Using Excel as a Data Checker for Batches

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or Find you Errors Before your Errors find you.

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After you finish your analytical run, what do you do?

- Look for a violation or out of control using specifications?
 Look at each entry on the screen?
 - Hope you didn't make a mistake, and entered everything correctly?

Several years ago I was inspecting a contract laboratory.

LIMS used a Microsoft SQL database.

 Some how they checked if analysis were done within holding times by using a export to Microsoft Excel.

 While Playing around with Excel one day I found the answer Minimum Requirements Your data must be in a database Access - SQL Oracle You must understand where your data is stored. - What fields are in what tables – How are your tables linked or key fields You need a safe user ID with read only access

If your unsure about your database

 Make an Microsoft Access ODBC to your LIMS database Look around for the fields you want Remember you can't get the "data" out if it's not "in" first. If all else fails Ask your DBA or LIMS vendor for help DBA = Data Base Administrator

Now, on with the show

It looks like this:In a perfect world.

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Three Easy Steps:
Get your data
Write your formulas
Automate with a macro

Step One

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18	71937	AC82000	0 EB-09		120400132	4/17/12 10	56 4/1	7/12 13:22	2 TKN	Nitrogen	0.41		0.05	1.00	4/23/12 9:45	SAMP	B
19	71937	AC82001	1 EB-10		120400132	4/17/12 10:	33 4/1	7/12 13:22	2 TKN	Nitrogen	0.42		0.05	1.00	4/23/12 9:45	SAMP	B
20	71937	AC82002	2 EB-11		120400132	4/17/12 10:	00 4/1	7/12 13:22	2 TKN	Nitrogen	0.42		0.05	1.00	4/23/12 9:45	SAMP	B
21	71937	AC82003	3 EB-12		120400132	4/17/12 11:	26 4/1	7/12 13:22	2 TKN	Nitrogen	0.52		0.05	1.00	4/23/12 9:45	SAMP	В
22	71937	AC82004	4 EB-13		120400132	4/17/12 11:	53 4/1	7/12 13:22	2 TKN	Nitrogen	0.52	J4	0.05	1.00	4/23/12 9:45	SAMP	В
23	71937	AC82005	5 EB-14		120400132	4/17/12 12:	05 4/1	7/12 13:22	2 TKN	Nitrogen	, 0.44		0.05	1.00	4/23/12 9:45	SAMP	В
24	71937	AC62006	6 EB-BLANK		120400132	4/17/12 10.	08 4/1	7/12 13.22	2 TKN	Nitrogen	, 0.05	U	0.05	1.00	4/23/12 9.45	FB	В
25	71937	AC82020	0 RAMP-A		120400141	4/18/12 11:	50 4/1	8/12 14:00	0 TKN	Nitrogen	, 4.4		0.05	1.00	4/23/12 9:45	SAMP	<u> </u>
26	71937	AC82021	1 RAMP-B		120400141	4/18/12 11:	50 4/1	8/12 14:00	0 TKN	Nitrogen	, 4.5		0.05	1.00	4/23/12 9:45	SAMP	<u> </u>
27	71937	AC82022	2 RAMP-C		120400141	4/18/12 11:	50 4/1	8/12 14:00	D TKN	Nitrogen	, 4.7		0.05	1.00	4/23/12 9:45	SAMP	<u> </u>
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6	71937	AC0100		4	20400131	4/17/12 10:	02 4/1	7/12 12:13	TKN	Nitrogen,	0.53		0.05	1.00	4/23/12 9:45	SAMP	В
7	7193 🇖	Cu <u>t</u>			00131	4/17/12 10:	24 4/1	7/12 12:13	TKN	Nitrogen,	0.84		0.05	1.00	4/23/12 9:45	SAMP	В
