

FNAL Status/ Operations

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Fermilab

April 15, 2005

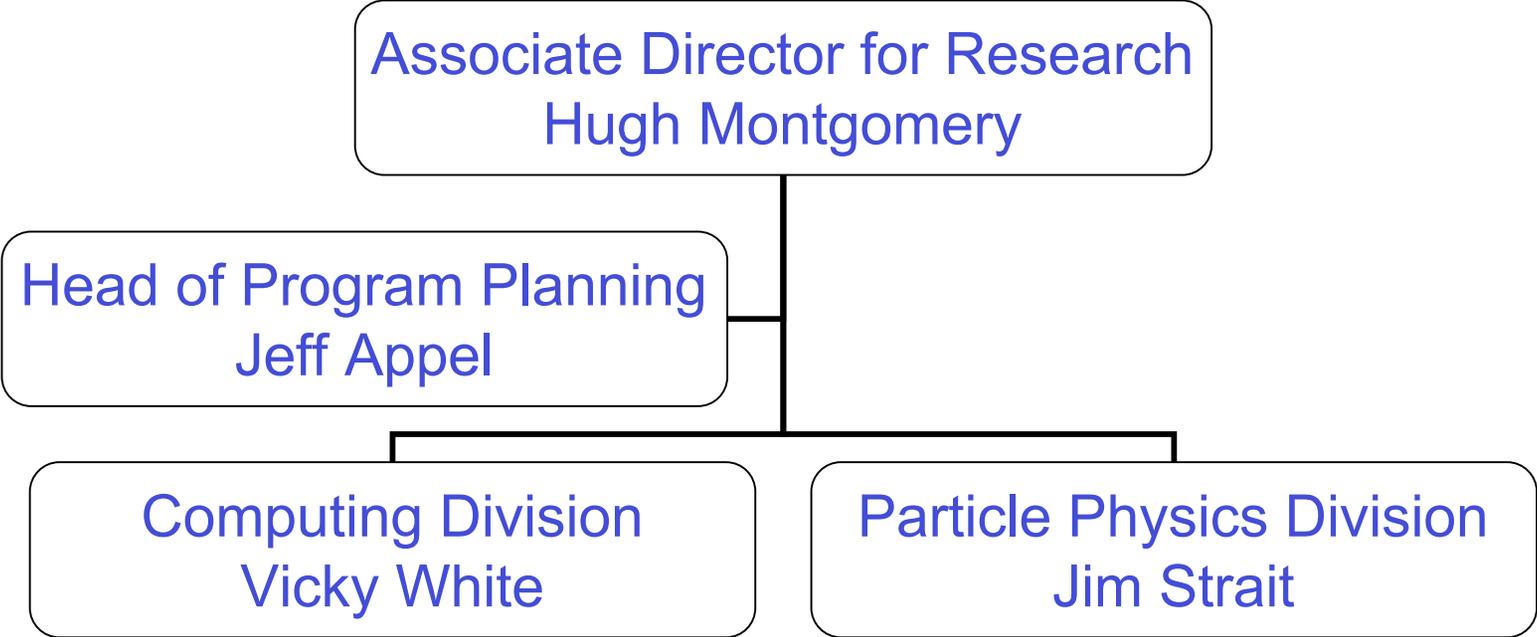
Physics Program

Associate Director for Research



- **Research Program**
 - **particle physics** which seeks to understand what are the fundamental components of our universe and how they interact
 - **complex of accelerators at Fermilab**
 - **accelerators elsewhere, LHC**
 - **Particle Astrophysics** - examining cosmic radiation; there are examples in which we use optical telescopes, charged particle detection, x-ray detection, and one in which we search for weakly interacting massive particle radiation
 - **theoretical physics**
 - **particle physics**
 - **Particle astrophysics**
 - **simulation, computation**
 - **Detectors**
 - **Lattice**
 - **Accelerators**

