

Battery Rejuvenation effect by -2 and -4 volt strength Nanopulser.

(Pulse shape and frequency are same, but pulse strength is -2 volt and -4 volt.)

Starting Date: February, 20, 2006 (Installation Date)

Battery usage: House Battery Bank with Solar Panel and generator

Batteries: Dyno Battery S3H, 6V, 260 Ah

* 8 batteries are configured as 12V, 1040 Ah battery bank.

There are two banks with same configuration.

Date Code for Bank #1 is June 1999, and bank #2 is July 1998.

REMARKS:

The batteries were pulled from 2 different boats about the same time, June 2004. They sat on a pallet behind my shop for over a year before I pulled my old batteries out. Before I put them into service around Sept 2005, I put them in the back of my truck, took them to work and charged them for a week on a Heart Freedom 20 inverter/ 100 amp 3 stage charger. Every night before going home, I turned the charger off, so the batteries rested every night and then after 5 days of cycle charging I moved them under the shop floor in the crawlspace. The battery S.G. was very low as you can see from sitting in a discharged state. This made the plates sulfate just from sitting outside all winter without charge. Some of the cells were at 1.100 to 1.180 S.G. which is very low.

Feb. 20 Batteries are float charged with a solar panel on the roof. Has occasional full charge with generator. Batteries look in a good physical condition without swells.

After the measurement -2 volt pulse strength Nanopulser was installed to bank #1, and -4 volt pulse strength to bank #2. This is to see the speed of desulfation effect.

March 20 Batteries are float charged with Solar Panel. Batteries are equalizing the cells in each bank and a full charge is necessary to help stir acid in cells.

2nd solar panel added today to bring total output to 160 watts or 7.6 amps max from solar. Full charge will be done once per week with generator.

April 17 Batteries are float charged with two solar panels during the day time. Batteries were charged with generator and Trace U2512 inverter for 4 hours total, in which first 1 hour at 125A charge and shut off at 95% charge on April 10, a week prior to measurement date. Batteries show significant increase in SG. in 2 months with Nanopulser.

May 18 Batteries have been float charged during the day with solar system. Batteries were charged once on gen set for 2 hours on May 13th with Trace Inverter Charger. Batteries show significant increase in S.G. especially in cells that were lower at start of test.

June 5 To see if there is any mistake on Feb 20 readings on 2-1-2, 2-8-2, and 2-8-3, data taken before the installation of Nanopulser was added to the sheet. Temperature was adjusted to 5C with a guess, based on Feb 20 temperature at 5C. By adding the SG reading before the installation, it is obvious that Feb. 20 reading of 2-1-2, 2-8-2 and 2-8-3 are wrong. And improvements are continuous and natural.

June 19 Batteries have been float charged with solar system all month. No Gen Charge was done due to owner not home for 10 days. Batteries shows decrease in specific gravity without cycling and Gen Charge. Solar output will increase 40W with additional panel on June 20.

July 17 Batteries have been float charged with Solar system all month. Solar output 200 watts. Gen charge was done on July 9th for 4 hours to equalize cells. Charged at 14.4 volts bulk. batteries show significant improvement on defect cells and overall the banks are evening out across the board voltage and SG. Battery maintenance will be done today. Cleaning of terminals and topping off with distilled water.

August 21 Batteries have been float charged with same system all month. No gen charge done due to good weather all month. Significant increase in specific gravity in deficient cells show whole bank coming in line. It also shows voltage coming even across.

Bank #1 - SPECIFIC GRAVITY

Date Code 7/98, with PG12N-001242 (-2v)