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10	7193	Paste Spec	ial		00132	4/16/12 9:	28 4/10	5/12 12:49	TKN	Nitrogen,	0.45		0.05	1.00	4/23/12 9:45	SAMP	B
11	/193				00132	4/16/12 9:	47 4/10	5/12 12:49	TKN	Nitrogen,	0.56		0.05	1.00	4/23/12 9:45	SAMP	В
12	7193	Insert			00132	4/16/12 10:	06 4/10	0/12 12:45 0/40 40:40		Nitrogen,	0.55		0.05	1.00	4/23/12 9:45	SAMP	В
13	7193	Delete			00132	4/16/12 10:	40 4/10	0/1Z 1Z:45		Nitrogen,	0.53		0.05	1.00	4/23/12 9:45	SAMP	В
14	7193	Clear Co <u>n</u> t	ents		00132	4/10/12 11.	01 4/10 01 4/10	2/12 12.45 2/12 12:45		Nitrogen,	0.04		0.05	1.00	4/23/12 9.45	SAMP	B
16	7193	Filter			00132	4/16/12 10.	03 //1	5/12 12.45 5/12 12:45		Nitrogen,	0.27		0.05	1.00	4/23/12 9:45	SAMP	B
17	7193	r int <u>e</u> r			00132	4/16/12 11:	21 4/1	5/12 12:43	TKN	Nitrogen	0.23		0.05	1.00	4/23/12 9:45	SAMP	B
18	7193	Sort			00132	4/17/12 10:	56 4/1	7/12 13:22	TKN	Nitrogen.	0.41		0.05	1.00	4/23/12 9:45	SAMP	B
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20	20 7193 Format Cells 00132 4/17/12 10:33 4/17/12 13:22 TKN Nitrogen, 0.42 0.05 1.00 4/23/12 9:45 SAMP B																
21	7193 📕				00132	4/17/12 11:	26 4/1	7/12 13:22	2 TKN	Nitrogen,	0.52		0.05	1.00	4/23/12 9:45	SAMP	В
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25	7193	Refresh			00141	4/18/12 11:	50 4/1	3/12 14:00	TKN	Nitrogen,	4.4		0.05	1.00	4/23/12 9:45	SAMP	
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27	/193/	AC82022	2 RAMP-C	1	20400141	4/18/12 11:	50 4/1	8/12 14:00	IKN	Nitrogen,	4.1		0.05	1.00	4/23/12 9:45	SAMP	
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14	71937	AC81996	EB-05		12040013	Remove ex	ternal d	ata from wo	irksheet b	etore clo	sing	54		0.05	1.00	4/23/
15	71937	AC81997	EB-06		12040013	Data formatting and	l layout -					67		0.05	1.00	4/23/
16	71937	AC81998	EB-07		12040013	🔽 Include field na	ames	Preserv	e column :	sort/filter	/layout	25		0.05	1.00	4/23/
17	71937	AC81999	EB-08		12040013	Include row nu	mbers	Preserv	e cell form	natting		47		0.05	1.00	4/23/
18	71937	AC82000	EB-09		12040013	Adjust column	width					41		0.05	1.00	4/23/
19	71937	AC82001	EB-10		12040013	<u>, H</u> ajase colarini	mach					42		0.05	1.00	4/23/
20	71937	AC82002	EB-11		12040013	If the number of r	ows in th	ne data rang	je change	s upon re	efresh:	42		0.05	1.00	4/23/
21	71937	AC82003	EB-12		12040013	Insert <u>c</u> ells	for new	data, delet	e unused	cells		52		0.05	1.00	4/23/
22	71937	AC82004	EB-13		12040013	🔿 Insert enti	re ro <u>w</u> s f	or new data	a, clear un	nused cel	s	52	J4	0.05	1.00	4/23/
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24	71937	AC82006	EB-BLANK		12040013			human a di				D5	U	0.05	1.00	4/23/
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Step One B

Ok, I was less than truthful about 3 steps
Get more data if needed for other sheets

I have Sheet Named "All Data", it brings in recent historical data by site for the batched Analyte of interest.

One more sheet brings in the historical QA data for the Analyte.

Step One C

 Add any needed information you can't pull from the database.

