



**BATTERY ANALYSE – REGENERATION REPORT**  
**HBL 2V CELL 24 CELLS 300AH**





Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20	#21	#22	#23	#24	Sum
00:00	2.22	2.25	2.23	2.24	2.24	2.24	2.25	2.25	2.25	2.18	2.25	2.24	2.25	2.25	2.25	2.23	2.23	2.22	2.24	2.25	2.07	2.25	2.24	2.25	53.57
00:15	2.04	2.06	2.05	2.05	2.05	2.05	2.06	2.06	2.06	2.05	2.07	2.05	2.06	2.07	2.05	2.05	2.06	2.03	2.07	2.07	2.07	2.06	2.05	2.07	49.36
00:30	2.02	2.03	2.03	2.03	2.03	2.03	2.04	2.03	2.03	2.03	2.05	2.03	2.03	2.04	2.03	2.03	2.04	2.01	2.04	2.05	2.07	2.03	2.03	2.04	48.82
00:45	2.02	2.02	2.03	2.02	2.03	2.02	2.03	2.03	2.02	2.03	2.04	2.03	2.03	2.03	2.03	2.03	2.03	2.01	2.04	2.04	2.07	2.03	2.02	2.04	48.72
01:00	2.02	2.02	2.03	2.02	2.02	2.02	2.03	2.03	2.02	2.03	2.04	2.03	2.03	2.03	2.02	2.03	2.03	2.01	2.04	2.04	2.07	2.03	2.02	2.04	48.7
01:15	2.02	2.01	2.03	2.02	2.02	2.02	2.03	2.02	2.02	2.02	2.04	2.02	2.03	2.03	2.02	2.03	2.03	2.01	2.04	2.04	2.07	2.02	2.02	2.03	48.64
01:30	2.02	2	2.02	2.01	2.02	2.01	2.03	2.02	2.01	2.02	2.04	2.02	2.02	2.03	2.02	2.03	2.03	2	2.03	2.03	2.07	2.02	2.02	2.03	48.55
01:45	2.01	1.98	2.02	2.01	2.02	2.01	2.02	2.02	2.01	2.02	2.04	2.02	2.02	2.03	2.02	2.02	2.02	2	2.03	2.03	2.07	2.02	2.02	2.03	48.49
02:00	2.01	1.96	2.02	2.01	2.01	2.01	2.02	2.02	2	2.02	2.03	2.01	2.02	2.02	2.01	2.02	2.02	2	2.03	2.03	2.07	2.02	2.01	2.03	48.4
02:15	2.01	1.93	2.01	2	2.01	2	2.02	2.01	2	2.01	2.03	2.01	2.02	2.02	2.01	2.02	2.02	2	2.03	2.03	2.07	2.01	2.01	2.02	48.3
02:30	2	1.85	2.01	2	2.01	2	2.02	2.01	1.99	2.01	2.03	2	2.01	2.02	2.01	2.01	2.01	1.99	2.02	2.02	2.07	2.01	2.01	2.02	48.13
02:45	2	1.75	2.01	2	2	1.99	2.01	2.01	1.99	2.01	2.02	2	2.01	2.01	2	2.01	2.01	1.99	2.02	2.02	2.07	2	2	2.02	47.95