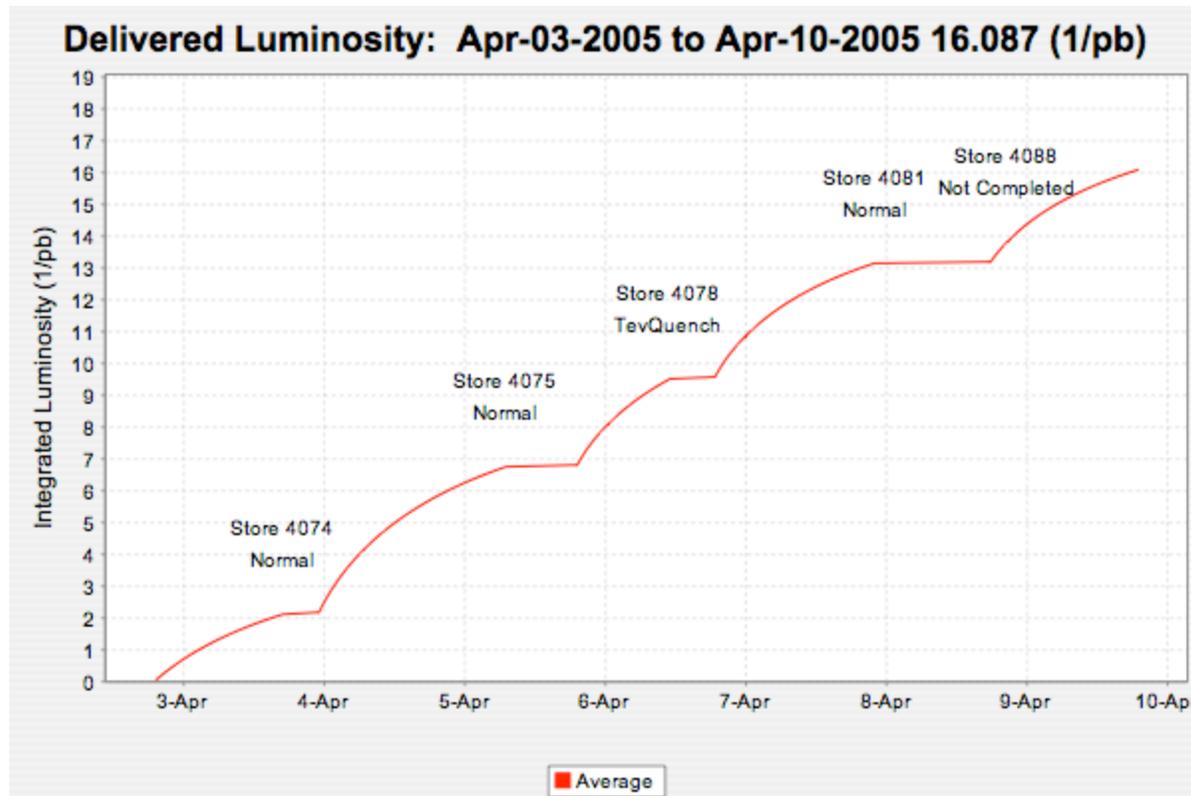
Line Management



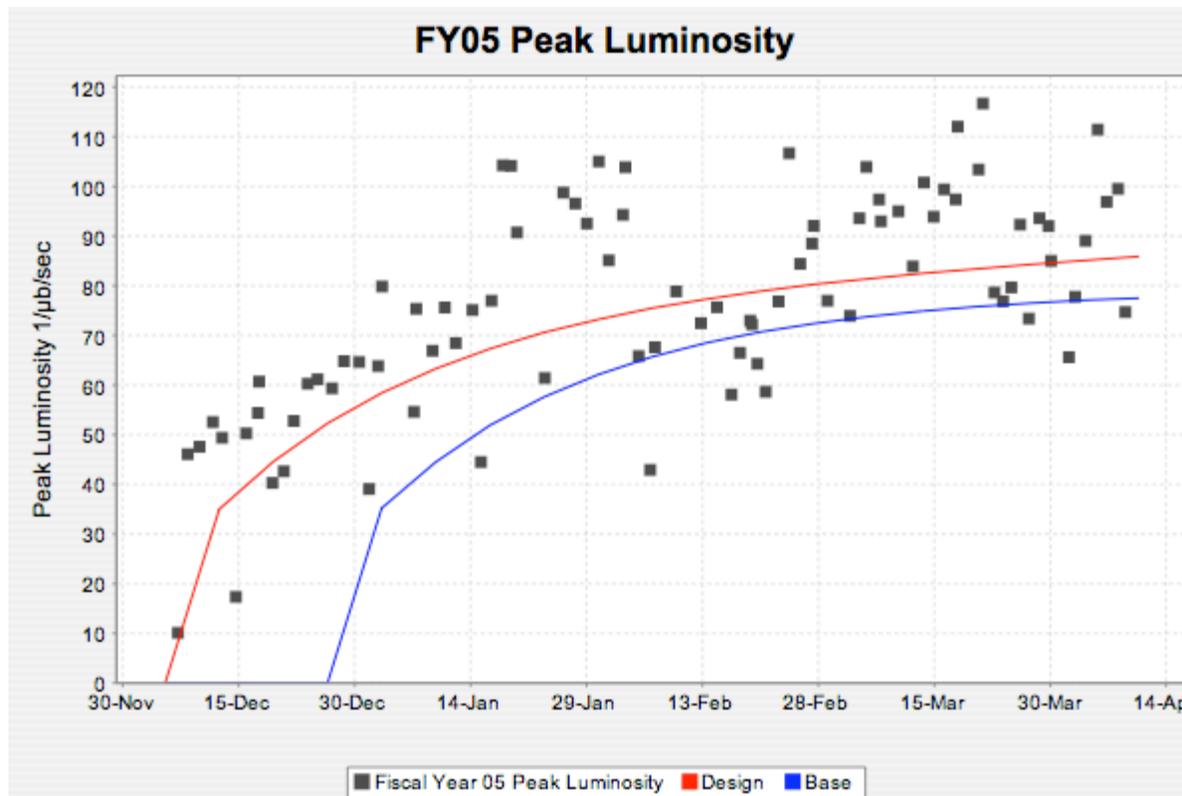
Scope of Operations Review: Physics Program

