

Accelerator performance plots in FY07 to be used as input for the luminosity projection model

Vaia Papadimitriou
August 22, 2007

Using information between October 1, 2006 and August 5, 2007. Stores 4996-5592 and pbar shots 4561- 6480 were used.

Store length, stores 4996-5592

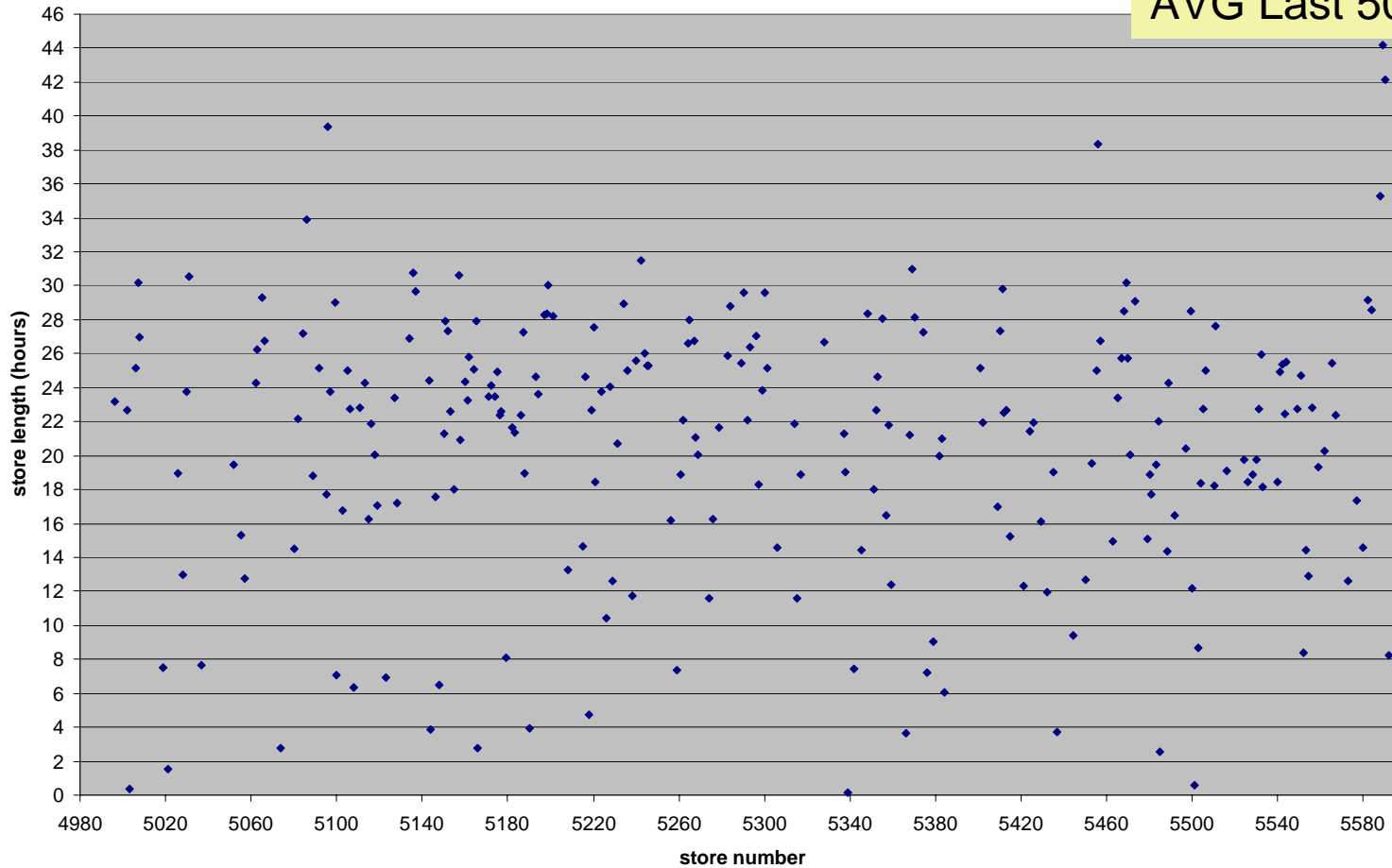
10/01/06-08/05/07

AVG FY07: 20.63 h

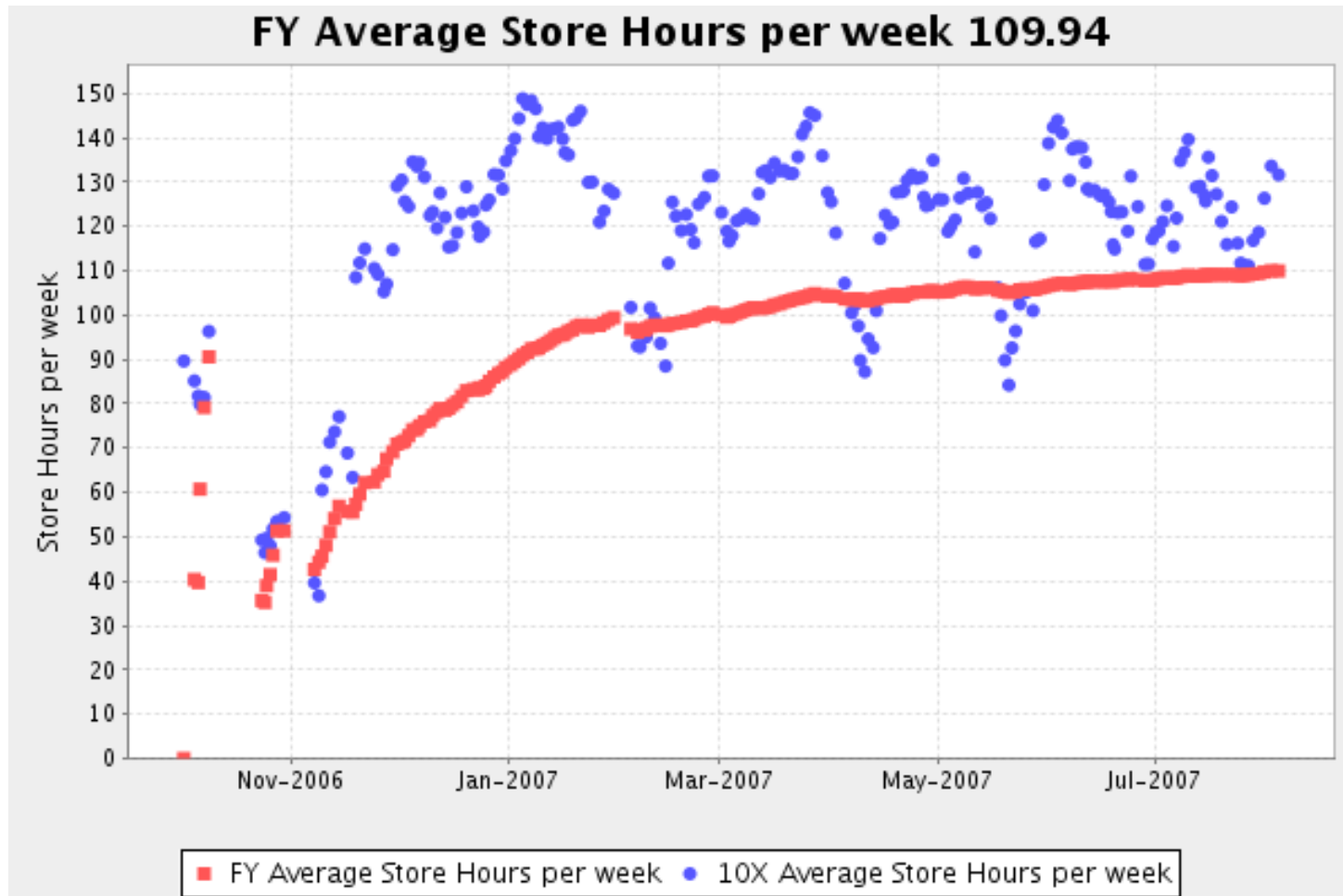
STD DEV FY07: 7.81 h

AVG Last 50 FY06: 22.07 h

6 store length (hours)



