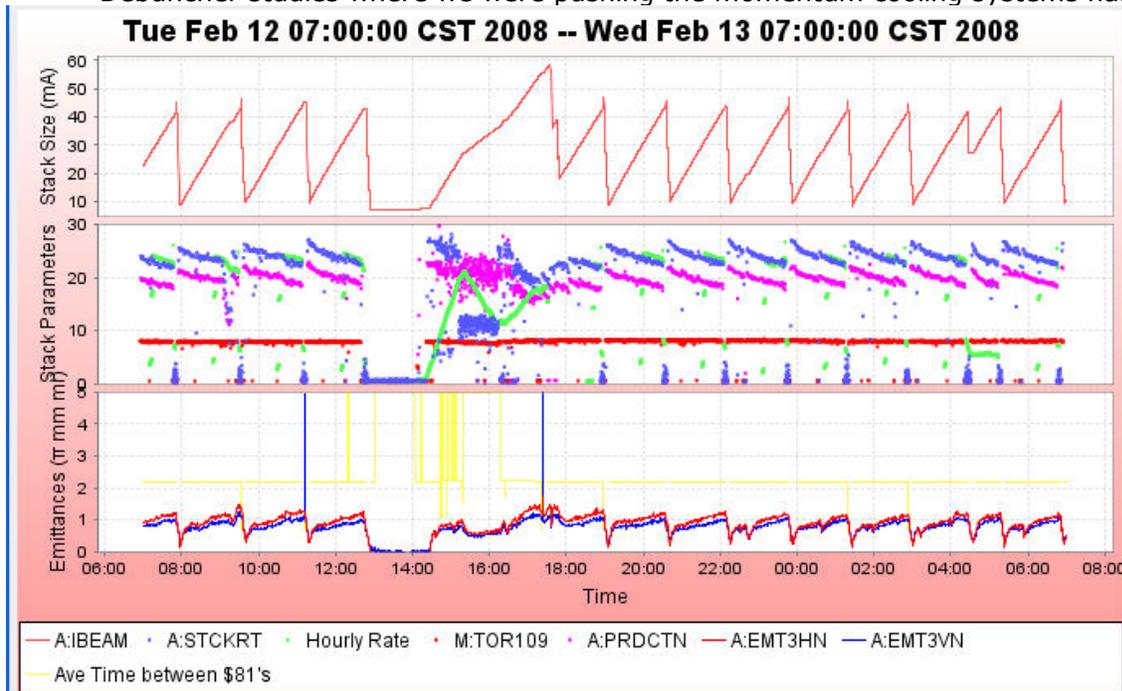


# 2008-02-13 Wednesday Morning Pbar Notes

Tuesday, February 12, 2008  
11:28 AM

## Stacking

- Protons on target averaged  $7.42 \times 10^{12}$  at 11 turns.
- We stacked 403.6mA in the last 24 hours.
- Best stacking hour was 24.03mA, and the average production efficiency was 18.13 e-6/proton.
- DRF1 continues to give us challenges.
  - DRF1-3 was worked on
    - It had tripped off.
    - This was just "growing pains" getting the station adjusted to the new PA.
    - Currents were adjusted and the station was turned back on and ran through the day shift.
    - At the start of the evening shift, DRF1-3 tripped off again, this time with a different problem. There is arcing in the cap boxes. Experts will work on this today.
  - DRF1-6 needed small current adjustments to reduce the number of trips.
  - All DRF1 stations were working by early day shift, with a sum fanback voltage of 5.5MV. Fanback voltage dropped to 4.5MV.
- Debuncher momentum band 2 TWT #2 alarmed 176 times. Most of this was during our Debuncher studies where we were pushing the momentum cooling systems hard.