Cell/Date	Feb. 14	Feb. 20	Mar. 20	April 17	May 18	June 19	July 17	Aug 21
1-1-1	1.215	1.220	1.227	1.233	1.245	1.241	1.252	1.261
1-1-2	1.225	1.225	1.232	1.233	1.247	1.246	1.252	1.261
1-1-3	1.220	1.225	1.232	1.228	1.249	1.243	1.249	1.257
1-2-1	1.225	1.230	1.237	1.243	1.252	1.246	1.257	1.269
1-2-2	1.230	1.230	1.232	1.243	1.252	1.251	1.259	1.267
1-2-3	1.225	1.220	1.227	1.238	1.245	1.243	1.254	1.261
1-3-1	1.220	1.225	1.227	1.233	1.252	1.243	1.257	1.261
1-3-2	1.230	1.230	1.227	1.238	1.252	1.246	1.255	1.264
1-3-3	1.220	1.225	1.227	1.233	1.247	1.241	1.252	1.256
1-4-1	1.220	1.220	1.222	1.233	1.245	1.241	1.255	1.259
1-4-2	1.230	1.230	1.232	1.243	1.252	1.246	1.259	1.267
1-4-3	1.230	1.230	1.232	1.243	1.252	1.246	1.257	1.264
1-5-1	1.230	1.225	1.232	1.238	1.255	1.248	1.259	1.269
1-5-2	1.225	1.230	1.232	1.238	1.249	1.246	1.259	1.269
1-5-3	1.225	1.220	1.227	1.233	1.242	1.241	1.249	1.259
1-6-1	1.225	1.225	1.232	1.240	1.252	1.246	1.257	1.264
1-6-2	1.200	1.207	1.212	1.218	1.232	1.224	1.237	1.244
1-6-3	1.225	1.225	1.227	1.238	1.247	1.244	1.254	1.264
1-7-1	1.210	1.210	1.217	1.233	1.247	1.248	1.259	1.269
1-7-2	1.215	1.220	1.227	1.243	1.257	1.251	1.267	1.274
1-7-3	1.210	1.215	1.222	1.233	1.252	1.248	1.262	1.269
1-8-1	1.230	1.225	1.232	1.245	1.265	1.258	1.272	1.279
1-8-2	1.215	1.220	1.227	1.243	1.257	1.253	1.267	1.277
1-8-3	1.220	1.225	1.227	1.243	1.259	1.254	1.267	1.276
Average	1.221	1.223	1.228	1.237	1.250	1.246	1.257	1.265
Temp.		5C	9C	9.5C	16C	14C	16C	19C

* Cell code: Bank - Battery - code example: (1-1-1)

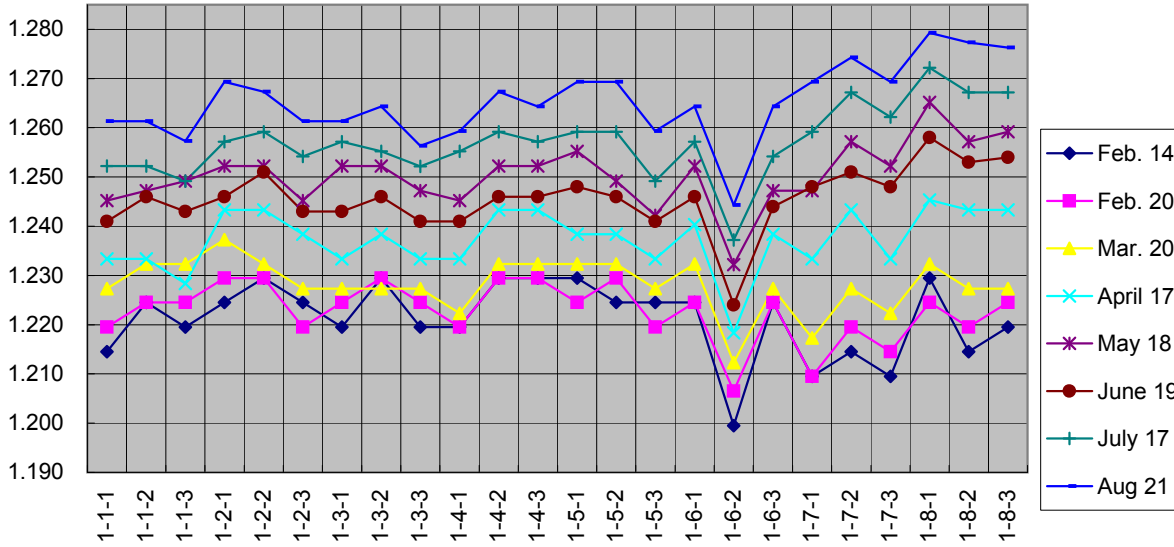
* Specific Gravity Temp. Adjustment formula: example at 5C (5C - 20C) X 0.0007 =- 0.0105