Store hours per week, FY07

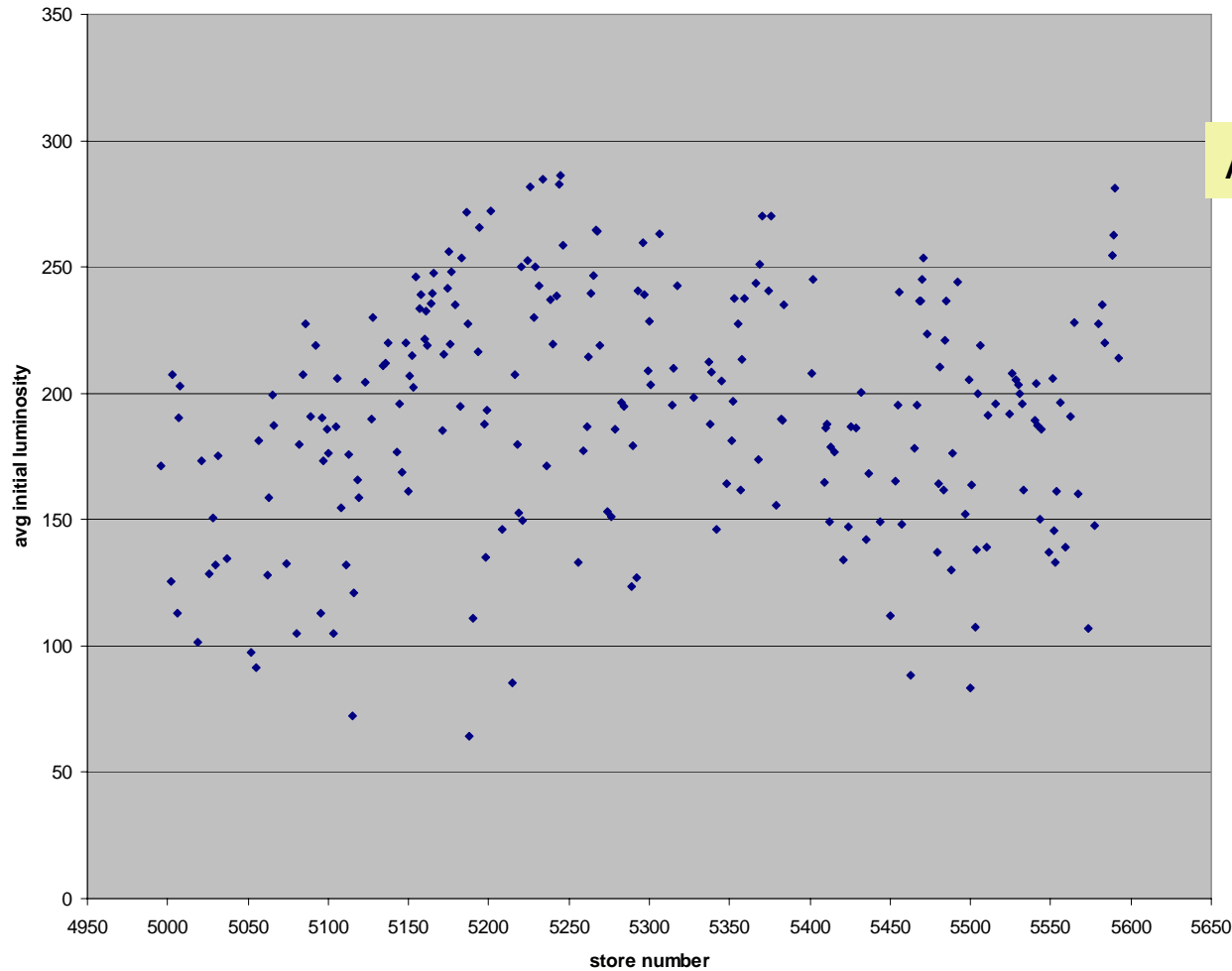


CDF-D0 average initial luminosity stores 4996- 5592

15 SDA avg initial lum (1E30) vs store number

10/01/06-08/05/07

AVG FY07: 192.48 E30

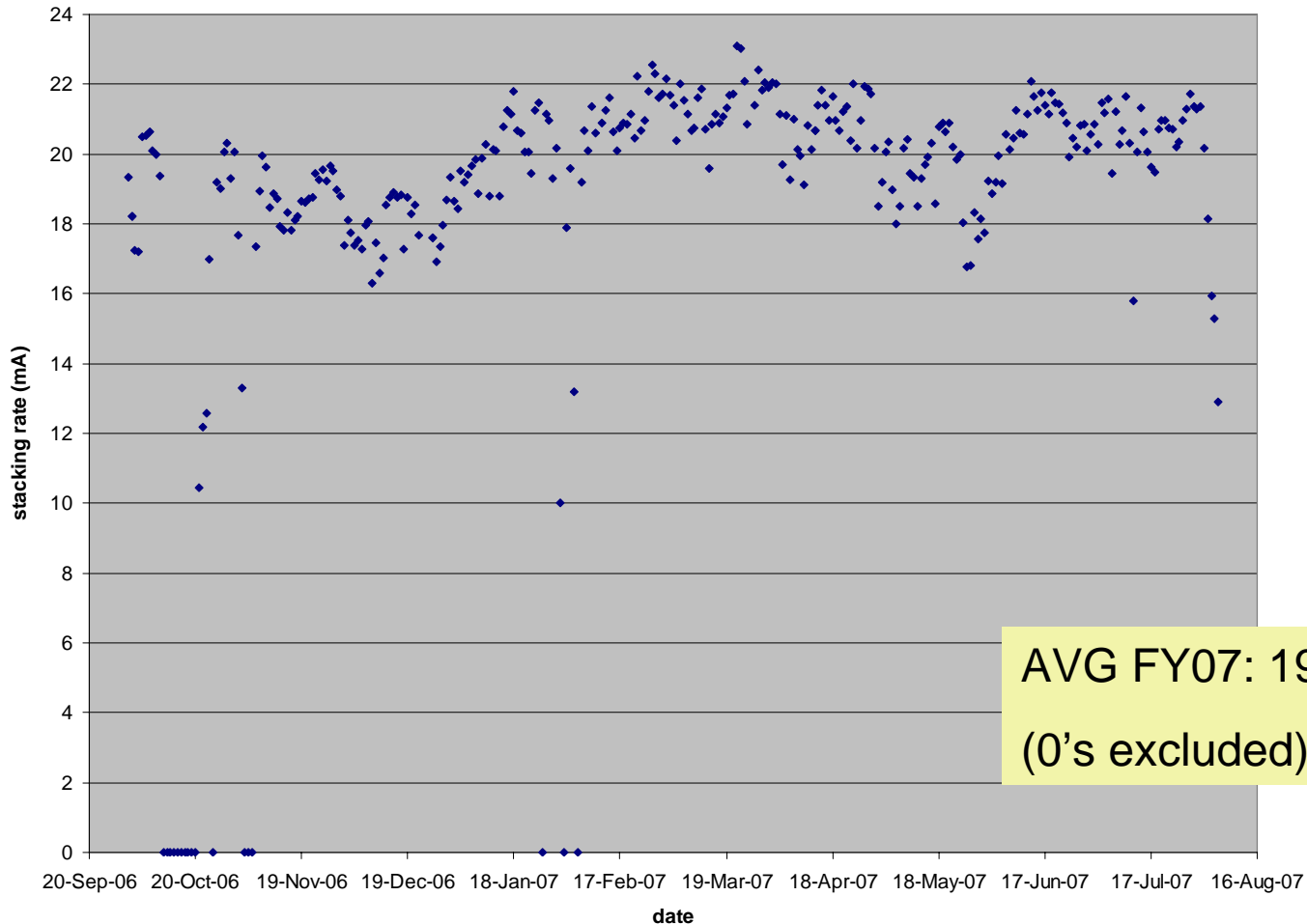


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Stacking rate (best hour) stores 4996- 5592

stacking rate (mA) best hour

10/01/06-08/05/07

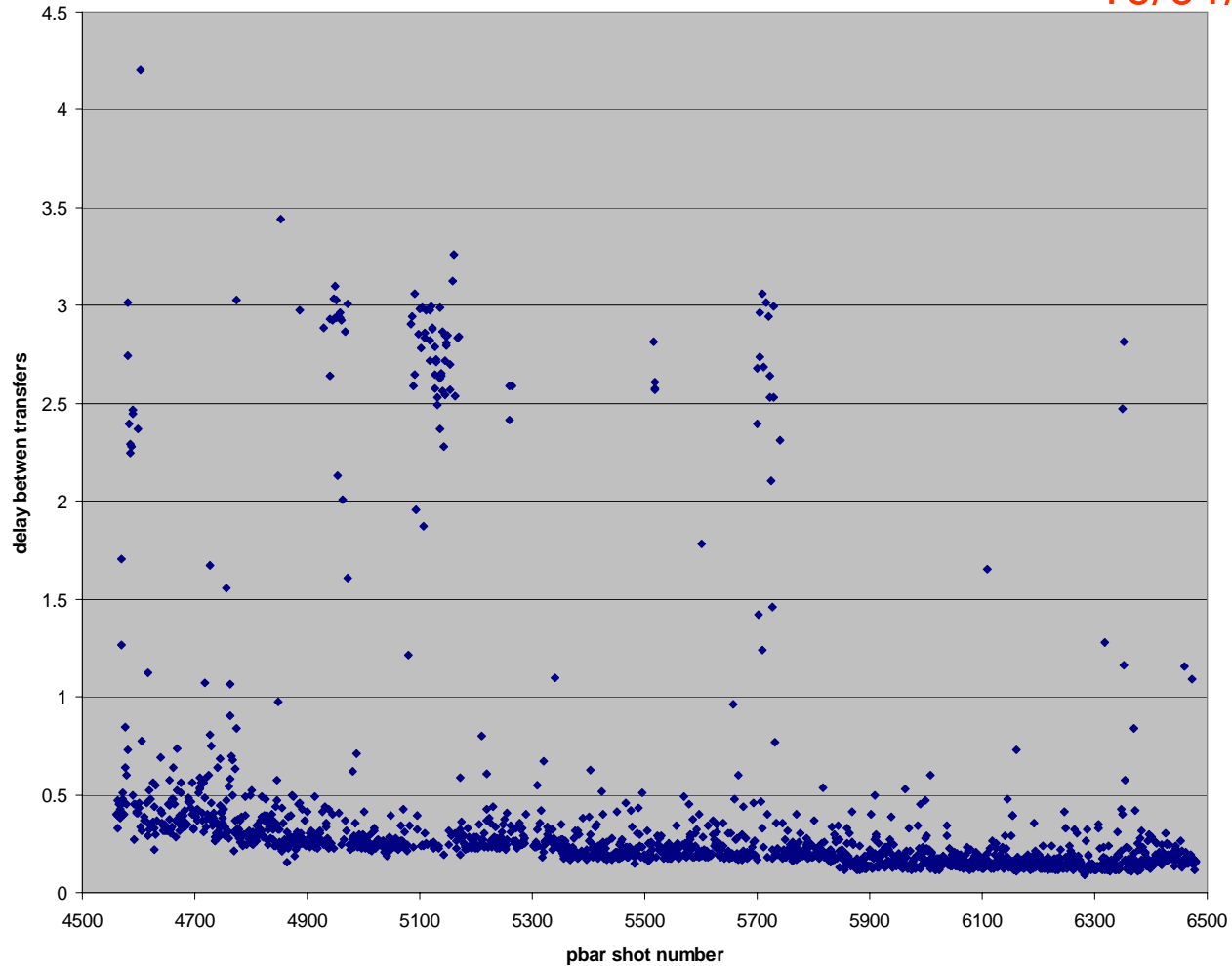


AVG FY07: 19.78 mA
(0's excluded)

Transfer time, shots 4561- 6480

delay in hours vs pbar shot number

10/01/06-08/04/07

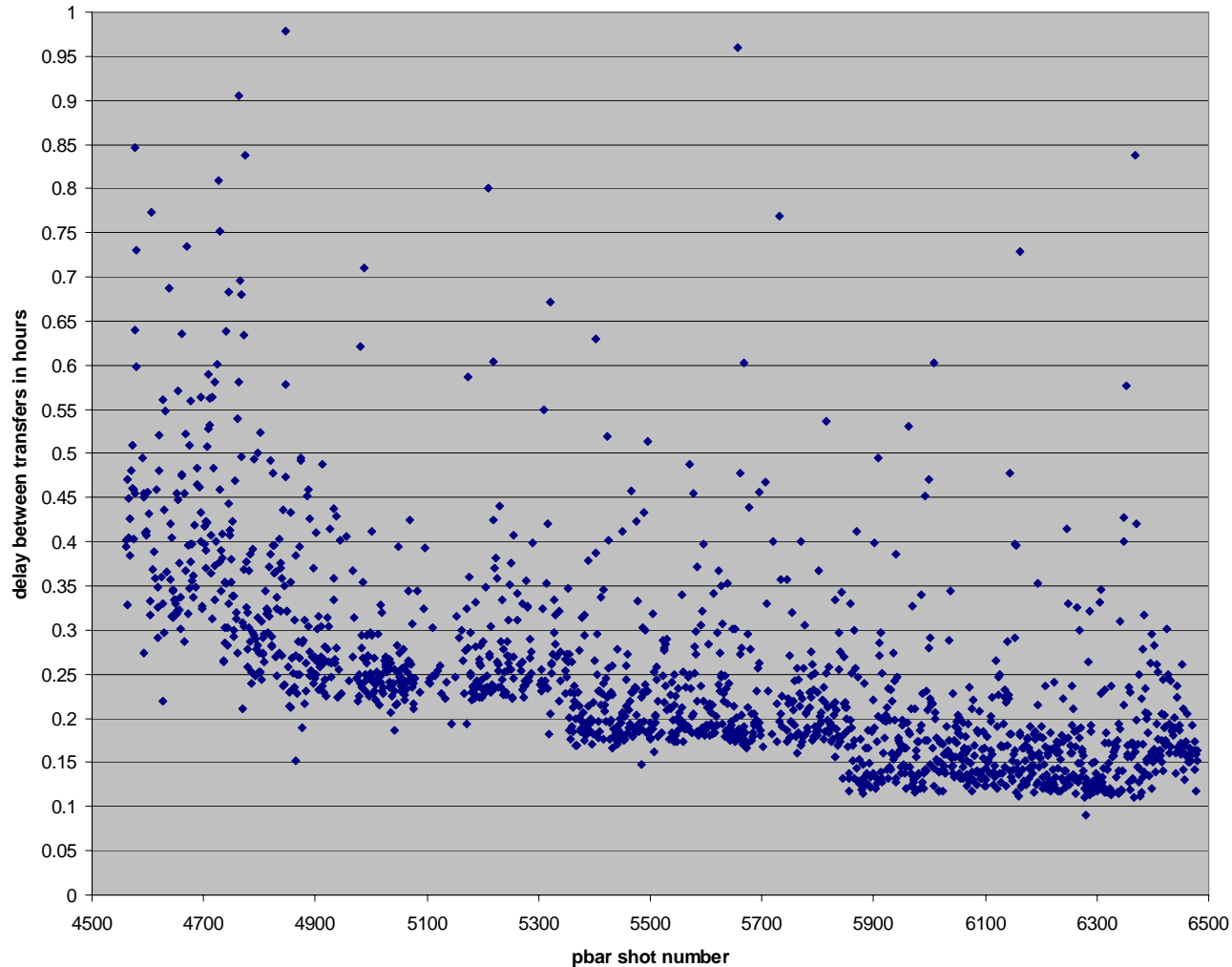


AVG FY07: 1st trim. 0.577 h, 2nd trim. 0.531 h, 3rd trim. 0.265 h, 4th trim. 0.215 h