 I have Sheet Named "Holding times", in addition to holding times it also contains information like: can the result be a text, is it a field parameter, does it have a PQL, and preservation temperature.

Step Two

Organize Data – Pivot Tables Write your Formulas – Is analysis start time < sample collect time</p> - Nested "if statements" If a logical statement is true do this, if not do that - VLookup Format your results Conditional Formatting

Pivot Tables

• Pivot Tables are your friend.

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24	CES015	SUR		17.822972	97 CES01S	UR		4.4390406	CES0	1SUR		74								
25	CES03E	BOT		16.	34 CES03B	от	2	2.758260321	CES0	3BOT		5								
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29	CES06E	BOT		11.6	98 CES06B	от	1	.851221219	CES0	6BOT		5								
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Now we can start

Formulas can be simple: - =IF(E2<D2,"ERROR", "OK")
Formulas can be complicated: - =IF(AG2="QC","OK",IF(VLOOKUP(F2,'Hold Times'!A:F,6,FALSE)="Y","OK",IF(L2="FB",IF(LEFT(I2,1)="U","OK","Check for V1"),IF(L2="FCEB",IF(LEFT(I2,1)="U","OK"," Check for V1"),"OK"))))

Things I can check for:

- Is the result a number?
 pH = 7..2?
- Is the result < MDL?
 Should it be qualified as < LOD?
 Between LOD and LOQ?
 Was the test performed before the sample was collected or received.
- Was the test within hold time?
 - If so was it properly qualified?

Things I can check for:

• Was the test performed in the future? • Was a qualifier used that was not necessary? Is the qualifier used on file or made up? Did sample meet proper thermal preservation? Was the result within 2 standard deviation units of the Historical mean?

Step Two B

Add ColorUse the Conditional formatting.