03:00	2	1.61	2	1.99	2	1.99	2.01	2	1.98	2	2.02	1.99	2.01	2.01	2	2.01	2.01	1.99	2.02	2.01	2.07	2	2	2.01	47.73
03:15	1.99	1.47	2	1.99	1.99	1.98	2	2	1.97	2	2.02	1.98	2	2	1.99	2	2	1.98	2.01	2.01	2.07	2	1.99	2.01	47.45
03:30	1.99	1.31	1.99	1.98	1.99	1.97	2	1.99	1.96	1.99	2.01	1.97	2	2	1.99	2	2	1.98	2.01	2.01	2.07	1.99	1.99	2.01	47.2
03:45	1.98	1.15	1.99	1.98	1.99	1.97	2	1.99	1.95	1.99	2.01	1.97	1.99	1.99	1.99	2	1.99	1.97	2.01	2	2.07	1.99	1.99	2	46.96
04:00	1.98	0.93	1.98	1.97	1.98	1.96	1.99	1.98	1.94	1.99	2.01	1.95	1.99	1.99	1.98	1.99	1.99	1.97	2	2	2.07	1.98	1.98	2	46.6
04:15	1.98	1.06	1.98	1.97	1.98	1.96	1.99	1.98	1.93	1.98	2	1.94	1.99	1.98	1.98	1.99	1.99	1.97	2	1.99	2.07	1.98	1.98	1.99	46.66
04:30	1.97	1.05	1.97	1.96	1.97	1.95	1.98	1.97	1.92	1.98	2	1.92	1.98	1.98	1.97	1.98	1.98	1.96	1.99	1.99	2.07	1.97	1.97	1.99	46.47
04:45	1.97	1.01	1.97	1.96	1.97	1.94	1.98	1.97	1.91	1.97	1.99	1.89	1.98	1.97	1.97	1.98	1.98	1.96	1.99	1.98	2.07	1.96	1.97	1.99	46.33
05:00	1.96	0.97	1.96	1.95	1.96	1.93	1.97	1.96	1.9	1.97	1.99	1.86	1.97	1.97	1.96	1.97	1.97	1.95	1.98	1.98	2.07	1.96	1.97	1.98	46.11
05:15	1.96	0.86	1.96	1.95	1.96	1.92	1.97	1.96	1.89	1.96	1.98	1.83	1.97	1.96	1.95	1.97	1.97	1.95	1.98	1.97	2.07	1.95	1.96	1.98	45.88
05:30	1.95	0.83	1.95	1.94	1.95	1.92	1.97	1.95	1.87	1.96	1.98	1.78	1.96	1.96	1.95	1.96	1.96	1.94	1.97	1.97	2.07	1.95	1.96	1.97	45.67
05:45	1.95	0.8	1.95	1.94	1.95	1.91	1.96	1.95	1.85	1.95	1.97	1.74	1.96	1.95	1.94	1.96	1.96	1.94	1.97	1.96	2.07	1.94	1.95	1.97	45.49
06:00	1.94	0.76	1.94	1.93	1.94	1.9	1.96	1.94	1.83	1.94	1.97	1.7	1.95	1.94	1.94	1.95	1.95	1.93	1.96	1.96	2.07	1.93	1.95	1.96	45.24
06:15	1.94	0	1.94	1.92	1.93	1.88	1.95	1.94	1.81	1.94	1.96	1.65	1.94	1.94	1.93	1.95	1.95	1.92	1.96	1.95	2.07	1.93	1.94	1.96	44.3