Transfer time, shots 4561- 6480

delay in hours vs pbar shot number

10/01/06-08/04/07



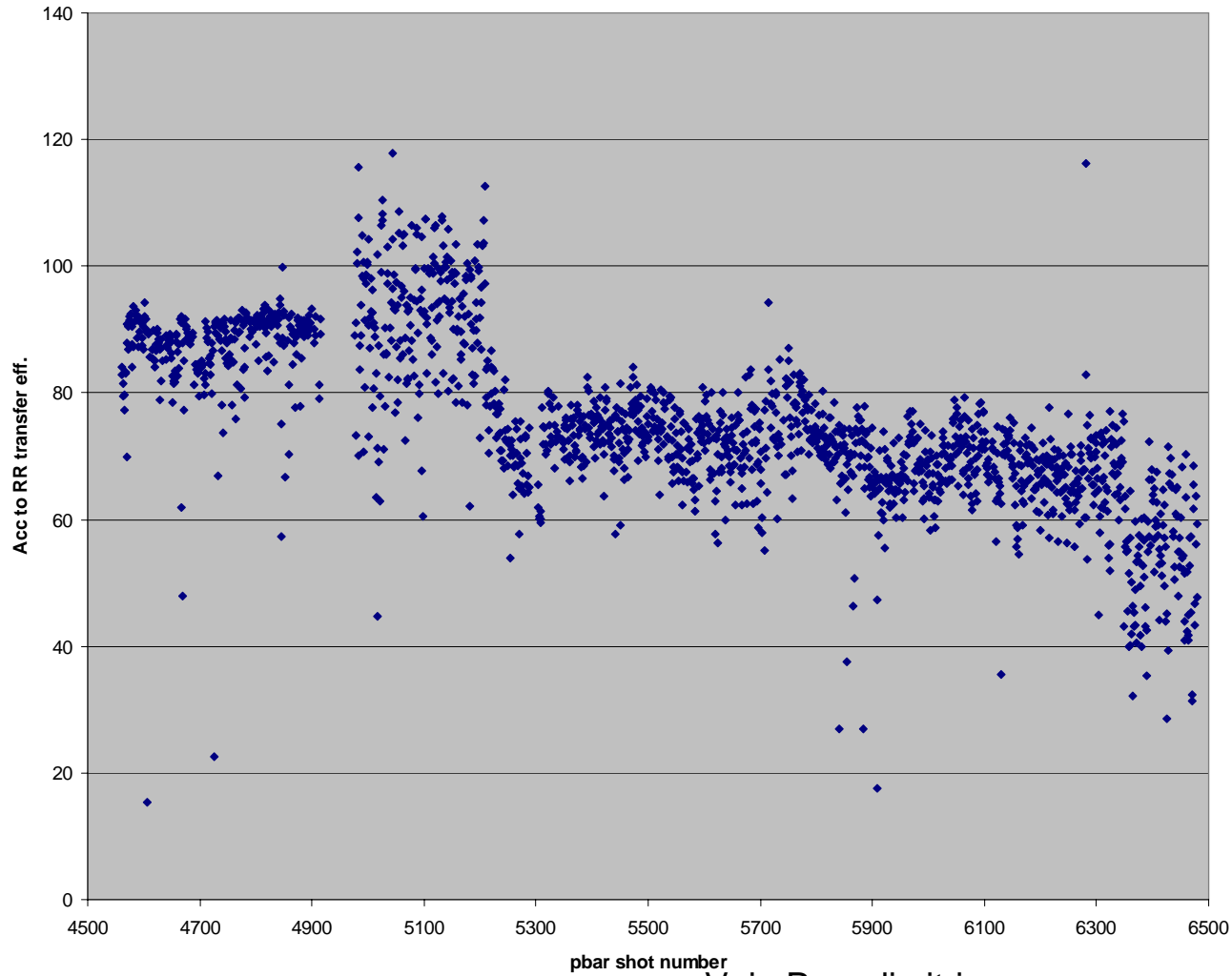
remove gt 2 hours for avg

AVG FY07: 1st trim. 0.395 h, 2nd trim. 0.268 h, 3rd trim. 0.206 h, 4th trim. 0.195 h

Transfer efficiency for pbar shots 4561-6480

Column 35 Total transfer efficiency (beg-end)

10/01/06-08/04/07



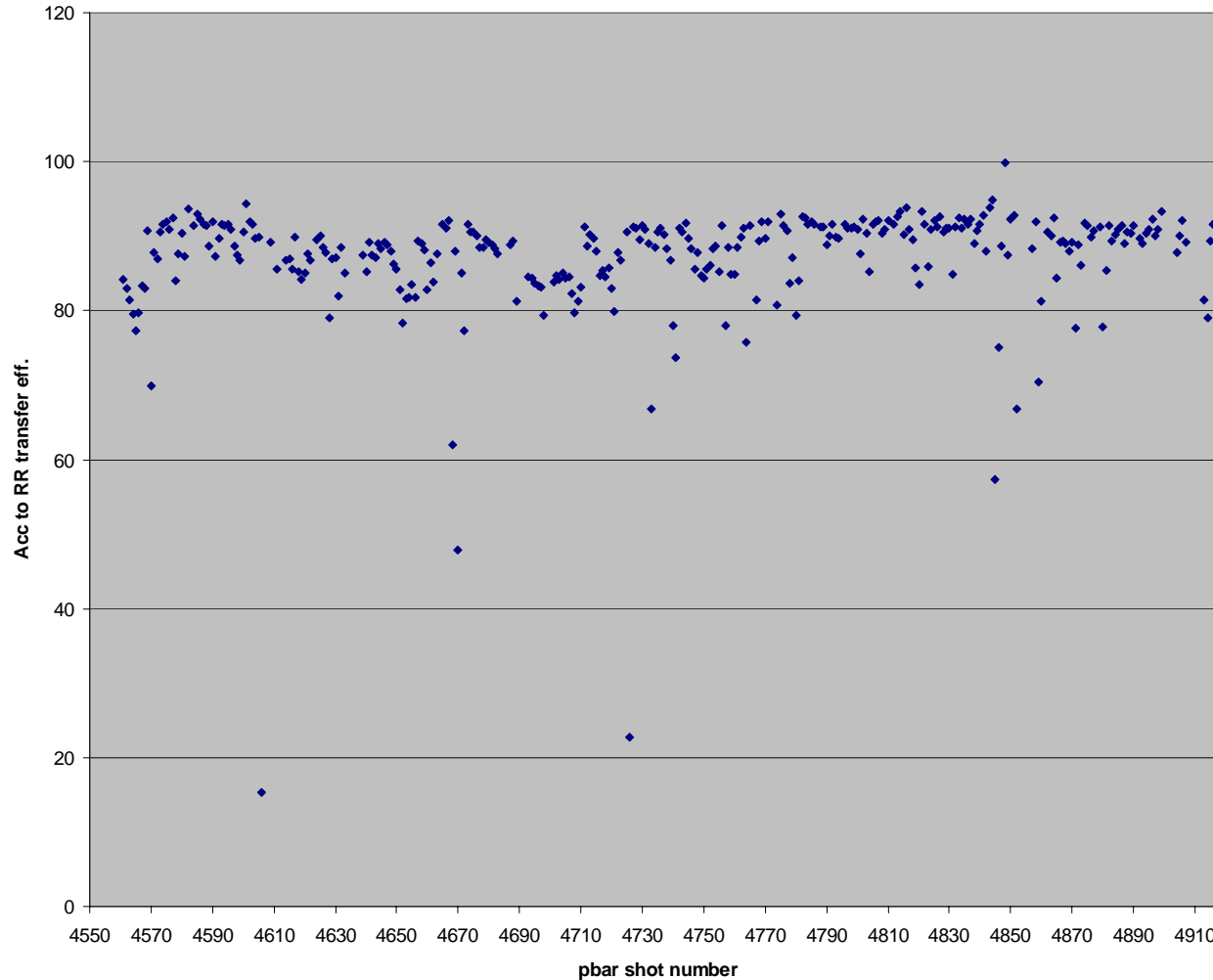
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Transfer efficiency for pbar shots