Step Three

Automate the process with a Macro
Use the Macro Recorder

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3	71937	AC81984	20A-19GR		120400131	4/17/12	8:23	4/17/12 12:13	TKN	Nitrogen,	1.6		0.05	1.00	4/23/12 9:45	SAMP	В
4	71937	AC81985	GATRGR91		120400131	4/17/12	8:41	4/17/12 12:13	TKN	Nitrogen,	1.0		0.05	1.00	4/23/12 9:45	SAMP	В _
5	71937	AC81986	GATRGR60		120400131	4/17/12	9:27	4/17/12 12:13	TKN	Nitrogen,	0.45		0.05	1.00	4/23/12 9:45	SAMP	B
6	71937	AC81987	GATRGR30		120400131	4/17/12 1	0:02	4/17/12 12:13	TKN	Nitrogen,	0.53		0.05	1.00	4/23/12 9:45	SAMP	В
7	((1937) AC81988 BURNTS 120400131 4/17/12 10:24 4/17/12 12:13 TKN Nitrogen, 0.84 0.05 1.00 4/23/12 9:45 SAMP B 8 71937 AC81990 16-3GR 120400131 4/17/12 11:30 4/17/12 12:13 TKN Nitrogen, 0.84 0.05 1.00 4/23/12 9:45 SAMP B 9 71937 AC81991 WSEQB 120400131 4/17/12 10:30 4/17/12 12:13 TKN Nitrogen, 0.05 U 0.05 1.00 4/23/12 9:45 SAMP B																
8	8 71937 AC81990 16-3GR 120400131 4/17/12 11:30 4/17/12 12:13 TKN Nitrogen, 0.82 0.05 1.00 4/23/12 9:45 SAMP B 9 71937 AC81991 WSEQB 120400131 4/17/12 10:30 4/17/12 12:13 TKN Nitrogen, 0.05 U 0.05 1.00 4/23/12 9:45 SAMP B 9 71937 AC81991 WSEQB 120400131 4/17/12 10:30 4/17/12 12:13 TKN Nitrogen, 0.05 U 0.05 1.00 4/23/12 9:45 SAMP B 10 71937 AC81992 FB 01 120400132 4/15/12 12:40 TKN Nitrogen, 0.45 0.05 1.00 4/23/12 9:45 FCEB B																
9	9 71937 AC81991 WSEQB 120400131 4/17/12 10:30 4/17/12 12:13 TKN Nitrogen, 0.05 U 0.05 1.00 4/23/12 5:45 SAMP B 9 71937 AC81991 WSEQB 120400131 4/17/12 12:13 TKN Nitrogen, 0.05 U 0.05 1.00 4/23/12 9:45 FCEB B 10 71937 AC81992 EB-01 120400132 4/16/12 9:28 4/16/12 12:49 TKN Nitrogen, 0.45 0.05 1.00 4/23/12 9:45 SAMP B																
10	10 71937 AC81992 EB-01 120400132 4/16/12 9:28 4/16/12 12:49 TKN Nitrogen, 0.45 0.05 1.00 4/23/12 9:45 SAMP B 11 71937 AC81993 EB-02 120400132 4/16/12 9:47 4/16/12 12:49 TKN Nitrogen, 0.56 0.05 1.00 4/23/12 9:45 SAMP B															BL	
11	71937	AC81993	EB-02		120400132	4/16/12	9:47	4/16/12 12:49	TKN	Nitrogen,	0.56		0.05	1.00	4/23/12 9:45	SAMP	В
12	71937	AC81994	EB-03		120400132	4/16/12 1	0:06	4/16/12 12:49	TKN	Nitrogen,	0.56		0.05	1.00	4/23/12 9:45	SAMP	В
13	71937	AC81995	EB-04		120400132	4/16/12 1	0:40	4/16/12 12:49	TKN	Nitrogen,	0.53		0.05	1.00	4/23/12 9:45	SAMP	В
14	71937	AC81996	EB-05		120400132	4/16/12 1	1:51	4/16/12 12:49	TKN	Nitrogen,	0.54		0.05	1.00	4/23/12 9:45	SAMP	В
15	/193/	AC81997	EB-06		120400132	4/16/12 1	0:21	4/16/12 12:49	IKN	Nitrogen,	0.27		0.05	1.00	4/23/12 9:45	SAMP	В
16	/193/	AC81998	EB-07		120400132	4/16/12 1	1:03	4/16/12 12:49	TKN	Nitrogen,	0.25		0.05	1.00	4/23/12 9:45	SAMP	В
1/	71937	AC81999	EB-08		120400132	4/16/12 1	1:21	4/16/12 12:49	TKN	Nitrogen,	0.47		0.05	1.00	4/23/12 9:45	SAMP	B
10	71937	AC82000	EB-09		120400132	4/17/12 1	0:56	4/17/12 13:22	TKN	Nitrogen,	0.41		0.05	1.00	4/23/12 9:45	SAMP	B