## Transfers

- Unstacked 418mA in 27 transfers over 13 sets.
  - Accumulator to MI efficiency 96.5%
  - Accumulator to RR efficiency 91.1%
- Transfer 7154 had only one transfer due to the Pbar and Recycler sequencers getting out of synch. Basically, Recycler only squeeze down enough for one transfer. Instead of trying to adjust on the fly, we went back to stacking.
- Shot 7147

## Shot 7147

- Completed our first iteration of Rapid transfers during stacking
- Overall, it was a success and provided a proof of principle as everything seemed to work ok mechanically.
- We did four transfers and had an 85% transfer efficiency to the Recycler.
- We have some data to look at:
  - SDA cases were not armed properly, and may require some sequencer tweaks.
  - It looks like we can stack on average 2mA between transfers
  - While stacking, we don't cool, so emittances will be a little larger on average, thus leading to the reduced transfer efficiency.
  - We will work on these issues.

SDA DATA									
Transfer		ACC (e10)		MI beam		RR (e10)		ACC to RR EFF	ACC to MI EFF
1st	Pre inj/ext	58.788				15.89			
	Post inj ext	56.188	2.6		2.543	18.09	2.2	84.62%	97.81%
2nd	Pre inj/ext	56.788				18.07			
	Post inj ext	36.188	20.6		19.201	35.819	17.75	86.16%	93.21%
3rd	Pre inj/ext	38.988				35.463			
	Post inj ext	25.388	13.6		12.48	47.001	11.54	84.84%	91.76%
4th	Pre inj/ext	26.188				46.775			
	Post inj ext	17.988	8.2		7.735	53.902	7.127	86.91%	94.33%
		<b>Unstacked</b>	<b>45</b>			<b>Stashed</b>	<b>38.61</b>	<b>Over ALL</b>	<b>85.81%</b>

Column 1 Number_0_Pbar	Column 4 Number_3_Transfer Time	Column 21 Number_2 0_A:IBEAM B sampled	Column 22 Number_21_A:IB	Unstacked (mA)	Column 23 Number_22_R:BE	Column 24 Number_23_R:BE	Stashed	Acc to RR Eff	Column 27 Number_26_MI	Column 28 Number_27_MI Before	Acc to MI Eff	Acc to MI2 Eff	Transfers	Sets	
	2/13/2008	7:00:00 AM		418.399			381.30	91.13%	403.707	405.336	96.49%	96.88%	37	13	
7156	Wednesday, February 13, 2008	6:51:13 AM	42.387	9.388	32.999	278.189	307.948	29.76	90.18%	31.738	30.922	96.18%	93.71%	3	1
7155	Wednesday, February 13, 2008	5:18:32 AM	43.588	9.988	33.600	248.613	278.934	30.32	90.24%	32.526	32.510	96.80%	96.76%	3	1
7154	Wednesday, February 13, 2008	4:27:23 AM	41.788	27.788	14.000	236.457	248.954	12.50	89.26%	13.271	13.239	94.79%	94.56%	1	1
7153	Wednesday, February 13, 2008	2:54:08 AM	41.988	8.988	33.000	207.252	237.055	29.80	90.31%	31.798	32.541	96.36%	98.61%	3	1
7152	Wednesday, February 13, 2008	1:20:14 AM	42.188	8.788	33.400	176.905	207.657	30.75	92.07%	32.383	32.677	96.96%	97.84%	3	1
7151	Tuesday, February 12, 2008	11:47:28 PM	43.388	9.988	33.400	146.543	177.279	30.74	92.02%	32.204	33.310	96.42%	99.73%	3	1
7150	Tuesday, February 12, 2008	10:10:16 PM	43.788	9.788	34.000	115.463	146.957	31.49	92.63%	33.198	33.305	97.64%	97.96%	3	1
7149	Tuesday, February 12, 2008	8:35:54 PM	43.788	10.188	33.600	84.684	115.756	31.07	92.48%	32.033	32.676	95.34%	97.25%	3	1
7148	Tuesday, February 12, 2008	6:59:03 PM	43.388	8.988	34.400	53.477	84.869	31.39	91.26%	32.558	32.562	94.65%	94.66%	3	1
7146	Tuesday, February 12, 2008	12:48:42 PM	42.988	7.788	35.200	330.054	362.409	32.36	91.92%	34.733	34.390	98.67%	97.70%	3	1
7145	Tuesday, February 12, 2008	11:13:08 AM	45.388	9.988	35.400	299.913	331.768	31.86	89.99%	33.988	34.319	96.01%	96.95%	3	1
7144	Tuesday, February 12, 2008	9:33:30 AM	42.988	10.188	32.800	272.332	301.729	29.40	89.63%	31.816	31.583	97.00%	96.29%	3	1
7143	Tuesday, February 12, 2008	7:52:20 AM	41.388	8.788	32.600	243.630	273.500	29.87	91.63%	31.461	31.302	96.51%	96.02%	3	1