4561-4916

Column 35 Total transfer efficiency (beg-end) vs pbar shot number

10/01/06-12/19/06

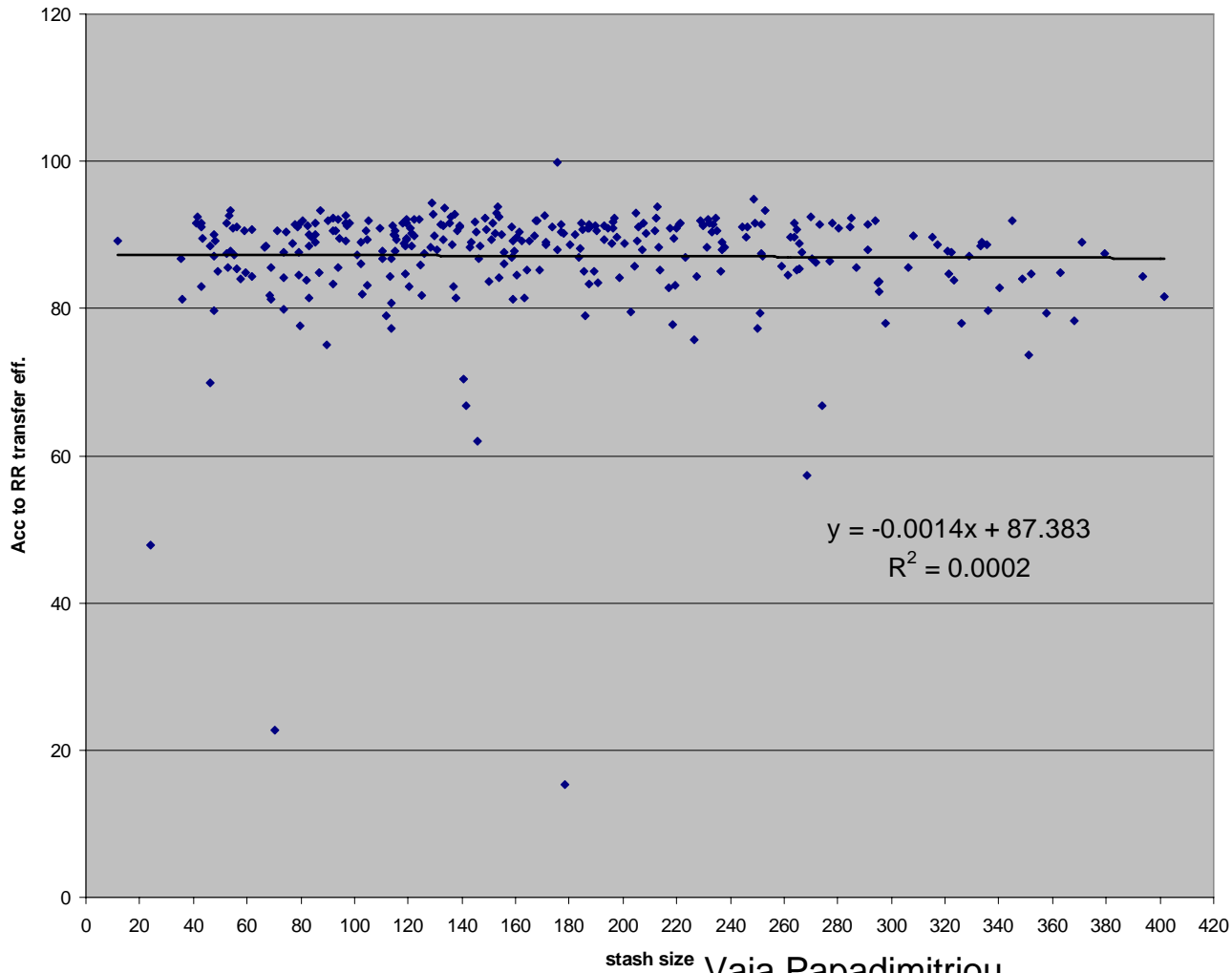


AVG FY07: 87.15%

Transfer efficiency for pbar shots vs stash size, 4561-4916

Column 35 Total transfer efficiency (beg-end) vs stash size

10/01/06-12/19/06



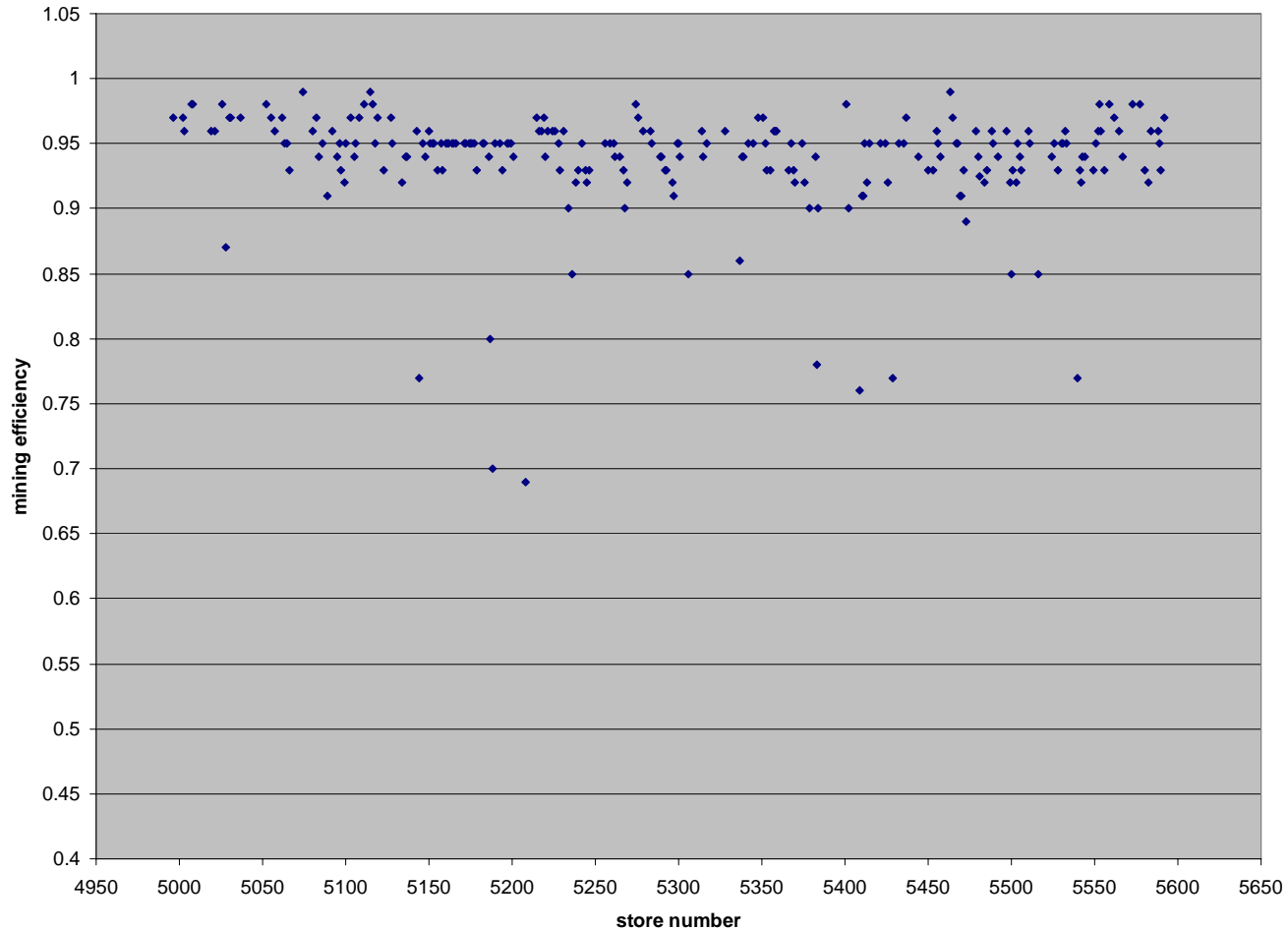
At 0 stash: 87.38%

At 300 E10 stash:
86.96%

Unstacking fraction, stores 4996-5592

10/01/06-08/05/07

31 RR unstacking fraction vs store number



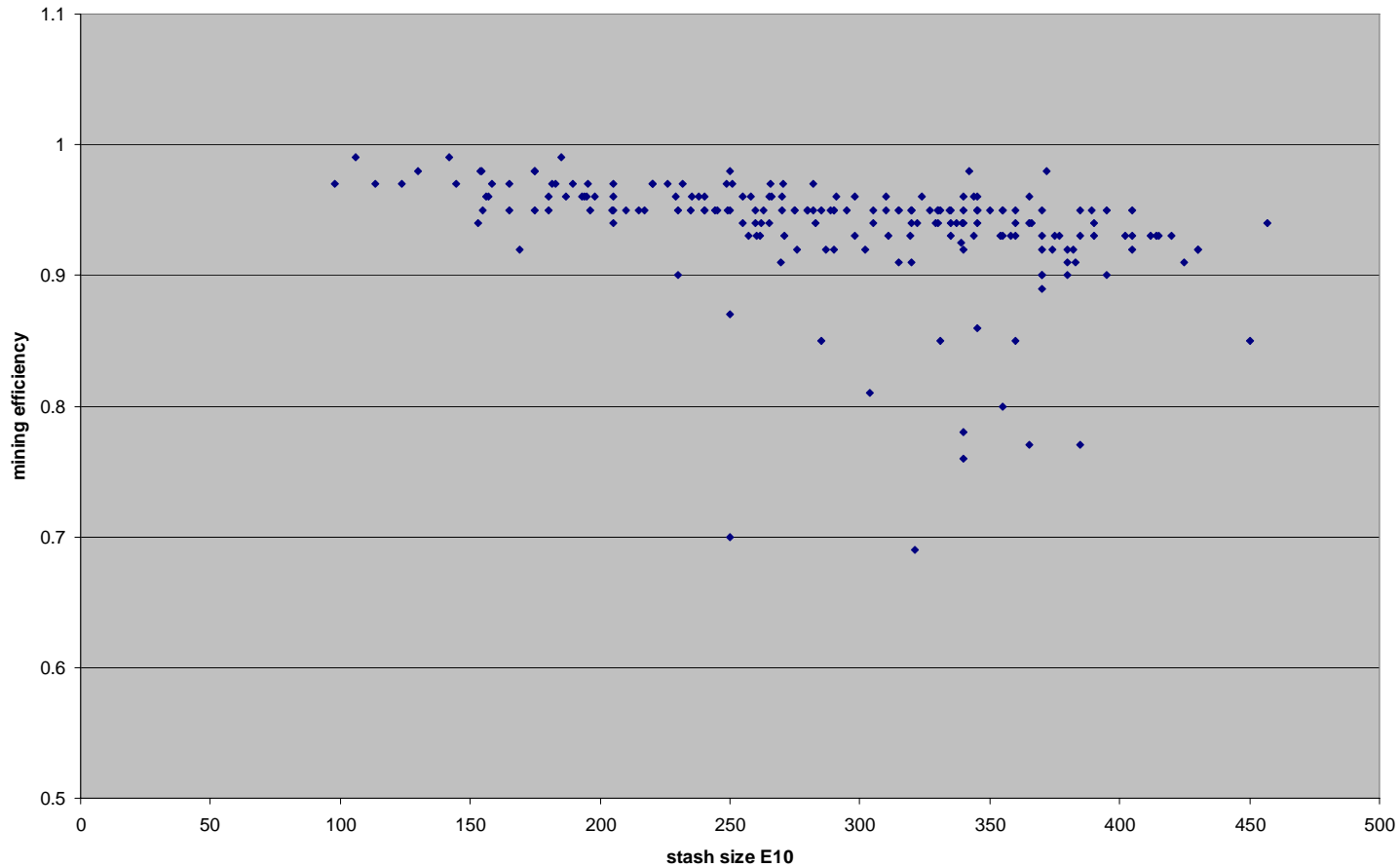
AVG FY07:0.938

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Fraction of pbars captured for each store, stores 4996-5516

31 RR unstacking fraction vs stash size

10/01/06-06/25/07

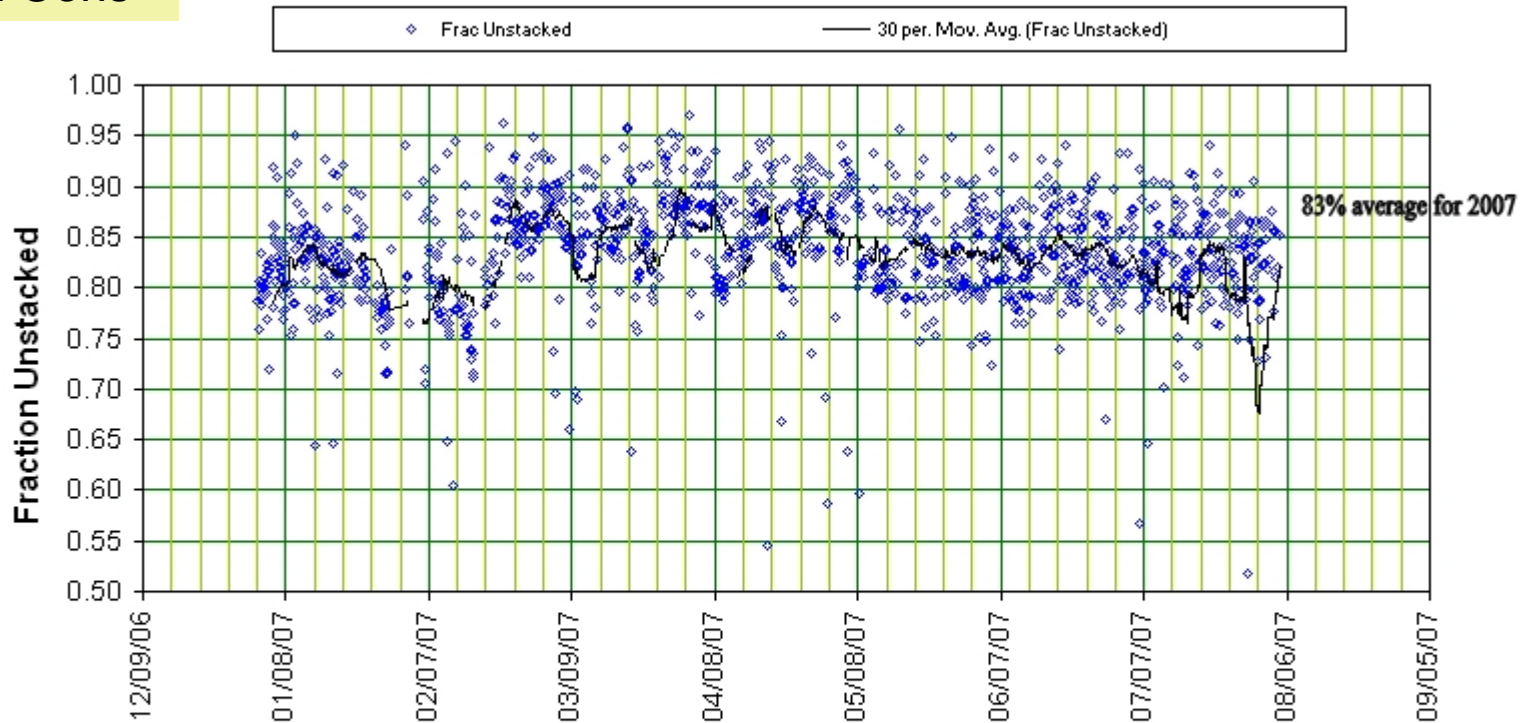


Unstacking fraction vs stash size, stores 4996-5592

10/01/06-08/05/07

From Cons

Fraction Unstacked vs Date



Assume a 10% Pbar left over factor in model to take into account that the more pbars you leave behind, the faster you can start transferring to Recycler.

