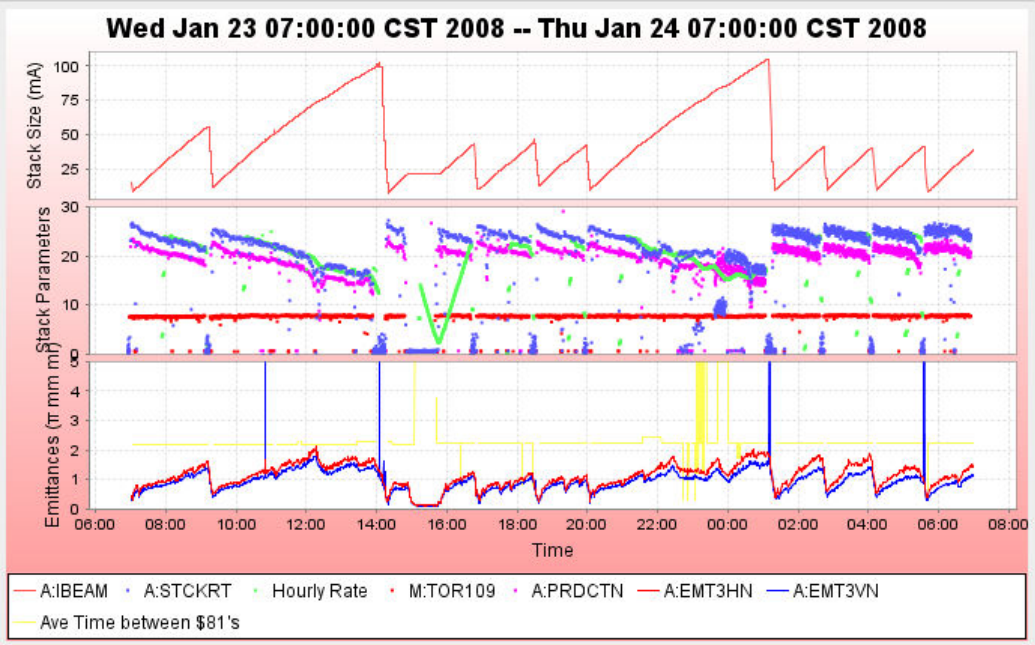
2008-01-24 Thursday Morning Pbar Notes

Thursday, January 24, 2008
7:00 AM

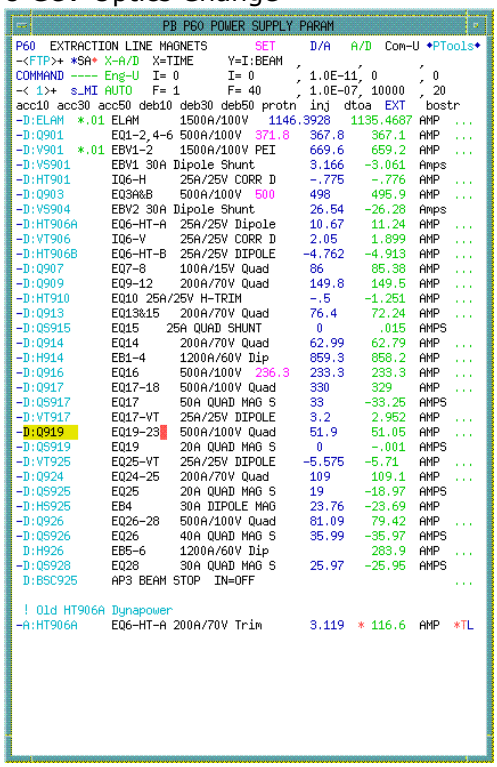
- No 9am Meeting today due to Furlough Meeting…Send Salah an email update instead.
- Friday 9am meeting is in Curia II. Double Check slides readability for Friday talk (smaller screen).
- Stacking
  - Protons on target averaged about 7.2e12 over the last 24 hours.
  - We stacked a total of 441mA over 24 hours.
  - Stacking performance was normal by recent standards.
  - Production Efficiency ran in it's normal 19-22e-6/proton range on normal iterations of stack to 40mA and transfer. It was slightly lower on two iterations that had larger stacks of 99mA stack and 105mA.
  - Our "best stacking hour" calculation yielded artificially high numbers this morning. The algorithm uses DCCT beam intensity data to make this calculation. Yesterday we did one shot reverse proton studies during stacking. When protons are injected the DCCT reads the sum of the intensities of the protons and pbars, and the algorithm was counting the protons leading to the artifically high reported stacking hour. Experts will look into ways to address this.
  - The Accumulator vacuum was sublimated.
  - 14:27:01- Henry Gusler is firing Accumulator TSPs.
    (last done, Monday, January 14 at 14:25.)