Bank #1 - Voltage by Battery

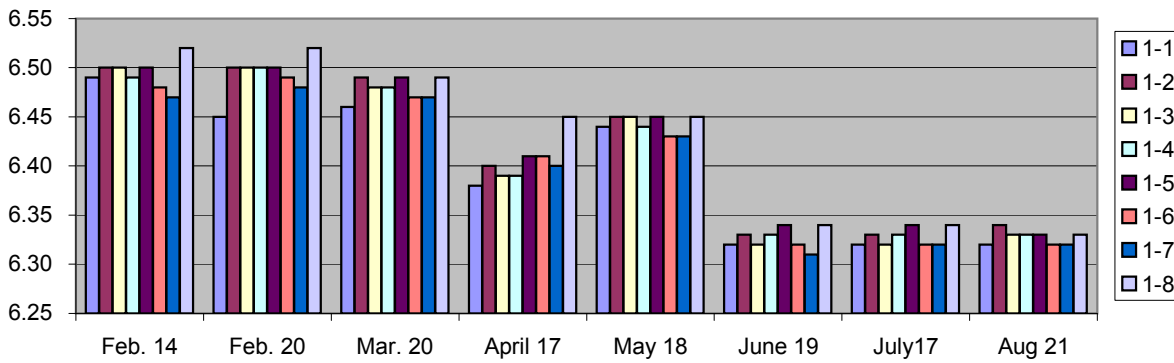
Batt/Date	Feb. 14	Feb. 20	Mar. 20	April 17	May 18	June 19	July17	Aug 21
1-1	6.49	6.45	6.46	6.38	6.44	6.32	6.32	6.32
1-2	6.50	6.50	6.49	6.40	6.45	6.33	6.33	6.34
1-3	6.50	6.50	6.48	6.39	6.45	6.32	6.32	6.33
1-4	6.49	6.50	6.48	6.39	6.44	6.33	6.33	6.33
1-5	6.50	6.50	6.49	6.41	6.45	6.34	6.34	6.33
1-6	6.48	6.49	6.47	6.41	6.43	6.32	6.32	6.32
1-7	6.47	6.48	6.47	6.40	6.43	6.31	6.32	6.32
1-8	6.52	6.52	6.49	6.45	6.45	6.34	6.34	6.33
Average	6.49	6.49	6.48	6.40	6.44	6.33	6.33	6.33
System V	12.99	12.99	12.96	12.81	12.89	12.65	12.66	12.66

* Batt Code: Bank - Battery (Code example: 1-1)

BANK #1 w/Nanopulser (-2v)



Voltage Difference by Battery - Batt Bank #1



Bank #2 - SPECIFIC GRAVITY

Date Code 6/99, with PG12N-001281(-4v)

Cell/Date	Feb. 14	Feb 20	Mar. 20	April 17	May 18	June 19	July 17	Aug 21
2-1-1	1.200	1.225	1.232	1.253	1.259	1.263	1.272	1.277
2-1-2	1.160	1.220	1.197	1.213	1.222	1.224	1.237	1.244
2-1-3	1.210	1.220	1.227	1.243	1.257	1.256	1.262	1.267
2-2-1	1.205	1.220	1.232	1.243	1.257	1.256	1.264	1.269
2-2-2	1.215	1.215	1.232	1.243	1.257	1.256	1.264	1.269
2-2-3	1.210	1.220	1.232	1.243	1.257	1.256	1.269	1.269
2-3-1	1.220	1.225	1.232	1.248	1.262	1.261	1.267	1.274
2-3-2	1.210	1.210	1.227	1.238	1.257	1.251	1.257	1.266
2-3-3	1.210	1.210	1.229	1.243	1.257	1.253	1.259	1.269
2-4-1	1.220	1.225	1.232	1.245	1.267	1.261	1.267	1.274
2-4-2	1.215	1.215	1.227	1.243	1.257	1.251	1.259	1.269
2-4-3	1.215	1.220	1.232	1.248	1.262	1.258	1.267	1.276
2-5-1	1.210	1.210	1.217	1.233	1.247	1.241	1.249	1.259
2-5-2	1.215	1.220	1.227	1.243	1.257	1.251	1.259	1.267
2-5-3	1.175	1.170	1.177	1.193	1.212	1.214	1.225	1.237
2-6-1	1.235	1.235	1.239	1.248	1.257	1.258	1.262	1.269
2-6-2	1.240	1.235	1.242	1.248	1.257	1.258	1.267	1.271
2-6-3	1.225	1.230	1.232	1.243	1.252	1.251	1.254	1.264
2-7-1	1.225	1.225	1.227	1.243	1.252	1.251	1.259	1.269
2-7-2	1.225	1.225	1.237	1.248	1.262	1.256	1.265	1.271
2-7-3	1.190	1.190	1.197	1.208	1.225	1.221	1.227	1.239
2-8-1	1.230	1.230	1.237	1.248	1.262	1.258	1.267	1.274
2-8-2	1.185	1.235	1.197	1.208	1.227	1.226	1.235	1.248
2-8-3	1.185	1.235	1.202	1.218	1.235	1.228	1.237	1.247
Average	1.209	1.219	1.224	1.237	1.251	1.248	1.256	1.264
Temp.		5C	9C	9.5C	16C	14C	16C	19C