- Operations Review (March 29-31)
 - _ Operating experiments
 - _ Direct Support (no man is an island)
 - _ LHC Support
- Annual Program Review (May 24-26)
 - _ Theory
 - _ Particle Astrophysics
 - _ LHC Program
 - _ LC R&D
 - _ Detector R&D for Future Initiatives

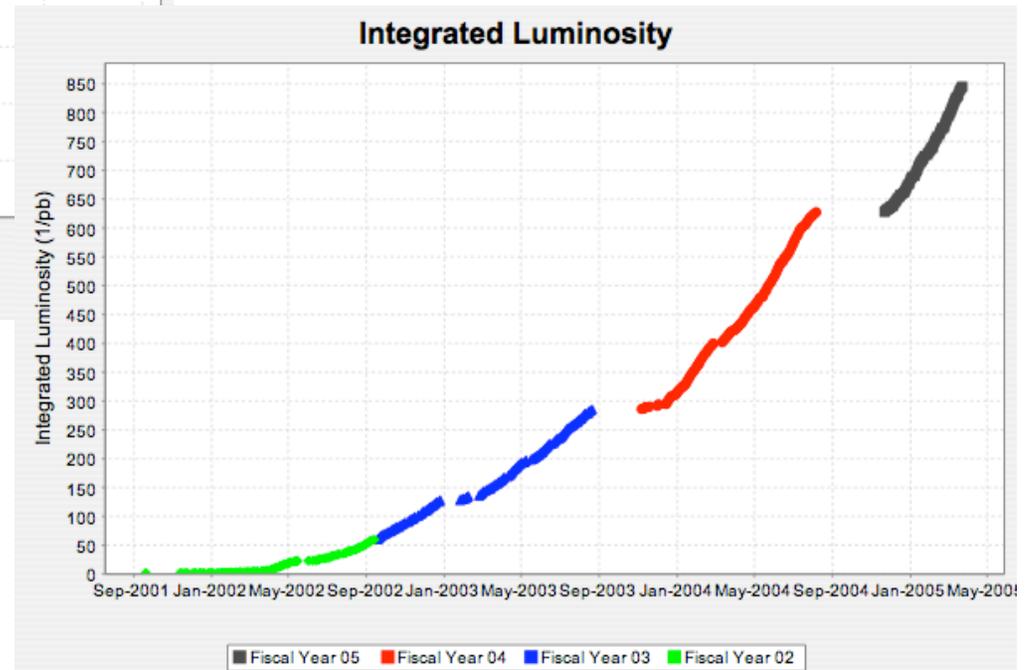
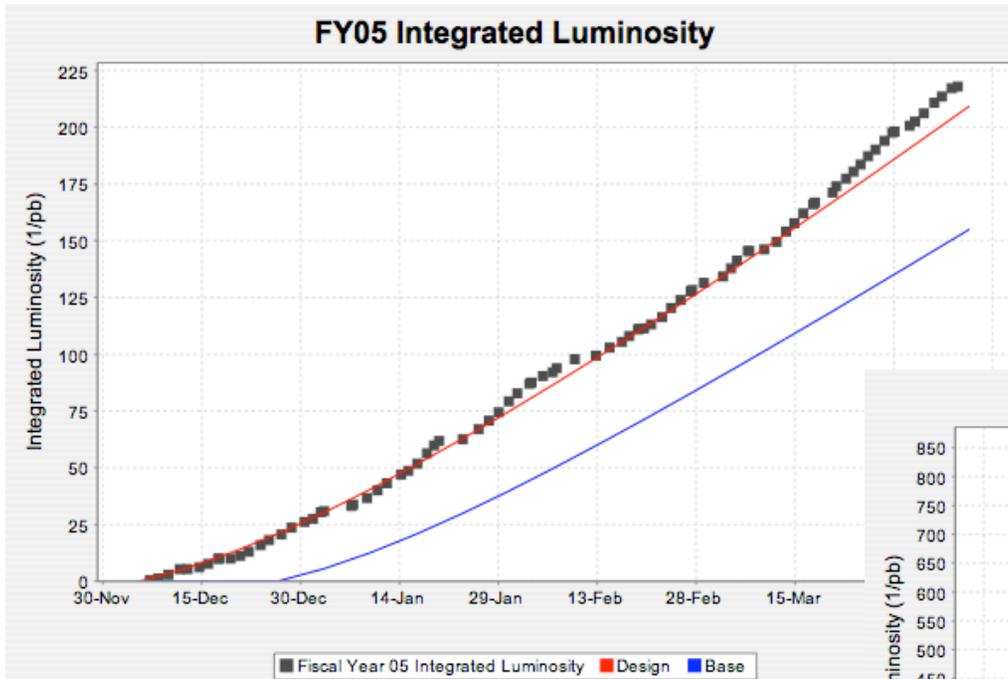
Tevatron