- Transfers
  - Unstacked 484e10 and 461e10 made it to the Recycler in 37 transfers over 11 sets.
  - We had around 96% transfer efficiency from the Accumulator to Main Injector and 93% from the Accumulator to Recycler. These numbers are brought down by two sets of five transfers that were made from ~100mA.
  - A new set of 8 GeV beamline optics changes were implemented. There is a hint of a small improvement in the transfer efficiencies for transfers made at 40e10, so the changes are being left in.

	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Column 4 Transfer Time		Column 21 A:IBEAMB sampled on S91 (A:IBEAM1), E10	Column 22 A:IBEAMB sampled on S94 (A:IBEAM2), E10	Unstacked (mA)	Column 23 R:BEAMS (R:BEAM E0[0]) pre xfer E10	Column 24 R:BEAM (R:BEAM E0[1]) post xfer, E10	Stashed	Acc to RR Eff	Column 27 MI DCCT SMALL BEAM (I:BEAMS), E10	Column 28 MI Before Extraction (I:BEAM6), E10	Acc to MI Eff	Acc to MI2 Eff	Transfers	Sets
2	1/23/2008	7:00:00 AM			483.999			451.73	0.93	465.679	461.181	96.21%	95.29%	37	11
3	Thursday, January 24, 2008	7:05:01 AM	40.388	8.988	31.400	179.077	208.554	29.48	0.94	30.568	29.850	97.35%	95.06%	3	1
4	Thursday, January 24, 2008	5:35:20 AM	41.588	8.388	33.200	148.996	180.278	31.28	0.94	32.418	31.568	97.64%	95.08%	3	1
5	Thursday, January 24, 2008	4:07:48 AM	40.788	10.188	30.600	122.027	149.988	27.96	0.91	29.165	29.070	95.31%	95.00%	3	1
6	Thursday, January 24, 2008	2:43:24 AM	40.988	10.388	30.600	95.012	122.886	27.87	0.91	29.497	28.637	96.40%	93.58%	3	1
7	Thursday, January 24, 2008	1:10:41 AM	104.988	10.188	94.800	15.340	96.568	81.23	0.86	89.332	89.428	94.23%	94.33%	5	1
8	Wednesday, January 23, 2008	7:58:58 PM	42.787	10.188	32.599	365.104	398.145	33.04	1.01	31.653	31.308	97.10%	96.04%	3	1
9	Wednesday, January 23, 2008	6:31:19 PM	43.388	13.188	30.200	339.173	370.663	31.49	1.04	30.213	30.089	100.04%	99.63%	3	1
10	Wednesday, January 23, 2008	4:47:07 PM	43.388	10.388	33.000	311.908	344.479	32.57	0.99	31.866	31.364	96.56%	95.04%	3	1
11	Wednesday, January 23, 2008	2:08:42 PM	98.988	8.188	90.800	233.325	319.041	85.72	0.94	88.391	87.608	97.35%	96.48%	5	1
12	Wednesday, January 23, 2008	9:13:59 AM	56.188	11.788	44.400	199.585	239.767	40.18	0.91	41.187	41.639	92.76%	93.78%	3	1
13	Wednesday, January 23, 2008	6:57:10 AM	40.988	8.588	32.400	170.931	201.843	30.91	0.95	31.389	30.620	96.88%	94.51%	3	1