* Cell code: Bank - Battery - code example: (2-1-1)

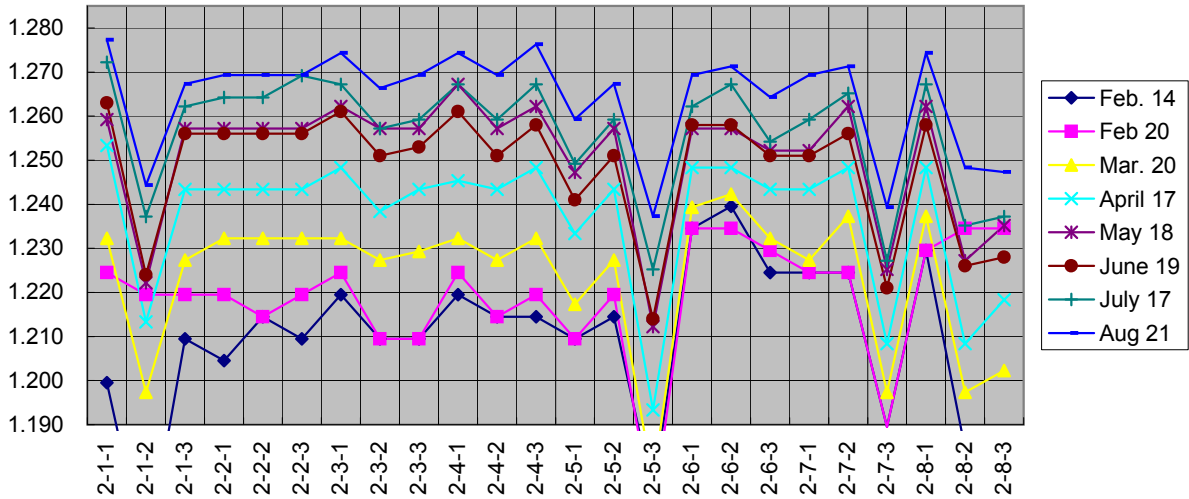
* Specific Gravity Temp. Adjustment formula: example at 5C (5C - 20C) X 0.0007 = -0.0105