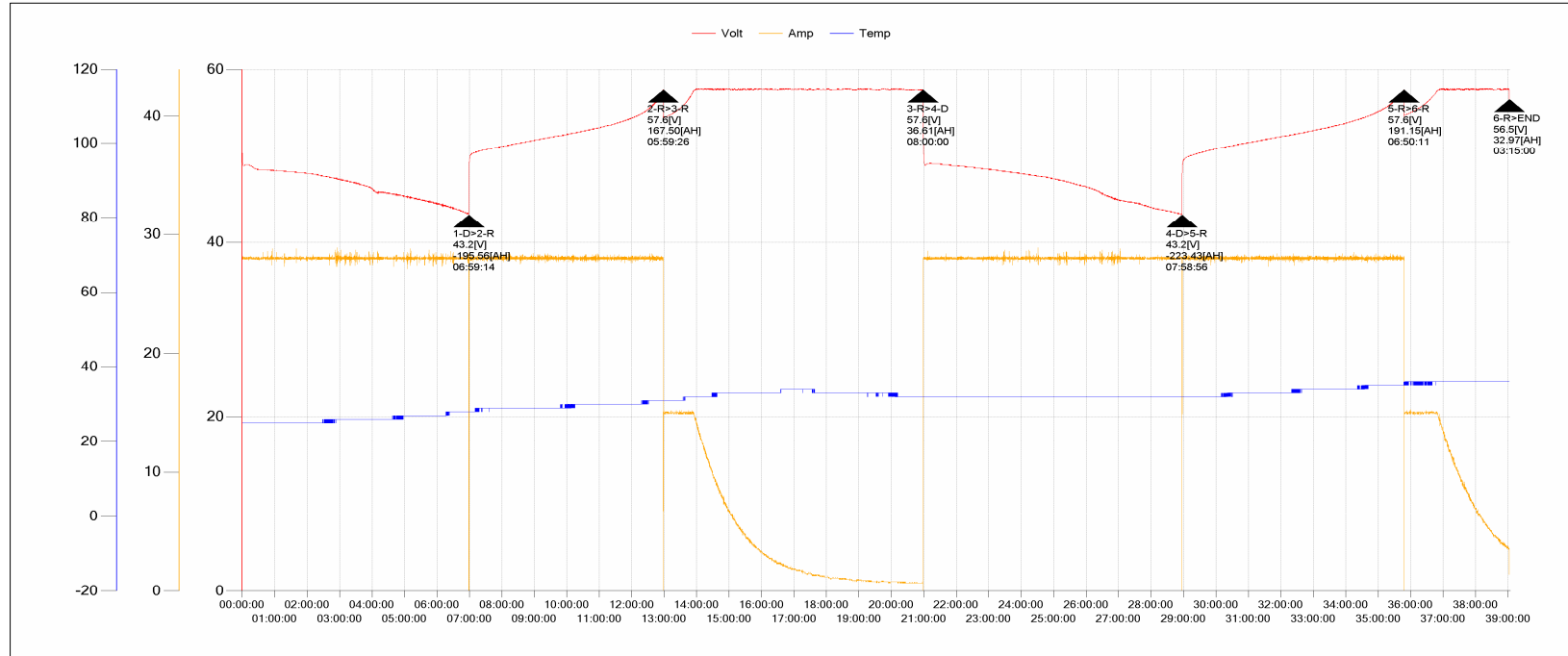
Max	2.22	2.25	2.23	2.24	2.24	2.24	2.25	2.25	2.25	2.18	2.25	2.24	2.25	2.25	2.25	2.23	2.23	2.22	2.24	2.25	2.07	2.25	2.24	2.25		
Avg	2	1.45	2	1.99	2	1.98	2.01	2	1.97	2	2.02	1.95	2.01	2.01	2	2.01	2.01	1.99	2.02	2.02	2.02	2	2	2.02		
Min	1.94		1.94	1.92	1.93	1.88	1.95	1.94	1.81	1.94	1.96	1.65	1.94	1.94	1.93	1.95	1.95	1.92	1.96	1.95	2.07	1.93	1.94	1.96		

