0 3 Å 3.5 mak bits 1 9 GCS/9 & GCS/7 1	Sengle ID G H did gH LM LM 2 Y.03 L0 3 Y.04 L0 3 Y.03 L0 4 Y.03 L0 4 Y.03 L0 4 Y.03 L0 3 Y.00 L0 4 Y.00 L0 3 X.00 mAthlth L 9 GOSPAS GOSPT L 70 GOSPAS GOSPT L	Sengle ID G H did gH did gH LNI LNI 2 Y.08 L0 3 Y.09 L0 4 Y.09 L0 4 Y.09 L0 4 Y.09 L0 4 Y.09 L0 3 Y.00 L0 4 Y.00 L0 3 Y.00 L0 3 Y.00 L0 4 Y.00 L0 3 Software the L0 3 Software the L0 2 Software Gesert L1	rti GCS/94 GCS/T			50	2.410	51.8520	49,4100
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Sample ID	A Aliquote ml	B a)V spike Mg	C Final vol. mg
1 V.02	0.02	0.02	50
2 V.05	0.05	0.05	50
3 V.10	0.10	0.10	50
4 V 0.50	0.50	0.50	50
5 V 1.00	1.00	1.00	50
6 V.2.00	2.00	2.00	50
7 V 5.00	5.00	5.00	50
8 AAS inst blk	<u>j</u>		50
9 QCS-19 & QCS-7		2	50
10 QCS-19 & QCS-7			50

Printing your worksheet from the head tab. Then write into the cells, like in your logbook







Thank you for your time