19	71937	AC82001	EB-10		120400132	4/17/12 1	0:33	4/17/12 13:22	TKN	Nitrogen,	0.42		0.05	1.00	4/23/12 9:45	SAMP	B
20	71937	AC02002	ED-11		120400132	4/17/12 1	1.00	4/17/12 13.22	TIXN	Nitrogen,	0.42		0.05	1.00	4/23/12 9.45	SAMP	
21	71937	AC02003	ED-12		120400132	4/17/12 1	1.20	4/11/12 13.22		Nitrogen,	0.52	14	0.05	1.00	4/23/12 9.45	SAMP	
22	71937	AC02004	ED-1J		120400132	4/17/12 1	1.55	4/11/12 13.22		Nitrogen,	0.52	J4	0.05	1.00	4/23/12 9.43	SAMP	
24	71937	AC82005	EB-BLANK		120400132	4/17/12 1	0.08	4/17/12 13.22	TKN	Nitrogen,	0.44	ш	0.05	1.00	4/23/12 9.45	FB	B
25	71937	AC82020	RAMP-A		120400132	4/18/12 1	1.50	4/18/12 14:00	TKN	Nitrogen	4.4	Ŭ	0.05	1.00	4/23/12 9:45	SAMP	
26	71937	AC82021	RAMP-B		120400141	4/18/12 1	1.50	4/18/12 14:00	TKN	Nitrogen	4.5		0.05	1.00	4/23/12 9:45	SAMP	
27	71937	AC82022	RAMP-C		120400141	4/18/12 1	1:50	4/18/12 14:00	TKN	Nitrogen	4.7		0.05	1.00	4/23/12 9:45	SAMP	
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2	71937	AC81976	WHISGR50	Macr	DΖ					trogen,	5.0	JA	0.05	1.00	4/23/12 9:45	SAMP	
3	71937	AC81984	ZUA-19GR	Shortcut	ev:					trogen,	1.0		0.05	1.00	4/23/12 9:45	SAMP	B
4	71937	AC81985	GATRGR91	Difference	_{сыд} т Г	_				trogen,	1.0		0.05	1.00	4/23/12 9:45	SAMP	B
5	71937	AC01900	GATRGROU		can j					trogen,	0.40		0.05	1.00	4/23/12 9.45	SAMP	
7	71937	AC01907		Store mad	ro in:					trogen,	0.00		0.05	1.00	4/23/12 9.45	SAMP	
0	8 71937 AC81990 16-3GR 9 71937 AC81991 WSEQB Description: trogen, 0.05 0.05 1.00 4/23/12 9:45 SAMP B 10 71937 AC81992 EB-01 trogen, 0.45 0.05 1.00 4/23/12 9:45 SAMP B																
0	6 /1937 AC81990 16-3GR 10 4/23/12 9:45 SAMP B 9 71937 AC81991 WSEQB Description: trogen, 0.05 U 0.05 1.00 4/23/12 9:45 FCEB B 10 71937 AC81992 EB-01 trogen, 0.45 0.05 1.00 4/23/12 9:45 SAMP B																
10	9 71937 AC81991 WSEQB Description: trogen, 0.05 U 0.05 1.00 4/23/12 9:45 FCEB B 10 71937 AC81992 EB-01 trogen, 0.45 0.05 1.00 4/23/12 9:45 SAMP B 11 71937 AC81993 FB 02 0.05 0.05 1.00 4/23/12 9:45 SAMP B																
11	71037	AC81993	EB-02							trogen,	0.45		0.05	1.00	4/23/12 9:45	SAMP	B
12	71037	AC81994	EB 03							trogen,	0.50		0.05	1.00	4/23/12 3:45	SAMD	B
13	71937	AC81995	EB-04							trogen	0.50		0.05	1.00	4/23/12 9:45	SAMP	B
14	71937	AC81996	EB-05							L trogen	0.53		0.05	1.00	4/23/12 9:45	SAMP	B
15	71937	AC81997	EB-06				0	K	Cancel	trogen	0.04		0.05	1.00	4/23/12 9:45	SAMP	B
16	71937	AC81998	EB-07	120400	132	4/16/12 11:0	3 4/16	/12 12:49	TKN	Nitrogen	0.25		0.05	1.00	4/23/12 9:45	SAMP	B
17	71937	AC81999	EB-08	120400	132	4/16/12 11:2	21 4/16	/12 12:49	TKN	Nitrogen	0.47		0.05	1.00	4/23/12 9:45	SAMP	B
18	71937	AC82000	EB-09	120400	132	4/17/12 10:5	6 4/17	/12 13:22	TKN	Nitrogen	0.41		0.05	1.00	4/23/12 9:45	SAMP	B
19	71937	AC82001	EB-10	120400	132	4/17/12 10:3	3 4/17	/12 13:22	TKN	Nitrogen.	0.42		0.05	1.00	4/23/12 9:45	SAMP	B
20	71937	AC82002	EB-11	120400	132	4/17/12 10:0	0 4/17	/12 13:22	TKN	Nitrogen	0.42		0.05	1.00	4/23/12 9:45	SAMP	B