### Load Test Result (MCS Chart)

Site Name ASCEND  
 Site Code ASCEND TOWER

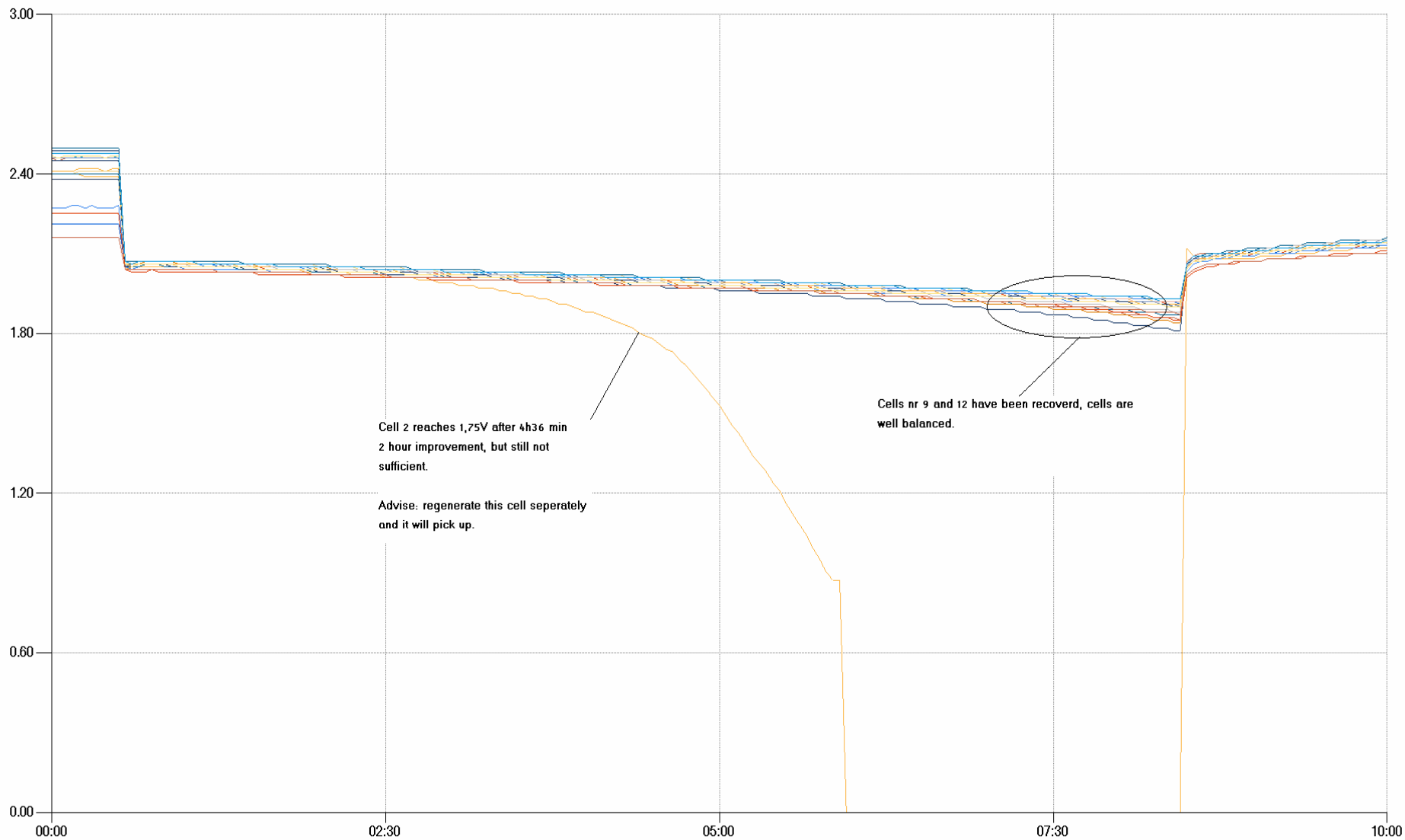
Test Date 10/12/2013  
 Test Hour 39:02:47 / 54:00:00

Brand	BHS	Volt.	48	AH	300	Cells	24	Standby Volt.	51	Type	VRLA	Year/Maf.	20120	Ambient Temp.	22
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Index	Method	Pulse	Setup Time	Elapsed Time	Setup Volt	Max Volt	Min Volt	Setup Amp	AH	Temperature
1	Discharge	1	11:00:00	06:59:14	43.2	53.0	43.2	28.0	-195.6	+ 28
2	Restoration	1	08:00:00	05:59:26	57.6	57.6	46.1	28.0	167.5	+ 31
3	Restoration	2	08:00:00	08:00:00	57.6	57.7	53.9	15.0	36.6	+ 32
4	Discharge	1	11:00:00	07:58:56	43.2	57.3	43.2	28.0	-223.4	+ 32
5	Restoration	1	08:00:00	06:50:11	57.6	57.6	44.7	28.0	191.2	+ 35
6	Restoration	2	08:00:00	03:15:00	57.6	57.7	54.1	15.0	33.0	+ 36