Bank #2 - Voltage by Battery

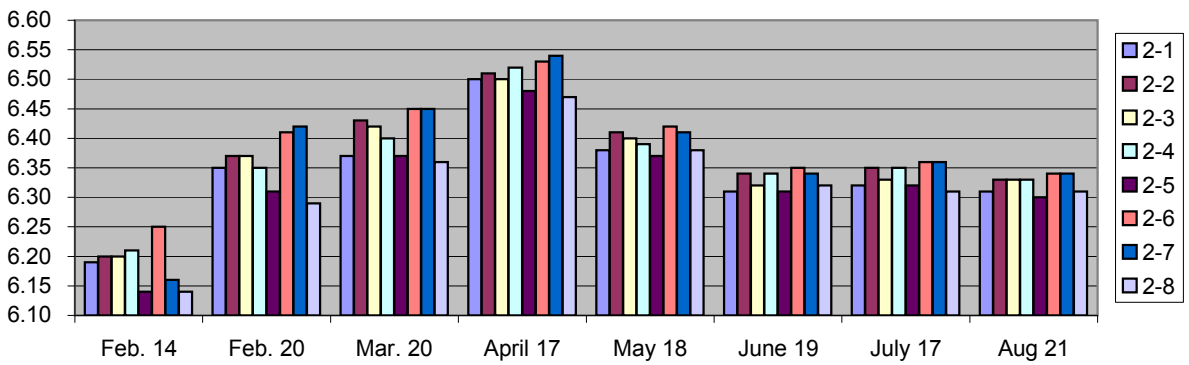
Batt/Date	Feb. 14	Feb. 20	Mar. 20	April 17	May 18	June 19	July 17	Aug 21
2-1	6.19	6.35	6.37	6.50	6.38	6.31	6.32	6.31
2-2	6.20	6.37	6.43	6.51	6.41	6.34	6.35	6.33
2-3	6.20	6.37	6.42	6.50	6.40	6.32	6.33	6.33
2-4	6.21	6.35	6.40	6.52	6.39	6.34	6.35	6.33
2-5	6.14	6.31	6.37	6.48	6.37	6.31	6.32	6.30
2-6	6.25	6.41	6.45	6.53	6.42	6.35	6.36	6.34
2-7	6.16	6.42	6.45	6.54	6.41	6.34	6.36	6.34
2-8	6.14	6.29	6.36	6.47	6.38	6.32	6.31	6.31
Average	6.19	6.36	6.41	6.51	6.40	6.33	6.34	6.32
System V	12.37	12.72	12.81	13.01	12.79	12.66	12.68	12.65

* Batt Code: Bank - Battery (Code example: 2-1)

BANK #2 w/ Nanopulser (-4v)



Voltage difference by Battery - Batt Bank #2



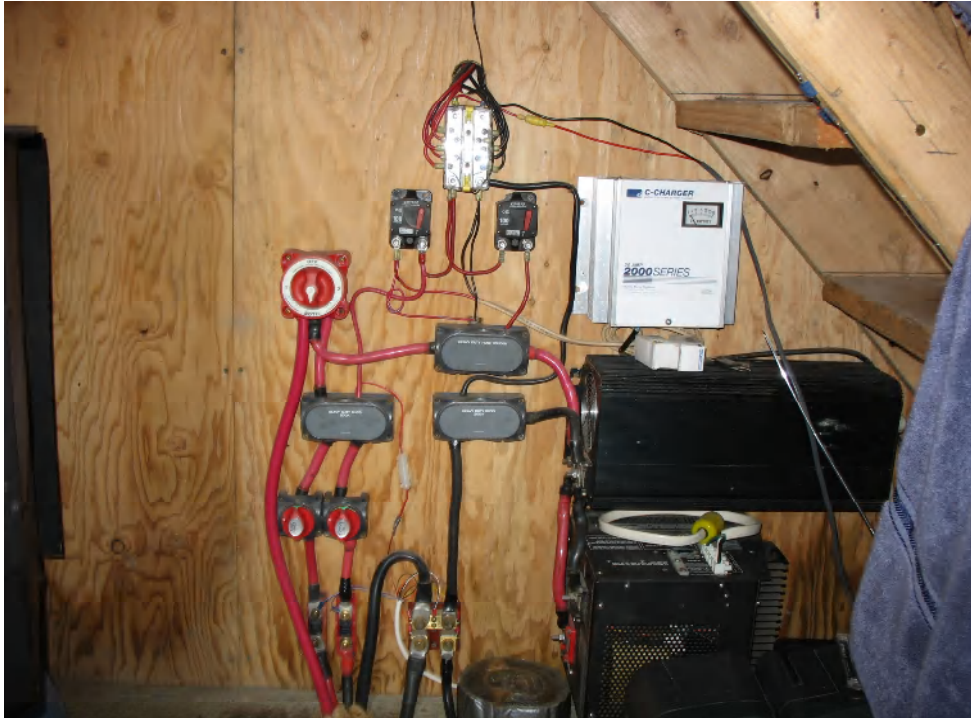
Solar panel on the roof float charges the battery banks.
Batteries are also charged occasionally with generator.



batteries are located under the floor. There is no temperature control.



Wiring and Inverter/charger setting.



Control and Monitor panel.



The second panel added on March 20.