Tevatron

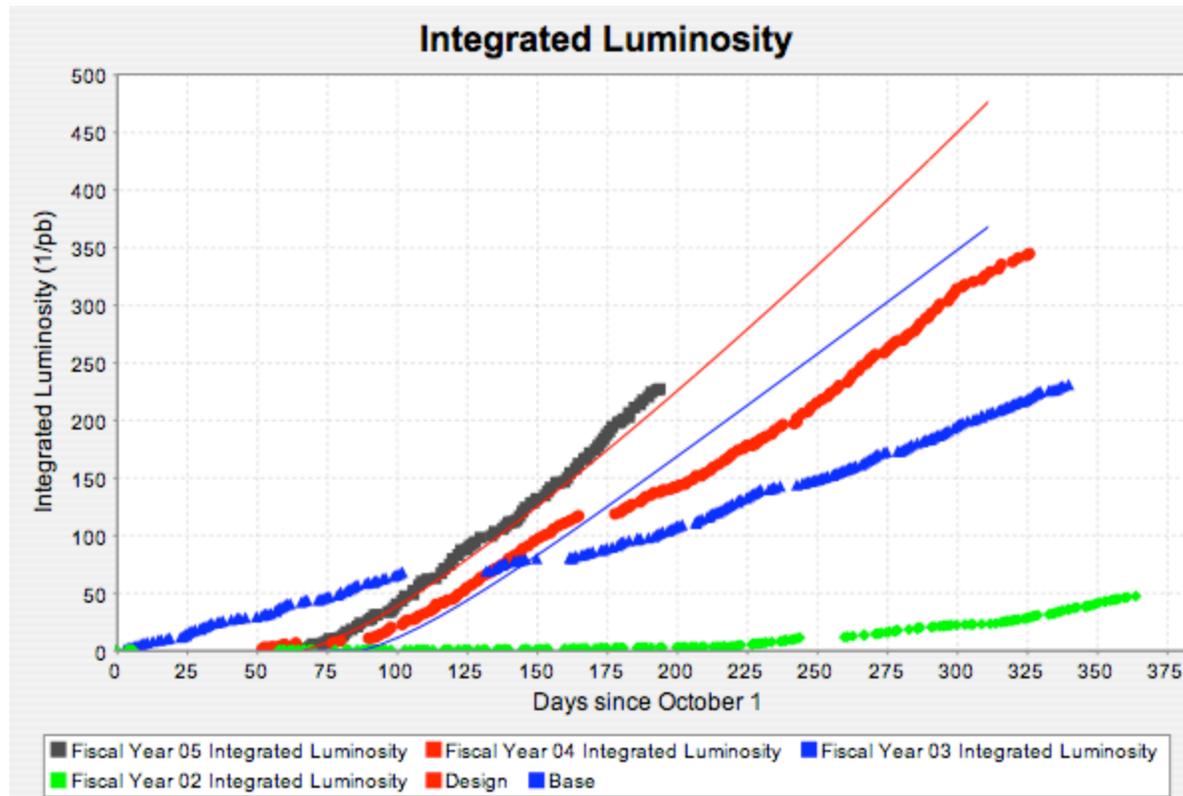


Tevatron



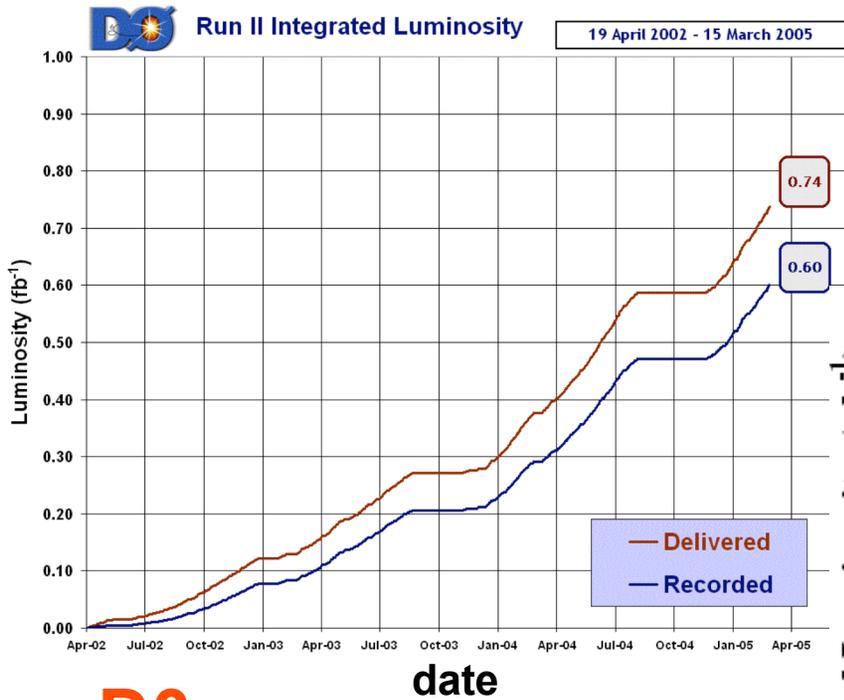
Tevatron

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