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 22 23 24 25



### Cell voltage after regeneration

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20	#22	#23	#24	#25	Sum
00:00	2.46	2.41	2.46	2.5	2.48	2.49	2.46	2.46	2.46	2.21	2.4	2.38	2.48	2.45	2.46	2.27	2.4	2.25	2.4	2.48	2.45	2.47	2.48	2.16	57.92
00:15	2.46	2.42	2.46	2.5	2.48	2.49	2.46	2.46	2.46	2.21	2.41	2.38	2.48	2.45	2.46	2.27	2.39	2.25	2.4	2.48	2.45	2.47	2.48	2.16	57.93
00:30	2.46	2.42	2.46	2.5	2.48	2.49	2.46	2.47	2.46	2.21	2.41	2.38	2.48	2.45	2.46	2.28	2.39	2.25	2.4	2.48	2.45	2.47	2.48	2.16	57.95
00:45	2.05	2.05	2.06	2.06	2.06	2.06	2.07	2.06	2.06	2.06	2.07	2.06	2.07	2.07	2.06	2.06	2.06	2.04	2.07	2.07	2.06	2.06	2.07	2.04	49.45
01:00	2.04	2.05	2.05	2.05	2.06	2.05	2.07	2.06	2.06	2.06	2.07	2.06	2.06	2.06	2.06	2.06	2.06	2.03	2.07	2.07	2.05	2.05	2.07	2.04	49.36
01:15	2.04	2.05	2.05	2.05	2.05	2.05	2.06	2.06	2.06	2.05	2.06	2.06	2.06	2.06	2.06	2.05	2.06	2.03	2.07	2.06	2.05	2.05	2.06	2.03	49.28
01:30	2.04	2.04	2.05	2.04	2.05	2.04	2.06	2.05	2.05	2.05	2.06	2.05	2.05	2.06	2.05	2.05	2.05	2.03	2.06	2.06	2.05	2.05	2.06	2.03	49.18
01:45	2.03	2.04	2.04	2.04	2.04	2.04	2.05	2.05	2.05	2.05	2.06	2.05	2.05	2.05	2.05	2.05	2.05	2.02	2.06	2.05	2.04	2.04	2.05	2.03	49.08
02:00	2.03	2.03	2.04	2.03	2.04	2.03	2.05	2.05	2.04	2.05	2.05	2.05	2.05	2.05	2.04	2.04	2.04	2.02	2.06	2.05	2.04	2.04	2.05	2.02	48.99
02:15	2.02	2.02	2.04	2.03	2.04	2.03	2.05	2.04	2.04	2.04	2.05	2.04	2.04	2.04	2.04	2.04	2.04	2.01	2.05	2.04	2.03	2.03	2.05	2.02	48.87
02:30	2.02	2.01	2.03	2.02	2.03	2.02	2.04	2.04	2.03	2.04	2.05	2.04	2.04	2.04	2.04	2.04	2.04	2.01	2.05	2.04	2.03	2.03	2.04	2.02	48.79