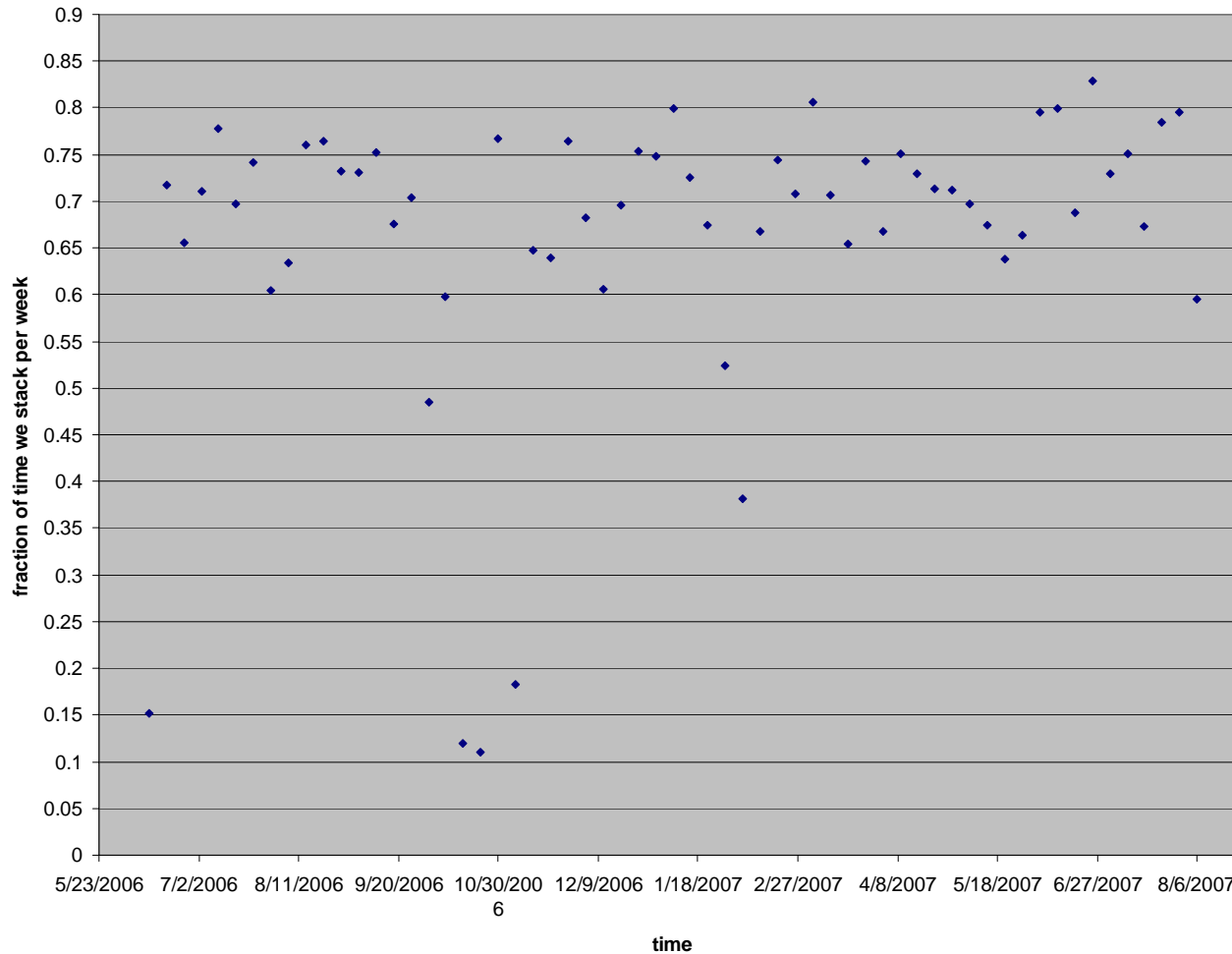
Pbar left over factor: 17%

Date

Fraction of time we stack per week, no setup for stacking is included

timeline factor no setup

06/04/06-08/05/07

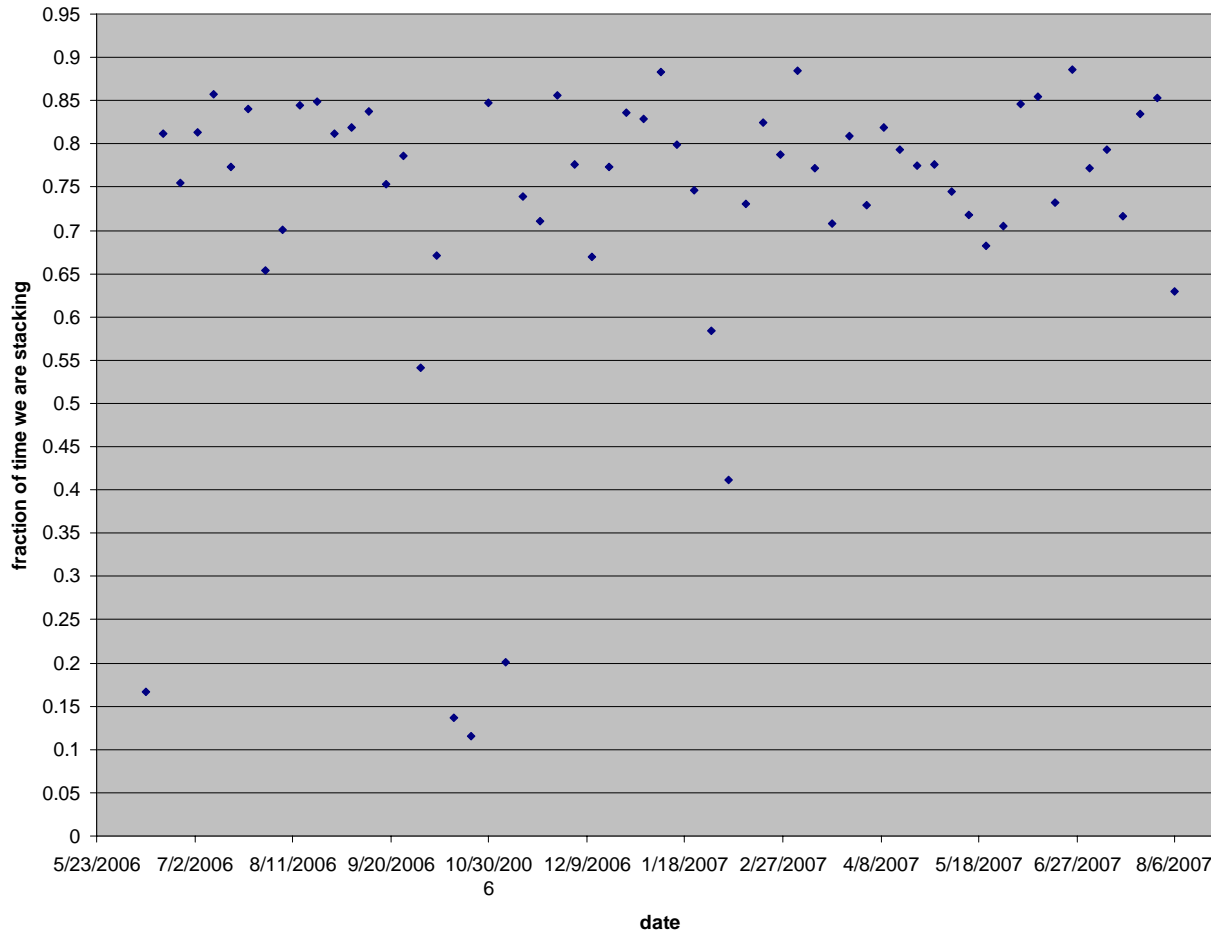


AVG FY07:0.6621
(0.70 if I remove the
3 small value
numbers in FY07)

Fraction of time we stack per week setup for stacking is included

timeline factor vs time

06/06/06-08/05/07

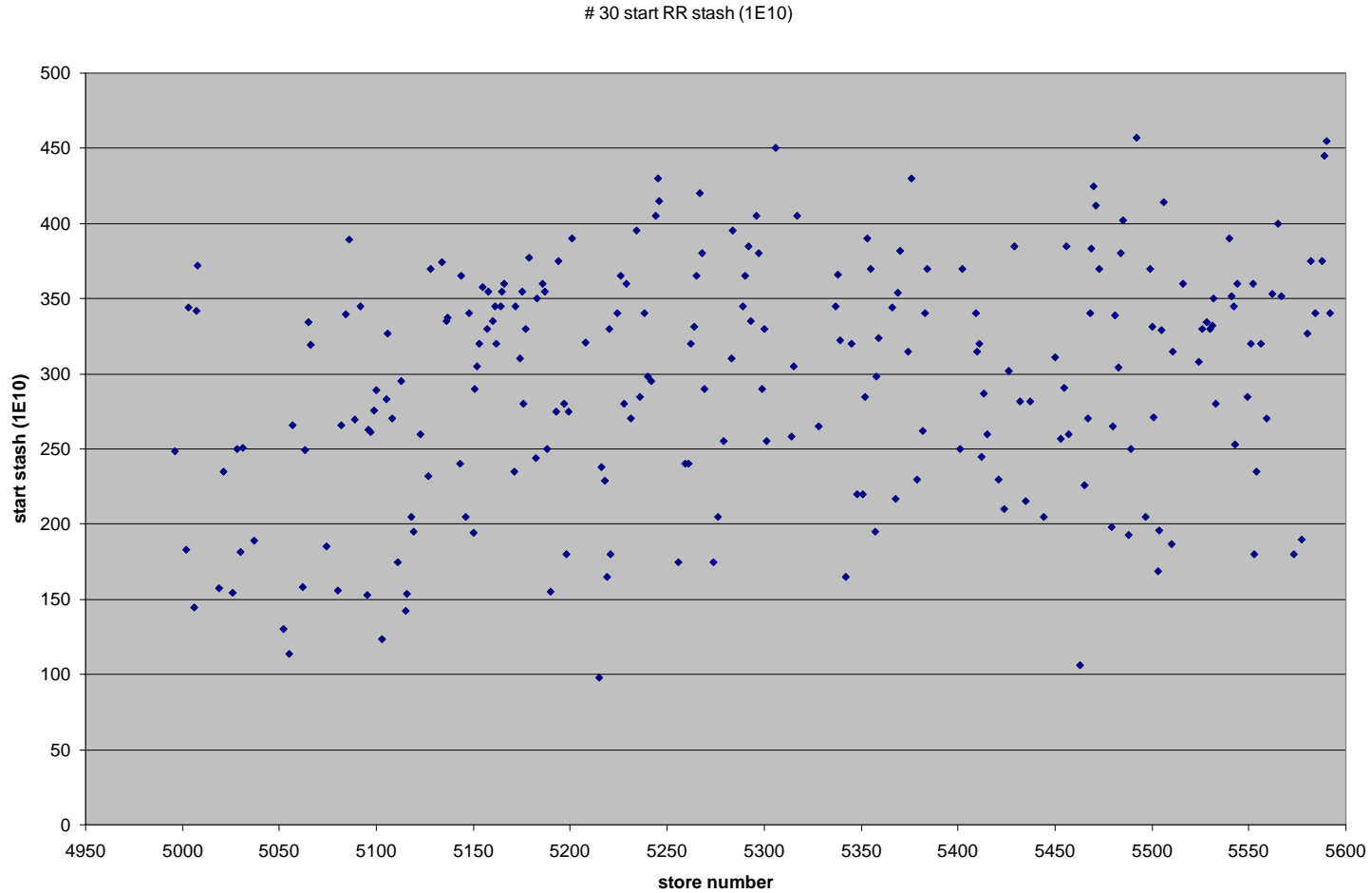


AVG FY07:0.7219
(0.76 if I remove the 3 small value numbers in FY07)

I assume a (74) 80% pbar timeline factor.
(this takes into account roughly about 15 hours in store setup per week, 12 hours in SwYa events and 6-7 hours in studies.)