## Studies

- Debuncher Momentum gain ramping studies
  - Took lots of data with the Debuncher gain ramps off.
  - Despite it being a network scope
  - Data collected offline for analysis.

## Requests

- None yet, but then again that is what I said yesterday when all the request came in around noon.
- Originally we wanted to do another set of fast transfers to the Recycler during stacking. This request was canceled by the studiers after the 9am. They have enough data from yesterday's efforts to keep them busy for another day.

enough data from yesterday's efforts to keep them busy for another day.

#### Other Notes

- 4 8 15 16 23 42 (are you reading Salah?)
- Pbar Heat Exchangers
- Sent email to ad-pbar@fnal.gov after talking to FESS. No one replied with any reservations.
  - It is time for maintenance on the Pbar 95-deg LCW heat exchanger as pressures and temperatures are getting to the edge of their tolerances. FESS wants to take the primary heat exchanger (newer plate and frame variety) offline for cleaning and flushing. This would mean switching to the backup (older tube and shell variety). FESS expects the switchover to be fairly gentle with pressure changes at most 2-5 PSI and temperature fluctuations at most 1-2-deg F. The entire switchover and stabilization of the system is expected to take less than 30 minutes.
- Dan Johnson later sent more email  
**PBar Heat Exchangers – switch from HE9[Plate& Frame] to HX8[Tube & Shell] – dP increasing[approaching 14 psi].**

**(Thursday morning after 0900 and after Pbars have been transferred to Recycler, Approximately ½ hour running in parallel.**

**Temperature fluctuation of 2-3 degrees expected.**

**Work on plate and frame will not start until next week.**

**It takes a couple days to clean plate and frame and have it ready to be put back online. (95-96 normal temps, alarm at 99)**

- Paul's Numbers
  - Stacking in last 24 hours
  - Most in an hour: 24.03 mA at Tue Feb 12 20:05:51 CST 2008
  - Best: 25.19 mA on 30-Jan-08
  - Average Production 18.13 e-6/proton Best: 25.41 e-6/proton on 01/30/2008
  - Average Protons on Target 7.01 e12 Best: 8.77 e12 on 07/24/2007
  - Largest Stack .00 mA Best: 271.01 mA on 11/14/2007
  -
- Al's Numbers
  - Stacking
    - Pbars stacked: 403.62 E10
    - Time stacking: 21.21 Hr
    - Average stacking rate: 19.03 E10/Hr
  - Uptime
    - Number of pulses while in stacking mode: 33599
    - Number of pulses with beam: 31897
    - Fraction of up pulses was: 94.93%
  - The uptime's effect on the stacking numbers
    - Corrected time stacking: 20.14 Hr
    - Possible average stacking rate: 20.04 E10/Hr
    - Could have stacked: 425.16 E10/Hr
  - Recycler Transfers
    - Pbars sent to the Recycler: 416.81 E10
    - Number of transfers : 38
    - Number of transfer sets: 13
    - Average Number of transfer per set: 2.92
    - Time taken to shoot: 01.55 Hr
    - Time per set of transfers: 07.16 min

- Time per set of transfers: 07.16 min
  - Transfer efficiency: 91.53%
- Other Info
    - Average POT : 7.42 E12
    - Average production: 17.05 pbars/E6 protons

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- First set of rapid transfers during stacking!

