

Cross-checking Beam Monitoring Records.

**Andy Blake, Cambridge University.
Data Validation, July 2010.**

or...

How often is the Big Green Button green?

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Overview

- **Have noticed that determinations of PoTs made directly from ACNET return slightly higher numbers than those performed (by me...) using MINOS offline database.**
 - For example, total PoTs for recent anti-neutrino running:
 - ◇ ACNET: 1.76e20 PoTs.
 - ◇ MINOS DB: 1.73e20 PoTs.
 - It's a small difference, but actually bigger than all other losses! (other losses: beam quality, no physics run, bad readout etc...)
- **To investigate one possible contribution to PoT difference, search for gaps in beam monitoring data in offline database.**
 - Method: count fraction of near detector spills with no associated beam monitoring data.

Cross-Checking Beam Monitoring

- **Cross-check beam monitoring records (BeamMonSpill) using near detector spills (SpillTimeND), whose times are also stored in the offline database.**
 - Assume that SpillTimeND record is complete, with no gaps!
 - ◇ Haven't checked this...
 - Assume that each ND spill record should be accompanied by a beam monitoring record.
 - ◇ Not sure whether this should always be true...
 - Count fraction of ND spills with no associated beam record.
 - ◇ Use time window of 1 second to make association.

Results (I)

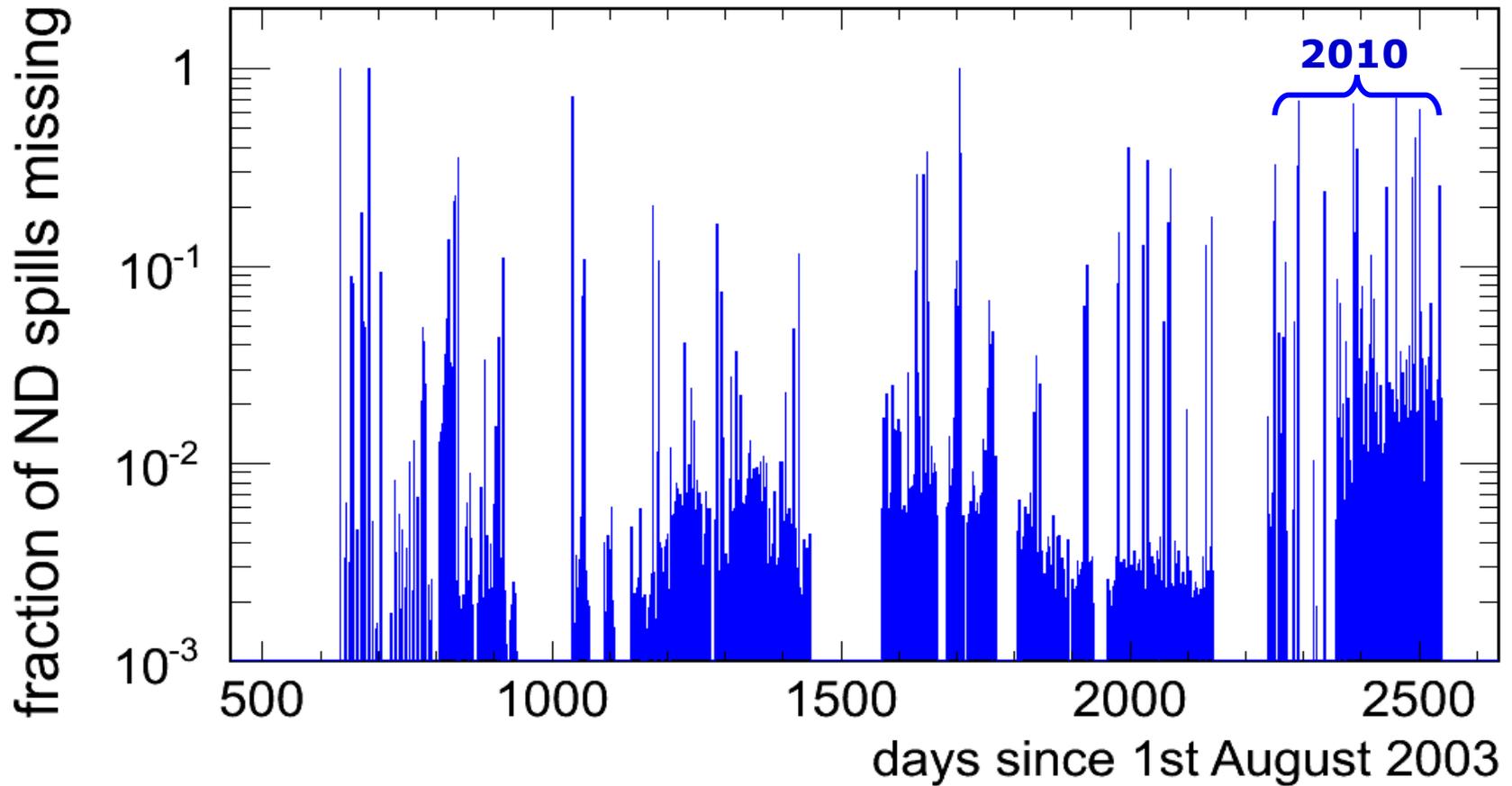
Year	NearDet Spills	Near Det Spills with no matching Beam Mon Spills	Fraction of spills with no beam monitoring
2005	5,985,400	92,800	1.5%
2006	6,236,700	44,000	0.7%
2007	7,435,500	57,400	0.7%
2008	8,882,000	115,300	1.3%
2009	9,081,700	152,800	1.7%
2010	6,363,000	225,700	3.5%

Note: numbers in this column increasing disproportionately!



Results (II)

Trend in data: Occasional spikes, with varying low-lying background level.
Background level used to be $<1\%$, but is now $\sim 3\%$.



Summary

- **Rate of near detector spills with no associated beam monitoring has increased this year.**
 - Rate of gaps in database has increased to $\sim 3\%$.
 - See following appendix for year-by-year analysis of data.
 - Recent increase seemed to start on 12th January 2010 (slide 14).
 - ◇ The beam monitoring software was upgraded that day!
 - ◇ But this might just be a coincidence...

Appendix:
Year-by-Year Checks on Beam Monitoring.