02:45	2.02	2	2.03	2.02	2.03	2.02	2.04	2.03	2.03	2.03	2.04	2.03	2.03	2.03	2.03	2.03	2.03	2.01	2.04	2.03	2.02	2.02	2.04	2.01	48.64
03:00	2.01	1.99	2.02	2.01	2.02	2.01	2.03	2.03	2.02	2.03	2.04	2.03	2.03	2.02	2.03	2.03	2.03	2	2.04	2.03	2.02	2.02	2.03	2.01	48.53
03:15	2.01	1.97	2.02	2.01	2.02	2.01	2.03	2.02	2.02	2.03	2.03	2.03	2.02	2.02	2.02	2.02	2.02	2	2.03	2.02	2.02	2.01	2.03	2	48.41
03:30	2	1.95	2.01	2	2.01	2	2.02	2.02	2.01	2.02	2.03	2.02	2.02	2.01	2.02	2.02	2.02	1.99	2.03	2.02	2.01	2.01	2.03	2	48.27
03:45	2	1.92	2.01	2	2.01	2	2.02	2.02	2.01	2.02	2.02	2.02	2.02	2.01	2.01	2.02	2.01	1.99	2.03	2.01	2.01	2	2.02	1.99	48.17
04:00	2	1.88	2.01	1.99	2	1.99	2.02	2.01	2	2.01	2.02	2.01	2.01	2	2.01	2.01	2.01	1.99	2.02	2.01	2	2	2.02	1.99	48.01
04:15	1.99	1.84	2	1.99	2	1.98	2.01	2.01	2	2.01	2.02	2.01	2.01	2	2	2.01	2	1.98	2.02	2	2	1.99	2.01	1.99	47.87
04:30	1.99	1.78	2	1.98	1.99	1.98	2.01	2	1.99	2	2.01	2	2	1.99	2	2	2	1.98	2.01	2	1.99	1.99	2.01	1.98	47.68
04:45	1.98	1.68	1.99	1.98	1.99	1.97	2	2	1.99	2	2.01	2	2	1.98	1.99	2	1.99	1.97	2.01	1.99	1.99	1.99	2	1.98	47.48
05:00	1.98	1.53	1.99	1.97	1.99	1.96	2	1.99	1.98	1.99	2	2	1.99	1.98	1.99	1.99	1.99	1.97	2	1.99	1.98	1.98	2	1.97	47.21
05:15	1.97	1.34	1.98	1.97	1.98	1.96	1.99	1.99	1.97	1.99	2	1.99	1.99	1.97	1.98	1.99	1.98	1.96	2	1.98	1.98	1.98	2	1.97	46.91
05:30	1.97	1.16	1.98	1.96	1.98	1.95	1.99	1.98	1.97	1.98	1.99	1.99	1.98	1.96	1.98	1.99	1.98	1.96	1.99	1.97	1.97	1.97	1.99	1.96	46.6
05:45	1.96	0.95	1.97	1.95	1.97	1.94	1.98	1.98	1.96	1.98	1.99	1.98	1.98	1.96	1.98	1.98	1.97	1.95	1.99	1.97	1.97	1.97	1.99	1.95	46.27