21	71937	AC82003	EB-12	120400	132	4/17/12 11:2	26 4/17	/12 13:22	TKN	Nitrogen.	0.52		0.05	1.00	4/23/12 9:45	SAMP	В
22	71937	AC82004	EB-13	120400	132	4/17/12 11:5	3 4/17	/12 13:22	TKN	Nitrogen	0.52	J4	0.05	1.00	4/23/12 9:45	SAMP	В
23	71937	AC82005	EB-14	120400	132	4/17/12 12:0	5 4/17	/12 13:22	TKN	Nitrogen	0.44		0.05	1.00	4/23/12 9:45	SAMP	В
24	71937	AC82006	EB-BLANK	120400	132	4/17/12 10.0	6 4/17	/12 13.22	TKN	Nitrogen,	0.05	U	0.05	1.00	4/23/12 9.45	FB	В
25	71937	AC82020	RAMP-A	120400	141	4/18/12 11:5	60 4/18	/12 14:00	TKN	Nitrogen,	4.4		0.05	1.00	4/23/12 9:45	SAMP	1
26	71937	AC82021	RAMP-B	120400	141	4/18/12 11:5	0 4/18	/12 14:00	TKN	Nitrogen,	4.5		0.05	1.00	4/23/12 9:45	SAMP	1
27	71937	AC82022	RAMP-C	120400	141	4/18/12 11:5	60 4/18	/12 14:00	TKN	Nitrogen,	4.7		0.05	1.00	4/23/12 9:45	SAMP	I
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1	BATNUMB	SAMPNO	LOCCODE		LOGBATCH	COLDATE	SUBDATE	ACOD		RESULT	QUAI	MDI	DII FACTOR	ASI
2	71937	AC81976	WHISGR50		120400129	4/16/12 9:05	4/16/12 12:42	TKN	Nitrogen	5.0		0.05	1 00	4/23/
3	71937	AC81984	20A-19GR		120400131	4/17/12 8:23	4/17/12 12:13	3 TKN	Nitrogen	1.6		0.05	1.00	4/23/
4	71937	AC81985	GATRGR91		120400131	4/17/12 8:41	4/17/12 12:13	3 TKN	Nitrogen	1.0		0.05	1.00	4/23/
5	71937	AC81986	GATRGR60		120400131	4/17/12 9:27	4/17/12 12:13	3 TKN	Nitrogen.	0.45		0.05	1.00	4/23/
6	71937	AC81987	GATRGR30		120400131	4/17/12 10:02	4/17/12 12:13	3 TKN	Nitrogen.	0.53		0.05	1.00	4/23/
7	71937	AC81988	BURNTS		120400131	4/17/12 10:24	4/17/12 12:13	3 TKN	Nitrogen.	0.84		0.05	1.00	4/23/
8	71937	AC81990	16-3GR		120400131	4/17/12 11:30	4/17/12 12:13	3 TKN	Nitrogen,	0.82		0.05	1.00	4/23/
9	71937	AC81991	WSEQB		120400131	4/17/12 10:30	4/17/12 12:13	3 TKN	Nitrogen,	0.05	U	0.05	1.00	4/23/
10	71937	AC81992	EB-01		120400132	4/16/12 9:28	4/16/12 12:49	TKN	Nitrogen,	0.45		0.05	1.00	4/23/
11	71937	AC81993	EB-02		120400132	4/16/12 9:47	4/16/12 12:49) TKN	Nitrogen,	0.56		0.05	1.00	4/23/
12	71937	AC81994	EB-03		120400132	4/16/12 10:06	4/16/12 12:49	TKN	Nitrogen,	0.56		0.05	1.00	4/23/
13	71937	AC81995	EB-04		120400132	4/16/12 10:40	4/16/12 12:49) TKN	Nitrogen,	0.53		0.05	1.00	4/23/
14	71937	AC81996	EB-05		120400132	4/16/12 11:51	4/16/12 12:49) TKN	Nitrogen,	0.54		0.05	1.00	4/23/
15	71937	AC81997	EB-06		120400132	4/16/12 10:21	4/16/12 12:49) TKN	Nitrogen,	0.27		0.05	1.00	4/23/
16	71937	AC81998	EB-07		120400132	4/16/12 11:03	4/16/12 12:49) TKN	Nitrogen,	0.25		0.05	1.00	4/23/
17	71937	AC81999	EB-08		120400132	4/16/12 11:21	4/16/12 12:49) TKN	Nitrogen,	0.47		0.05	1.00	4/23/
18	71937	AC82000	EB-09		120400132	4/17/12 10:56	6 4/17/12 13:22	2 TKN	Nitrogen,	0.41		0.05	1.00	4/23/
19	71937	AC82001	EB-10		120400132	4/17/12 10:33	4/17/12 13:22	2 TKN	Nitrogen,	0.42		0.05	1.00	4/23/
20	71937	AC82002	EB-11		120400132	4/17/12 10:00	4/17/12 13:22	2 TKN	Nitrogen,	0.42		0.05	1.00	4/23/