Initial stash size vs store number, stores 4996-5592

10/01/06-08/05/07



AVG FY07: 295.69 E10

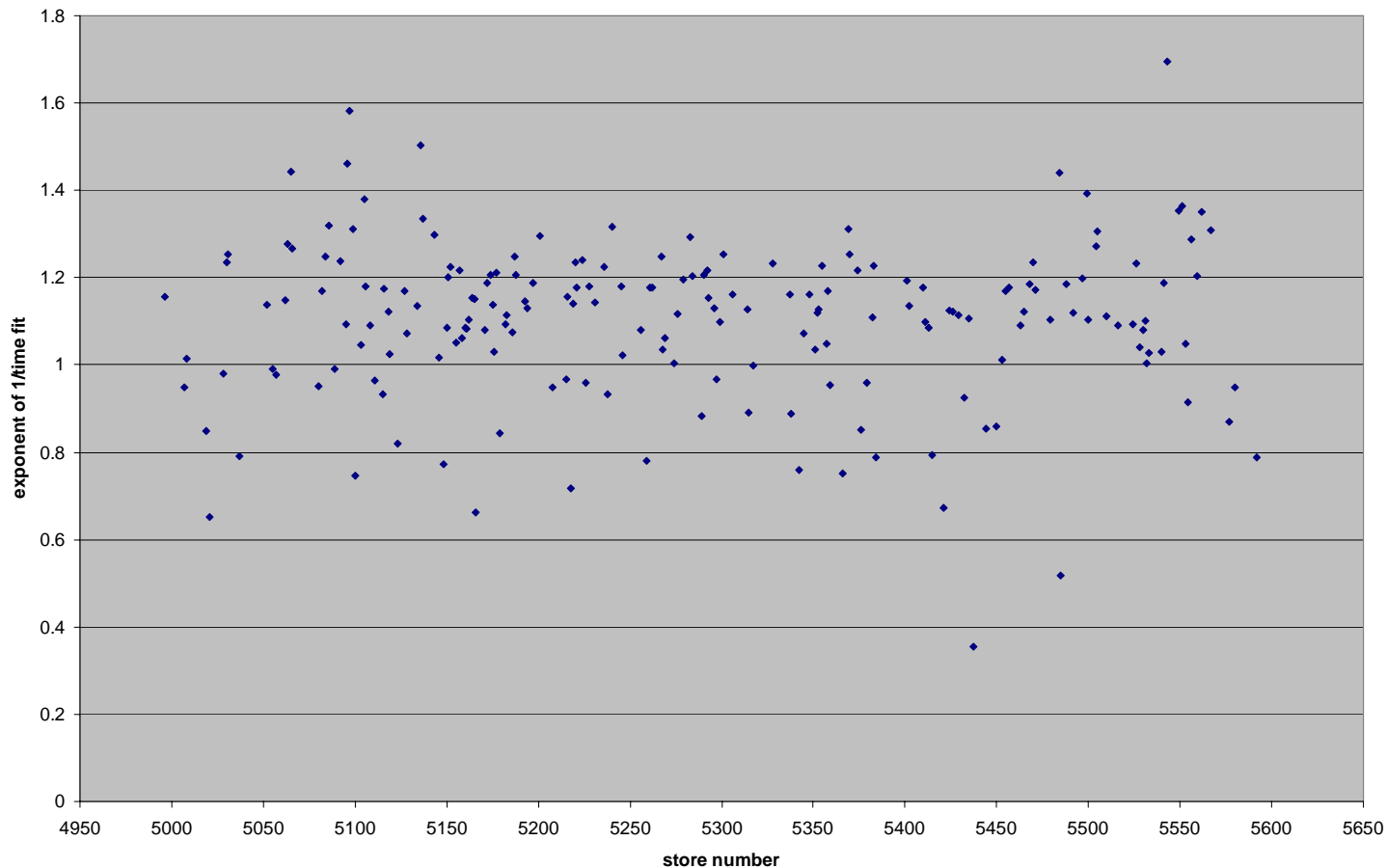
CDF luminosity lifetime fits

(exponent)

$$L(t) = \frac{L_0}{\left(1 + \frac{t}{\mu\tau}\right)^\mu}$$

10/01/06-08/05/07

182 exponent 1/time vs store number chisquare < 5



Stores 4996-5592

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AVG FY07: 1.1

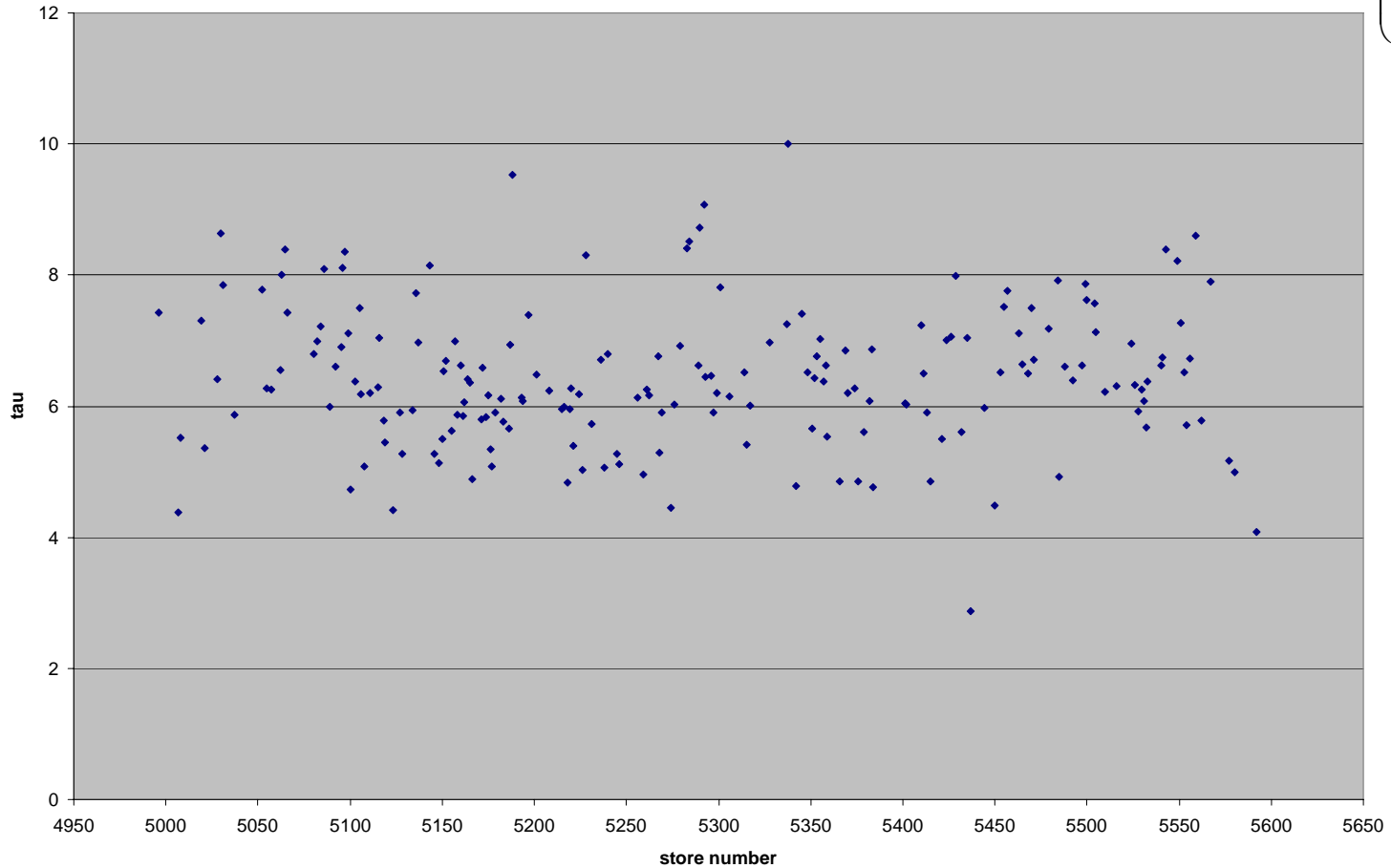
CDF luminosity lifetime fits (tau)

(chisquare<5)

181 TAU 1/time vs store number

$$L(t) = \frac{L_0}{\left(1 + \frac{t}{\mu\tau}\right)^\mu}$$

10/01/06-08/05/07

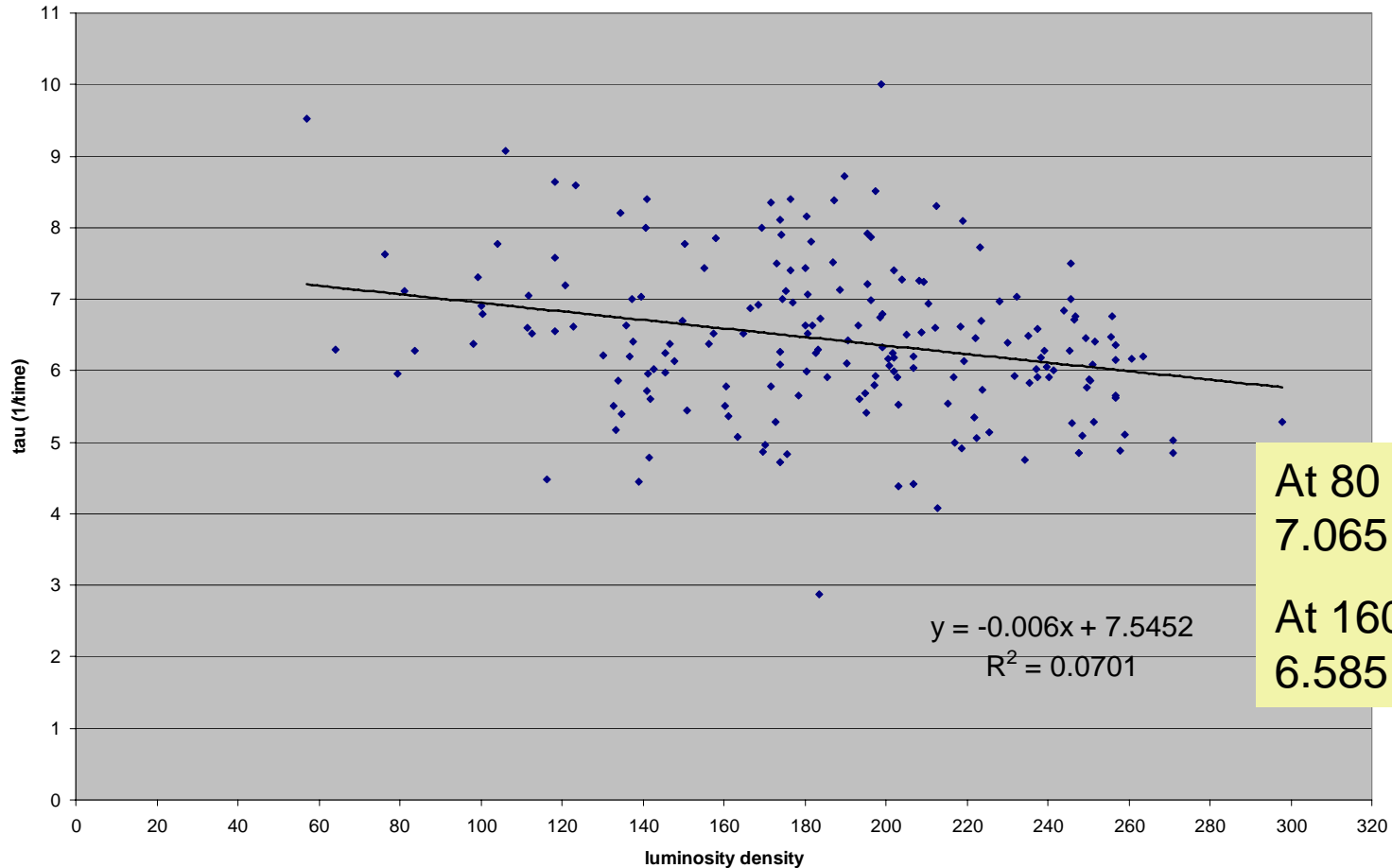


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Stores 4996-5592 ⁸

CDF luminosity lifetime fits (tau) vs lum density, FY07 (chisquare<5)