06:15	1.95	0	1.96	1.94	1.96	1.92	1.97	1.97	1.94	1.97	1.97	1.97	1.97	1.94	1.97	1.97	1.96	1.94	1.98	1.95	1.96	1.96	1.98	1.94		45.04
06:30	1.95	0	1.96	1.93	1.96	1.91	1.97	1.96	1.94	1.96	1.97	1.96	1.96	1.93	1.96	1.97	1.96	1.94	1.97	1.95	1.95	1.95	1.97	1.94		44.92
06:45	1.94	0	1.95	1.93	1.95	1.9	1.96	1.96	1.93	1.96	1.96	1.96	1.96	1.92	1.95	1.96	1.95	1.93	1.97	1.94	1.95	1.94	1.97	1.93		44.77
07:00	1.94	0	1.95	1.92	1.94	1.89	1.96	1.95	1.92	1.95	1.96	1.95	1.95	1.91	1.95	1.96	1.95	1.92	1.96	1.93	1.94	1.94	1.96	1.92		44.62
07:15	1.93	0	1.94	1.91	1.94	1.88	1.95	1.95	1.91	1.95	1.95	1.94	1.95	1.91	1.94	1.95	1.94	1.92	1.96	1.93	1.94	1.93	1.96	1.92		44.5
07:30	1.93	0	1.94	1.91	1.93	1.87	1.95	1.94	1.9	1.94	1.95	1.94	1.94	1.89	1.94	1.95	1.93	1.91	1.95	1.92	1.93	1.93	1.95	1.91		44.35
07:45	1.92	0	1.93	1.9	1.93	1.86	1.94	1.94	1.89	1.93	1.94	1.93	1.93	1.88	1.93	1.94	1.93	1.89	1.95	1.91	1.92	1.92	1.95	1.9		44.16
08:00	1.91	0	1.92	1.89	1.92	1.84	1.94	1.93	1.88	1.93	1.93	1.92	1.93	1.87	1.92	1.94	1.92	1.88	1.94	1.9	1.92	1.91	1.94	1.89		43.97
<b>08:15</b>	<b>1.91</b>	<b>0</b>	<b>1.92</b>	<b>1.88</b>	<b>1.91</b>	<b>1.82</b>	<b>1.93</b>	<b>1.93</b>	<b>1.86</b>	<b>1.92</b>	<b>1.92</b>	<b>1.91</b>	<b>1.92</b>	<b>1.85</b>	<b>1.92</b>	<b>1.93</b>	<b>1.91</b>	<b>1.86</b>	<b>1.93</b>	<b>1.89</b>	<b>1.91</b>	<b>1.91</b>	<b>1.93</b>	<b>1.88</b>		<b>43.75</b>
08:30	2.03	2.12	2.04	2.06	2.04	2.06	2.06	2.06	2.07	2.05	2.06	2.05	2.04	2.05	2.05	2.04	2.05	2.01	2.06	2.06	2.06	2.04	2.06	2.02		49.24
08:45	2.08	2.08	2.08	2.1	2.09	2.09	2.1	2.1	2.1	2.09	2.1	2.08	2.09	2.1	2.1	2.08	2.09	2.06	2.1	2.1	2.1	2.09	2.1	2.06		50.16
09:00	2.09	2.08	2.1	2.12	2.1	2.11	2.11	2.11	2.11	2.1	2.11	2.09	2.1	2.11	2.11	2.09	2.1	2.07	2.11	2.11	2.11	2.1	2.11	2.07		50.42
09:15	2.1	2.1	2.11	2.13	2.11	2.11	2.12	2.12	2.12	2.11	2.12	2.1	2.11	2.12	2.12	2.1	2.11	2.08	2.12	2.12	2.12	2.11	2.12	2.08		50.66
09:30	2.11	2.11	2.12	2.14	2.12	2.12	2.13	2.13	2.13	2.12	2.13	2.11	2.12	2.13	2.13	2.11	2.12	2.09	2.13	2.13	2.13	2.12	2.13	2.09		50.9
09:45	2.12	2.12	2.12	2.15	2.13	2.13	2.14	2.14	2.14	2.12	2.14	2.12	2.13	2.14	2.14	2.12	2.13	2.1	2.14	2.14	2.14	2.13	2.14	2.1		51.12
10:00	2.13	2.12	2.13	2.16	2.14	2.14	2.15	2.15	2.15	2.13	2.14	2.13	2.14	2.15	2.15	2.13	2.14	2.11	2.15	2.15	2.15	2.14	2.15	2.1		51.33
Max	2.46	2.42	2.46	2.5	2.48	2.49	2.46	2.47	2.46	2.21	2.41	2.38	2.48	2.45	2.46	2.28	2.4	2.25	2.4	2.48	2.45	2.47	2.48	2.16		
Avg	2.04	1.47	2.05	2.04	2.05	2.03	2.06	2.05	2.04	2.03	2.05	2.04	2.05	2.04	2.05	2.04	2.04	2.01	2.06	2.05	2.05	2.04	2.06	2.01		
Min	1.91		1.92	1.88	1.91	1.82	1.93	1.93	1.86	1.92	1.92	1.91	1.92	1.85	1.92	1.93	1.91	1.86	1.93	1.89	1.91	1.91	1.93	1.88		

### Conclusion:

Cell nr 2 is the weak link in this battery string, remove cell nr 2 with a new charged cell, and again start the discharge process. I know that we will be close to 300Ah.

After regeneration all cells are perfectly balanced (not including cell nr 2), after the regeneration process wij have added 1 hour and 30 minutes more of back up regardless of the bad cell which we have identified in cell nr 2. IF we would remove and replace cell nr 2 you will reach at least 1h30 min more of back up.

And we will be close to reach the maximum capacity of the battery when applying a C10 discharge test.

UPS back up to 47V BEFORE: 3 hours and 30 minutes

UPS back up to 47V AFTER: 5 hours

IF we replace cell nr 2 back up would be around 7 hours.