21	71937	AC82003	EB-12		120400132	4/17/12 11:26	6 4/17/12 13:22	2 TKN	Nitrogen,	0.52		0.05	1.00	4/23/
22	71937	AC82004	EB-13		120400132	4/17/12 11:53	4/17/12 13:22	2 TKN	Nitrogen,	0.52	J4	0.05	1.00	4/23/
23	71937	AC82005	EB-14		120400132	4/17/12 12:05	4/17/12 13:22	2 TKN	Nitrogen,	0.44		0.05	1.00	4/23/
24	71937	AC82006	EB-BLANK		120400132	4/17/12 10:08	4/17/12 13:22	2 TKN	Nitrogen,	0.05	U	0.05	1.00	4/23/
25	71937	AC82020	RAMP-A		120400141	4/18/12 11:50	4/18/12 14:00) TKN	Nitrogen,	4.4		0.05	1.00	4/23/
26	71937	AC82021	RAMP-B		120400141	4/18/12 11:50	4/18/12 14:00	TKN	Nitrogen,	4.5		0.05	1.00	4/23/
27	71937	AC82022	RAMP-C		120400141	4/18/12 11:50	4/18/12 14:00	TKN	Nitrogen,	4.7		0.05	1.00	4/23/
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2 B	0		0.5	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	0.00
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7 B	0		10.2 0)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	1.32
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10 B	0		0.5 0)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	14.30
11 B	0		0.5 0	Ж	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	14.3(
12 B	0		5.78 C	Ж	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	0.00
13 B	0		5 0)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	0.00
14 B	0		14.4 0)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	1.32
10 B	0		39.2 C)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	14.30
17 B	0		3.14 0	Ж	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	0.00
18 B	0		1.25 0	Ж	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	ОК	0.0(
19 B	0		2.11 0)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	1.32
20 B	0		2.01 0)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	12.73
21 B	0		0.06 0)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	00	OK	OK	OK	OK	OK	0.00
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24 B	0		-0.03 C	Ж	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	QC	OK	OK	OK	OK	OK	0.00
25 B	0		-0 C)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	QC	OK	OK	OK	OK	OK	0.00
26 B	0	(0.001 C)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	QC	OK	OK	OK	OK	OK	0.00
27 B	0		45.7 C)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	0.00
29 B	0		14 0)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	1.32
30 B	0		36.7 C	Ж	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	12.7:
31 B	0		0.5 0	Ж	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	14.30
32 B	0		0.25 0)K	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	0.00
33 B																								
Banda		utput 97		V-IVH3 Z	TN NOS	C Hold	Times	quair	ners / R	celease no	tes / LW	HI / HOV						_				0		
Ready	*																				92%			
# 8	start		6) 🕑		LoggerN	et			RKS Proc	🦻 🌈 Mie	crosoft Acce	s	Power(Grid TNI 2	📲 P	owerGrid_	beta	. 3	MS Office	»»	😢 💽 💟 (39,	4:24 PM



Questions?

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