181 TAU 1/time vs lum density



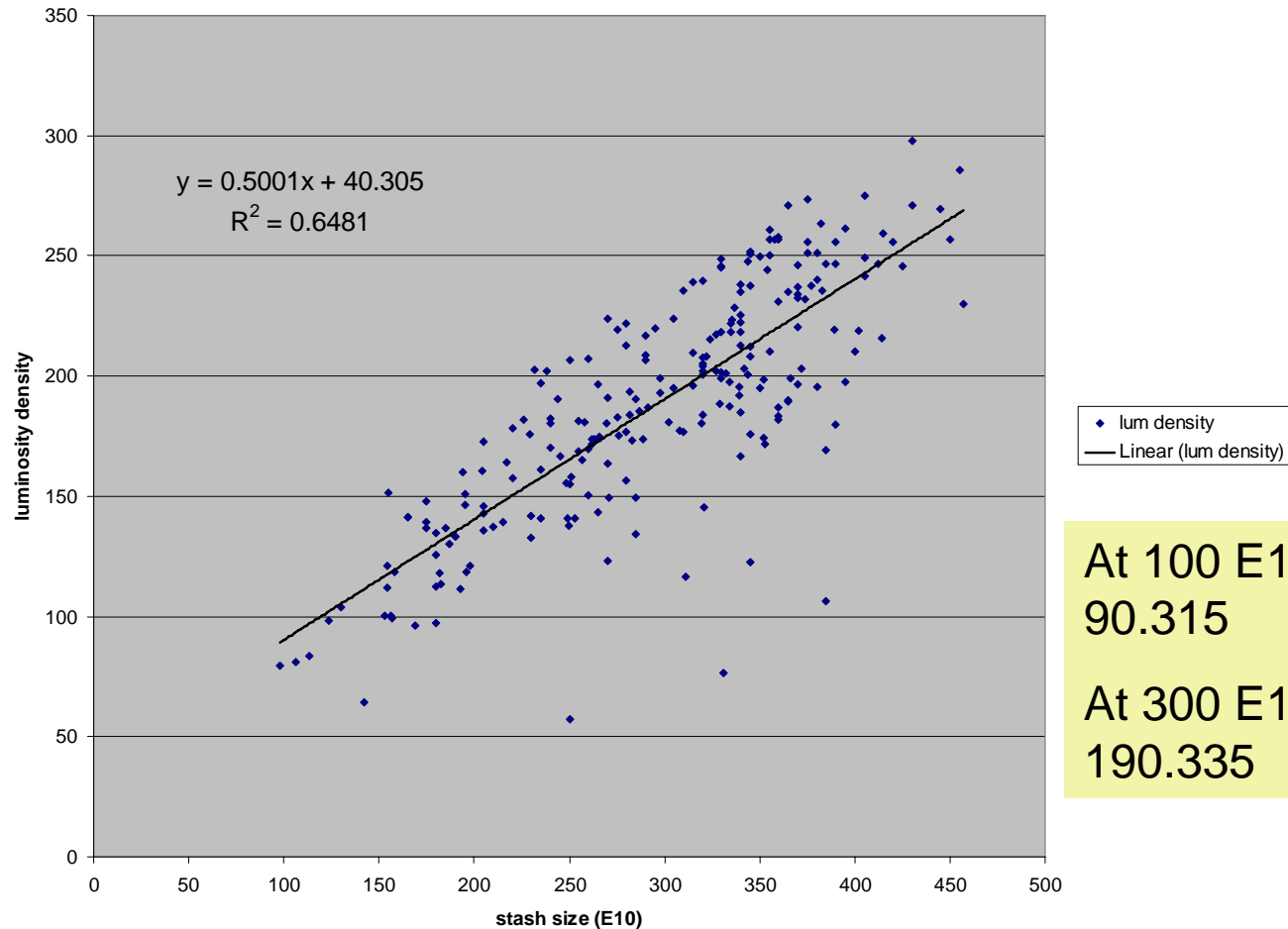
10/01/06-08/05/07

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Stores 4996-5592 ⁹

luminosity density vs stash size

lum density vs stash size

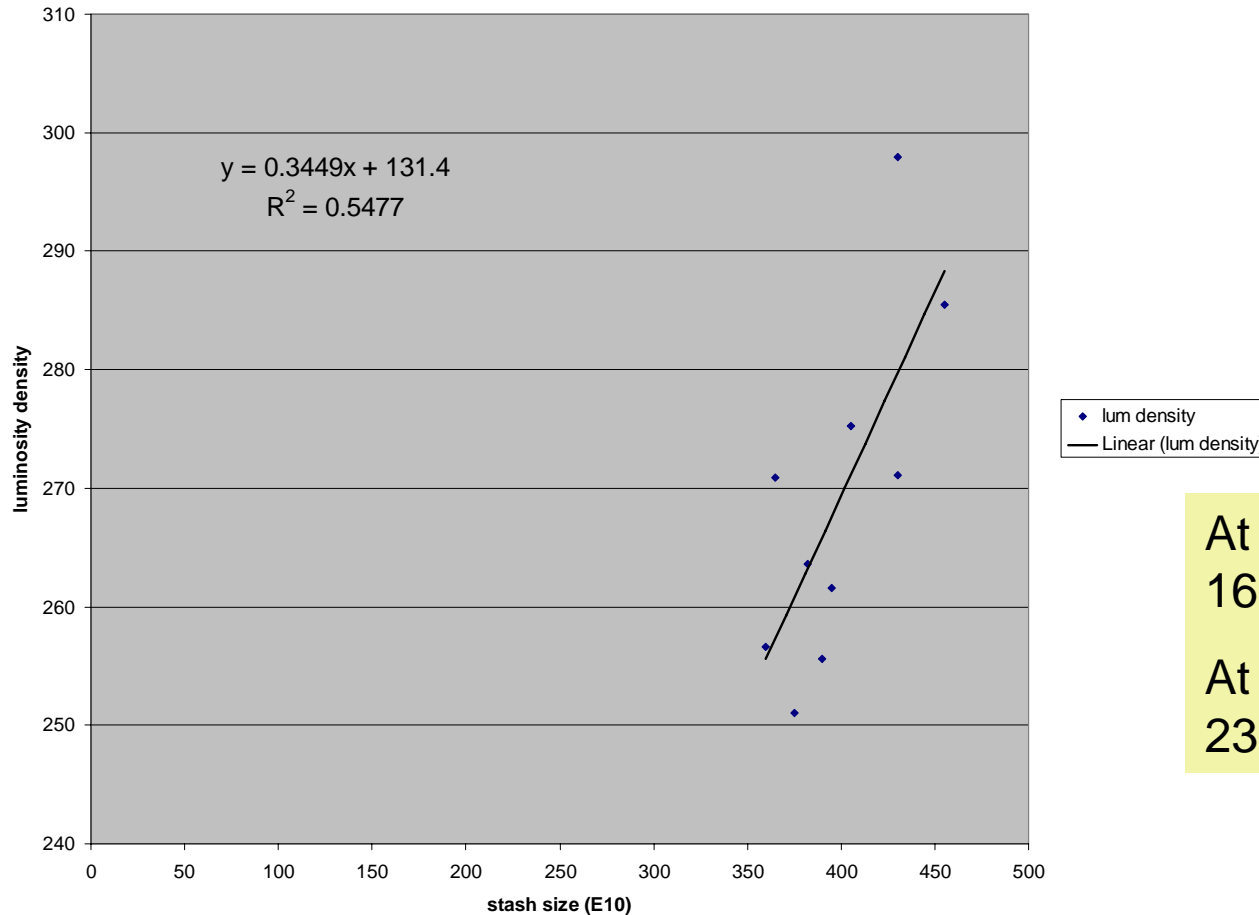


At 100 E10 stash:
90.315

At 300 E10 stash:
190.335

luminosity density vs stash size for best 10 initial luminosity stores

lum density vs stash size



At 100 E10 stash:
165.89

At 300 E10 stash:
234.87

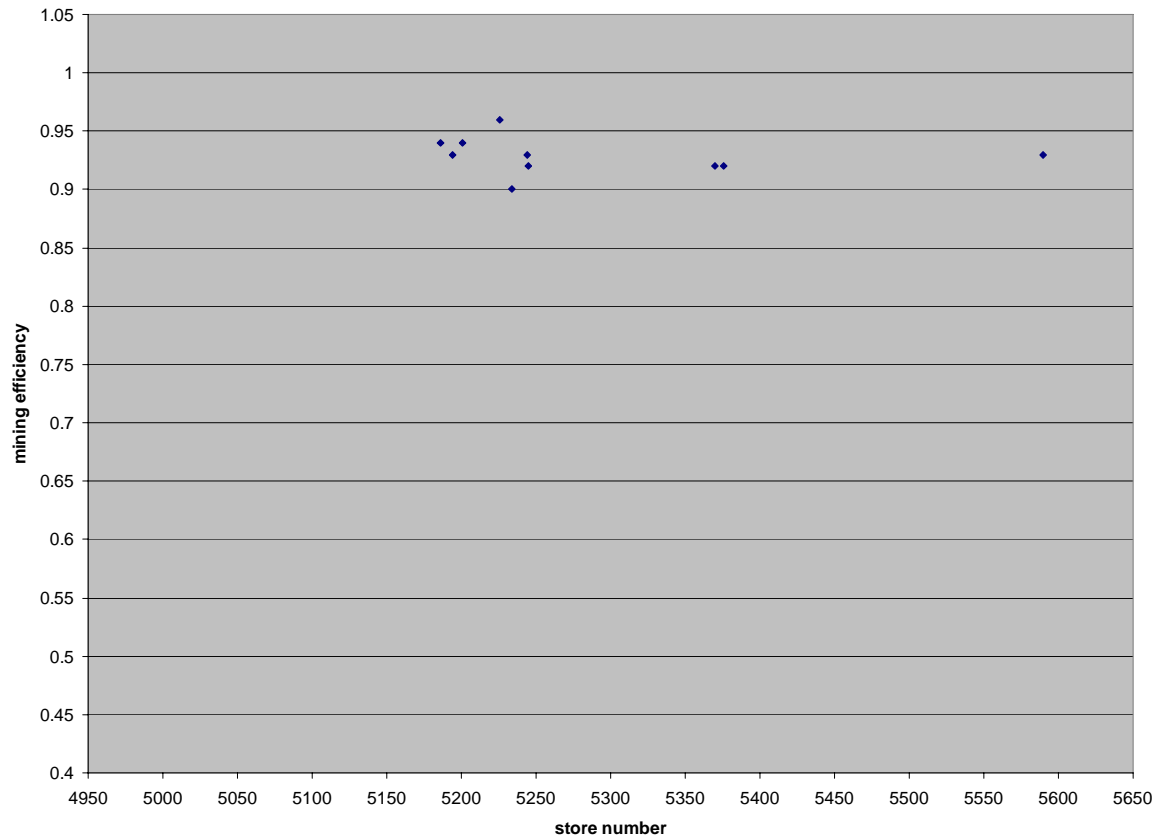
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Stores: 5245, 5234, 5244, 5226, 5590,
5201, 5186, 5376, 5370, 5194

Mining efficiency for best 10 initial luminosity stores

31 RR unstacking fraction vs store number



Average: 92.9%

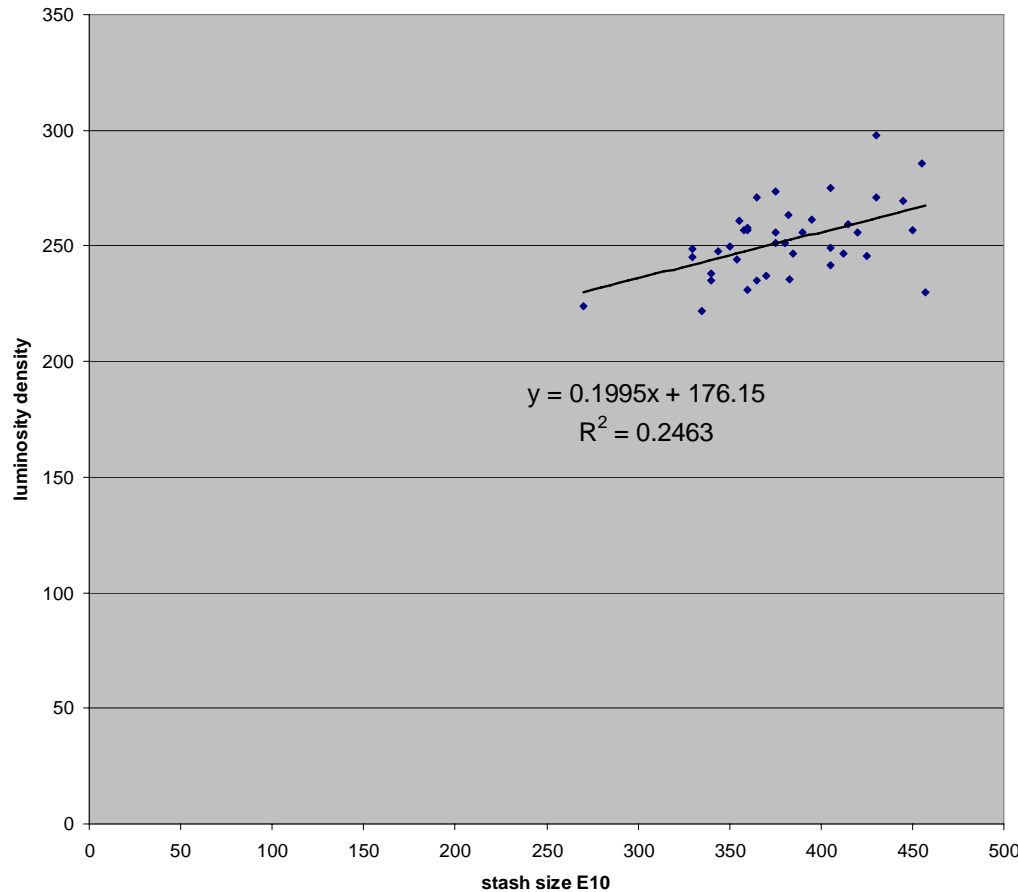
10/01/06-08/05/07

Vaia

Stores: 5245, 5234, 5244, 5226, 5590,
5201, 5186, 5376, 5370, 5194

luminosity density vs stash size for best 39 initial luminosity stores

lum density vs stash size (39 highest initial lum stores)