- Studies
  - 8 GeV Optics Change



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                    PB P60 POWER SUPPLY PARAM
P60  EXTRACTION LINE MAGNETS        SET     D/A   A/D  Com-U ♦PTools♦
-<FTP>+ *SA* X-A/D  X=TIME     Y=I:BEAM   ,          ,          ,
COMMAND ---- Eng-U  I= 0       I= 0       , 1.0E-11, 0          , 0
-< 1>+  s_MI AUTO   F= 1       F= 40      , 1.0E-07, 10000      , 20
acc10 acc30 acc50 deb10 deb30 deb50 protn  inj   dtoa  EXT   bostr
-D:ELAM  *.01 ELAM      1500A/100V   1146.3928   1135.4687 AMP  ...
-D:Q901       EQ1-2,4-6 500A/100V  371.8   367.8    367.1  AMP  ...
-D:V901  *.01 EBV1-2    1500A/100V PEI     669.6    659.2  AMP  ...
-D:VS901      EBV1 30A Dipole Shunt        3.166   -3.061  Amps
-D:HT901      IQ6-H     25A/25V CORR D     -.775    -.776  AMP  ...
-D:Q903       EQ3A&B    500A/100V  500     498      495.9  AMP  ...
-D:VS904      EBV2 30A Dipole Shunt        26.54   -26.28  Amps
-D:HT906A     EQ6-HT-A  25A/25V Dipole     10.67    11.24  AMP  ...
-D:VT906      IQ6-V     25A/25V CORR D     2.05     1.899  AMP  ...
-D:HT906B     EQ6-HT-B  25A/25V DIPOLE    -4.762   -4.913  AMP  ...
-D:Q907       EQ7-8     100A/15V Quad      86       85.38  AMP  ...
-D:Q909       EQ9-12    200A/70V Quad      149.8    149.5  AMP  ...
-D:HT910      EQ10 25A/25V H-TRIM          -.5      -1.251  AMP  ...
-D:Q913       EQ13&15   200A/70V Quad      76.4     72.24  AMP  ...
-D:QS915      EQ15    25A QUAD SHUNT       0         .015  AMPS
-D:Q914       EQ14      200A/70V Quad      62.99    62.79  AMP  ...
-D:H914       EB1-4     1200A/60V Dip      859.3    858.2  AMP  ...
-D:Q916       EQ16      500A/100V  236.3    233.3    233.3  AMP  ...
-D:Q917       EQ17-18   500A/100V Quad     330      329    AMP  ...
-D:QS917      EQ17      50A QUAD MAG S     33      -33.25  AMPS
-D:VT917      EQ17-VT   25A/25V DIPOLE     3.2      2.952  AMP  ...
-D:Q919       EQ19-23   500A/100V Quad     51.9     51.05  AMP  ...
-D:QS919      EQ19      20A QUAD MAG S     0        -.001  AMPS
-D:VT925      EQ25-VT   25A/25V DIPOLE    -5.575   -5.71   AMP  ...
-D:Q924       EQ24-25   200A/70V Quad      109      109.1  AMP  ...
-D:QS925      EQ25      20A QUAD MAG S     19      -18.97  AMPS
-D:HS925      EB4       30A DIPOLE MAG     23.76   -23.69  AMP
-D:Q926       EQ26-28   500A/100V Quad     81.09    79.42  AMP  ...
-D:QS926      EQ26      40A QUAD MAG S     35.99   -35.97  AMPS
 D:H926       EB5-6     1200A/60V Dip                283.9  AMP  ...
-D:QS928      EQ28      30A QUAD MAG S     25.97   -25.95  AMPS
 D:BSC925     AP3 BEAM STOP  IN=OFF                        ...