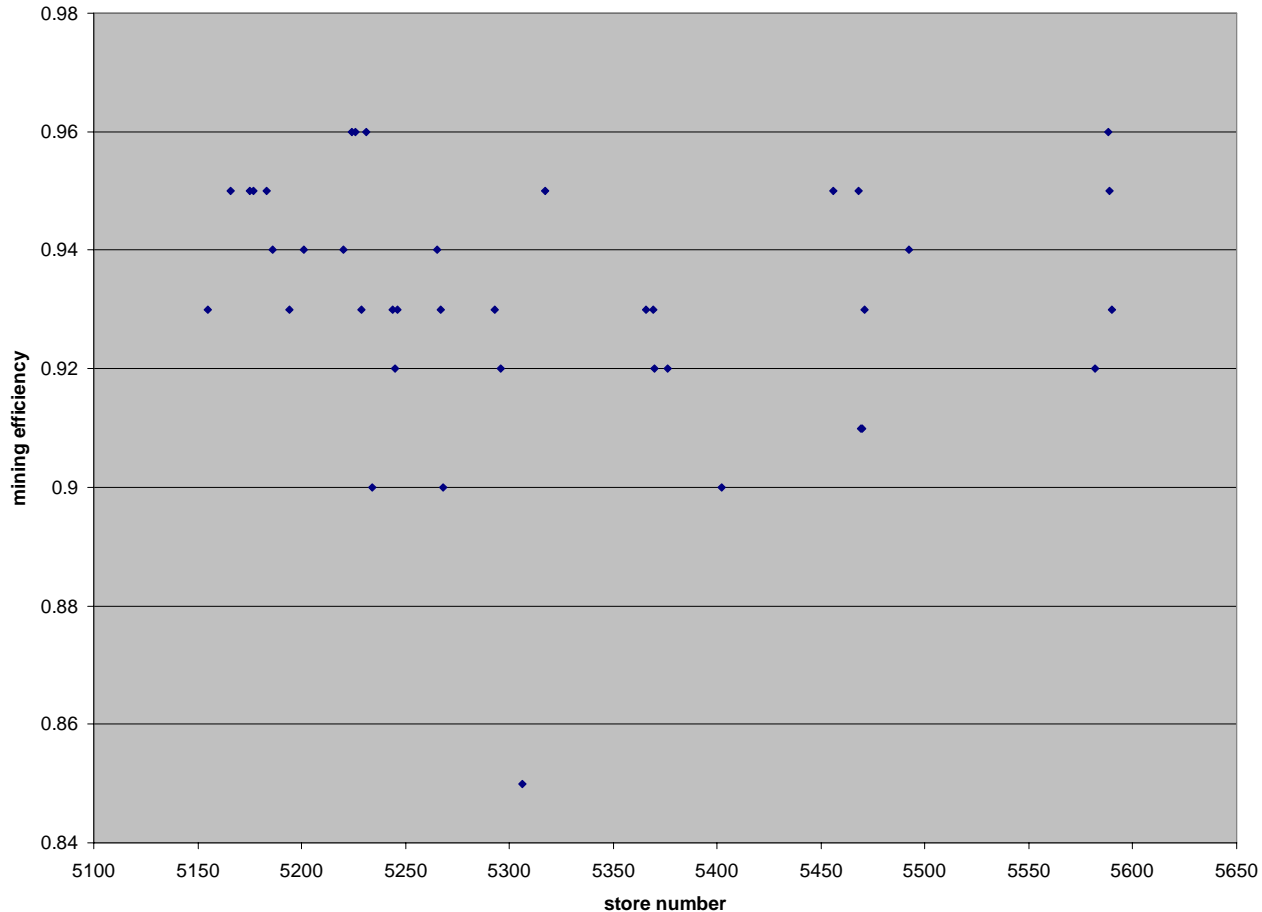


At 100 E10 stash:
196.1

At 300 E10 stash:
236

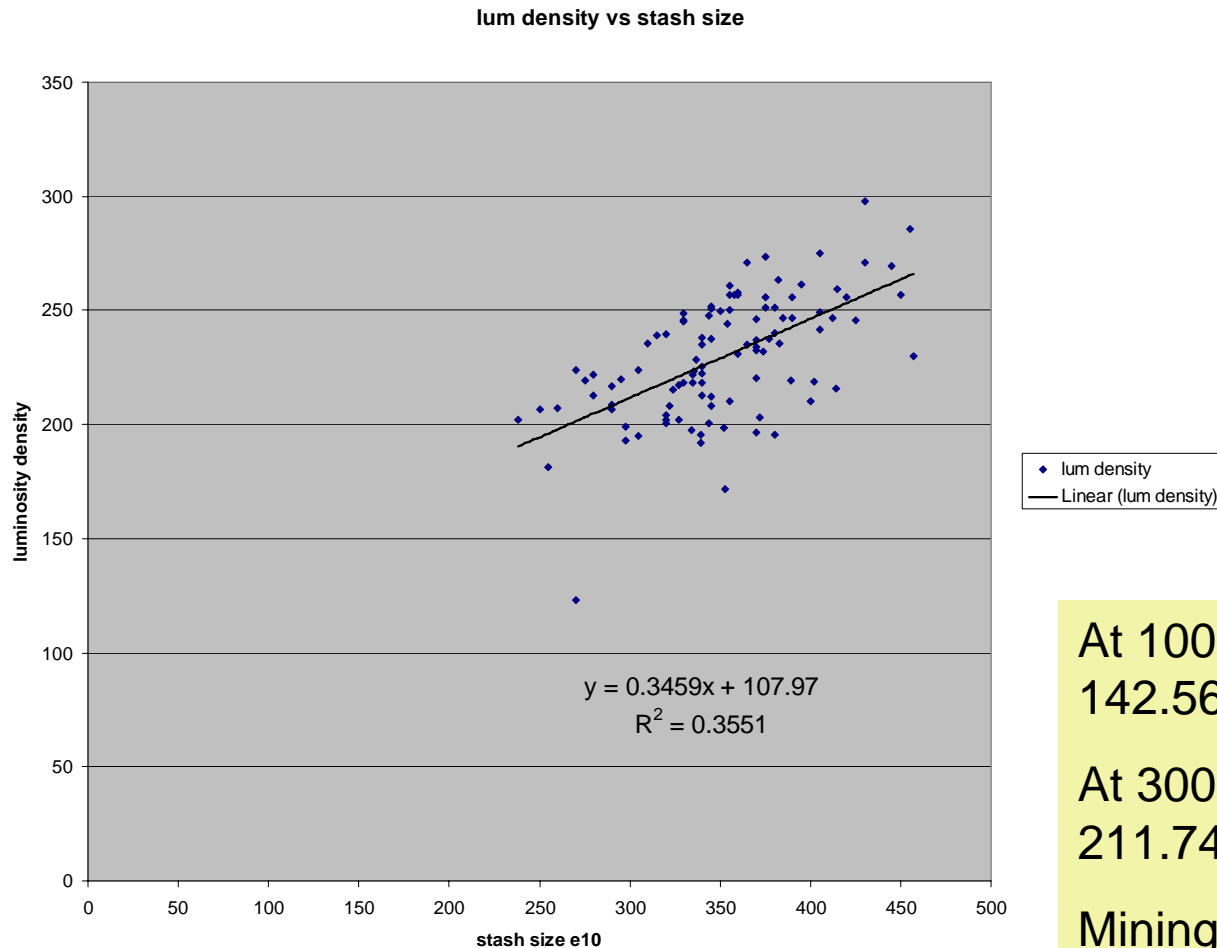
Mining efficiency for best 39 initial luminosity stores

31 RR unstacking fraction vs store number



Average: 93.2%

luminosity density vs stash size for 103 stores with initial luminosity gt 2E32



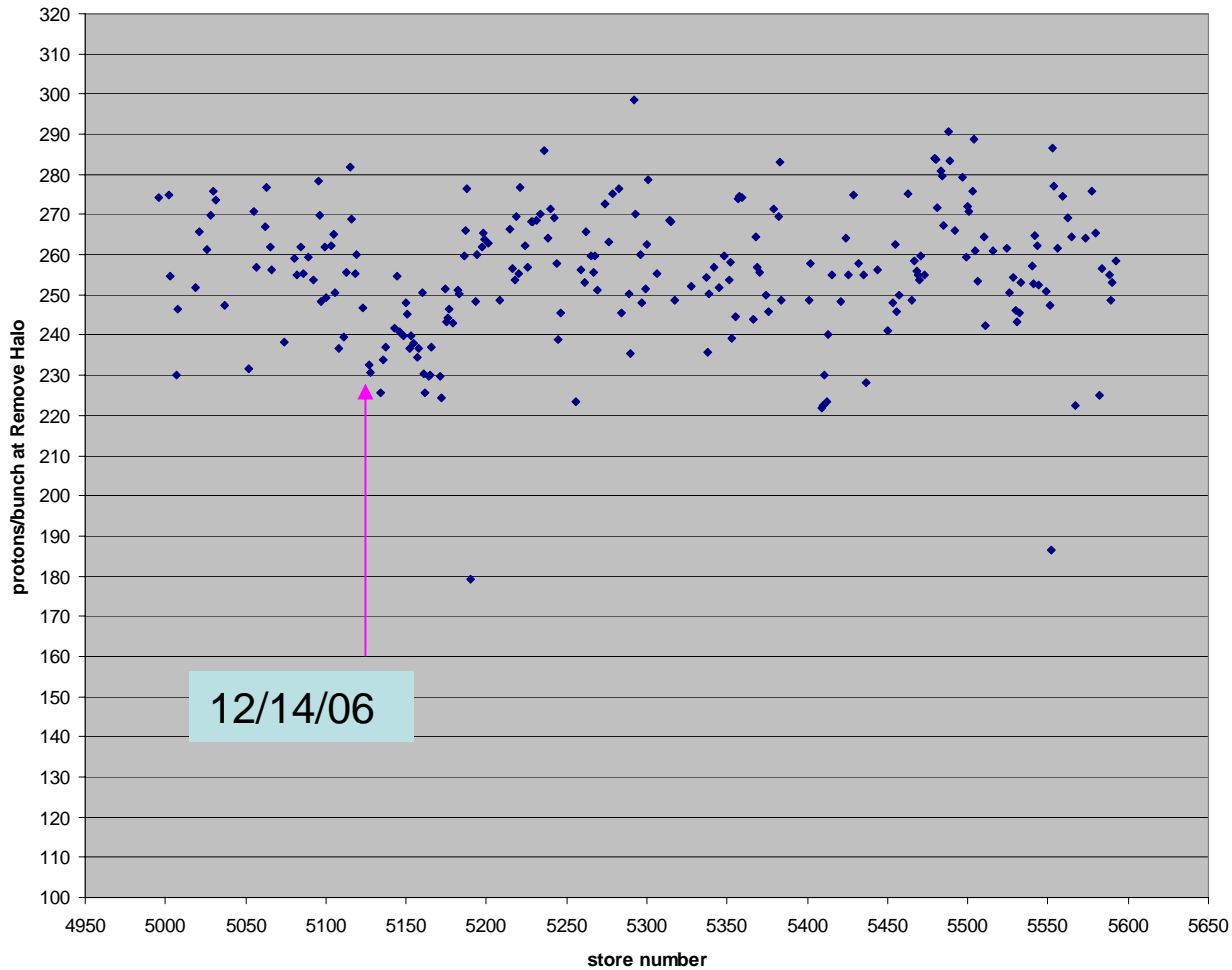
At 100 E10 stash:
142.56

At 300 E10 stash:
211.74

Mining eff: 93.66%

Protons per bunch at Remove Halo, stores 4996-5592

10/01/06-08/05/07



12/14/06

AVG for last 50 stores in FY06
(4859-4994): 256.4

AVG FY07: 255.59 1E09