 ! Old HT906A Dynapower
-A:HT906A     EQ6-HT-A 200A/70V Trim       3.119  * 116.6  AMP  *TL
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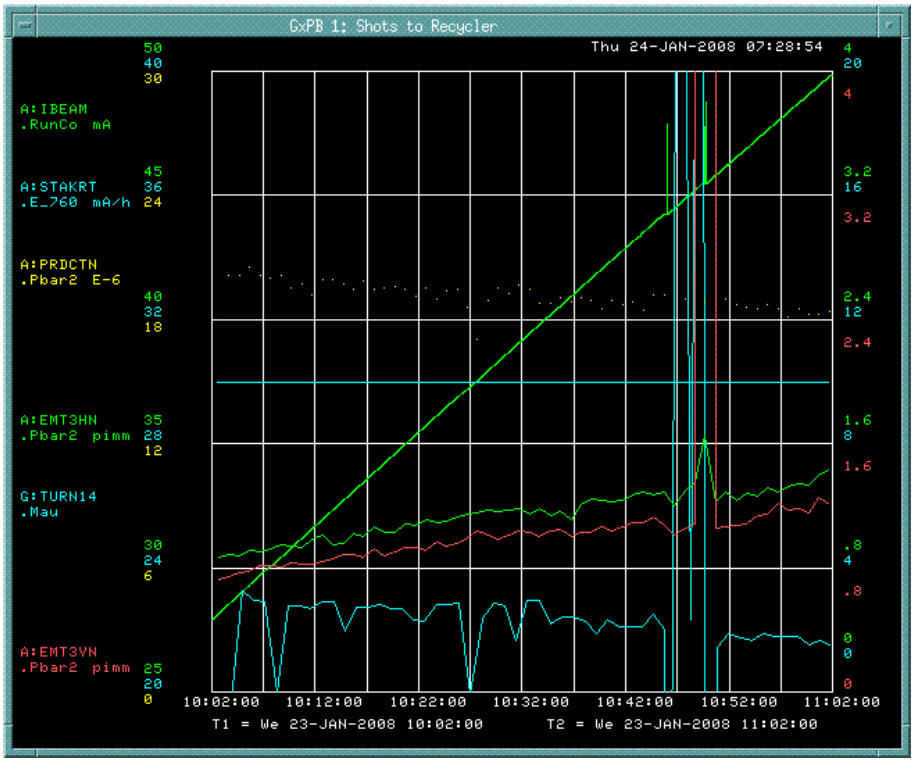
Pasted from <http://www-bd.fnal.gov/cgi-mach/machlog.pl?nb=pbar08&action=view&page=-357&button=yes&invert=yes>

  - I:Q703 was also increased 11A from an I68 setting of 193.25 to 204.25A

- Study Requests
  - One shot reverse proton studies during stacking. This will have a minimal impact on stacking.
- Other Notes
  - Paul's Numbers
    - Most in an hour: 24.90 mA at Wed Jan 23 11:02:11 CST 2008
    - Best: 24.90 mA on 24-Jan-08
    - Average Production 16.09 e-6/proton Best: 23.53 e-6/proton on 11/11/2007
    - Average Protons on Target 6.95 e12 Best: 8.77 e12 on 07/24/2007
    - Largest Stack 105.12 mA Best: 271.01 mA on 11/14/2007
    - The best stacking hour number is wrong. There were spikes in the Accumulator beam current that lead to the overinflated calculation.
      - These spikes were the result of one shot reverse proton studies.



- Al's Numbers
  - Stacking
    - Pbars stacked: 441.21 E10
    - Time stacking: 21.46 Hr
    - Average stacking rate: 20.56 E10/Hr
  - Uptime
    - Number of pulses while in stacking mode: 34184
    - Number of pulses with beam: 32378
    - Fraction of up pulses was: 94.72%
  - The uptime's effect on the stacking numbers
    - Corrected time stacking: 20.32 Hr
    - Possible average stacking rate: 21.71 E10/Hr
  - Recycler Transfers
    - Pbars sent to the Recycler: 471.83 E10
    - Number of transfers : 36
    - Number of transfer sets: 11
    - Average Number of transfer per set: 3.27
    - Time taken to shoot: 01.75 Hr
    - Time per set of transfers: 09.57 min
    - Transfer efficiency: 80.12%
  - Other Info
    - Average POT : 7.16 E12
    - Average production: 19.04 pbars/E6 protons

- Debuncher Cooling

  Good afternoon,
  While doing Deb momentum studies, we found several problems that will need an extended shut down period to investigate, i.e. more than 8 hours., The spreadsheet attached shows the problems.
  1. Momentum band 1 Horizontal lower has a ripple corresponding to about a 12 ns cable ringing. Pete thinks this could be due to a bad Cablewaves 1/2" coax connector know to have problems above 4 GHz.
  2. There is something wrong in the frequency response of Deb Mom. Band 1 kickers 1-4 (vertical orientation). For some reason it is frequency selective for the upper

band. The sheet shows kicker 1 and 5. Kickers 1-4 show this problem, kickers 5-8 do not. This cannot be a 4 way splitter problem and the powers were balanced at the TWT output to the Kicker. A measurement of the 4 way splitter should be done first, then we would need to measure s11 and perhaps TDR of this tank to diagnose further. I say longer than 8 hours only because this involves dissection of a working system. Should something break in the process, it would need to be fixed, taking extra time.
Ralph