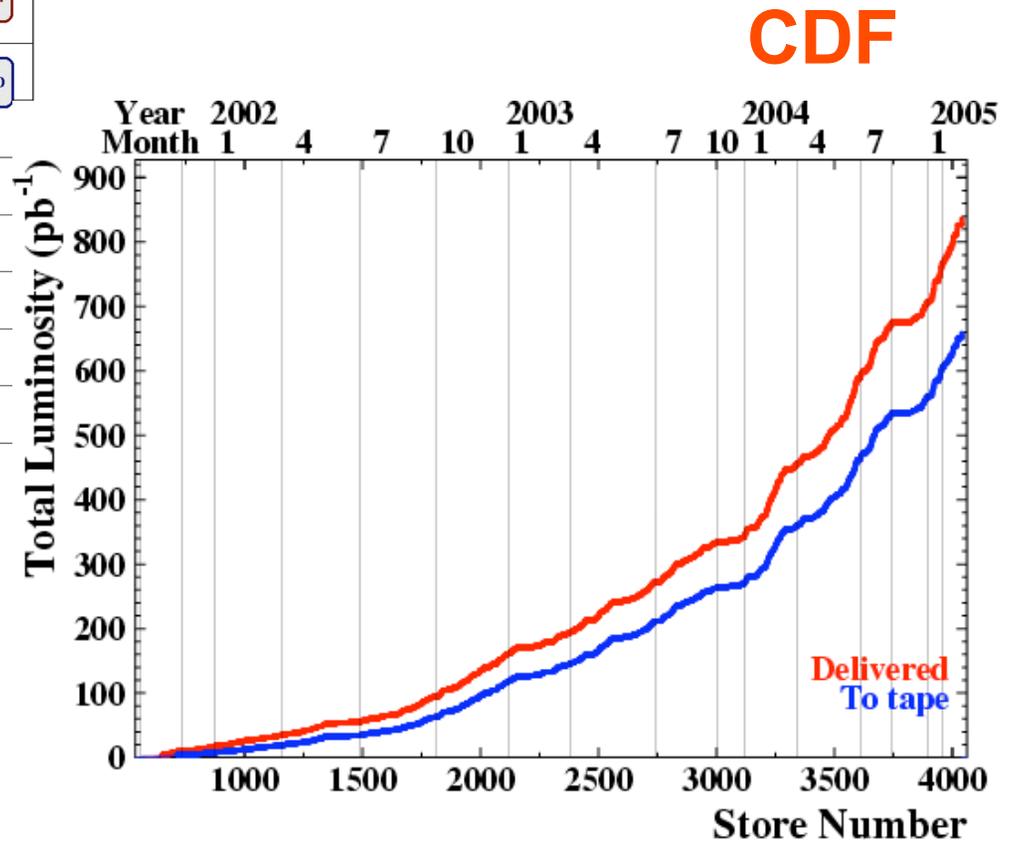


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Luminosity Delivered/Recorded

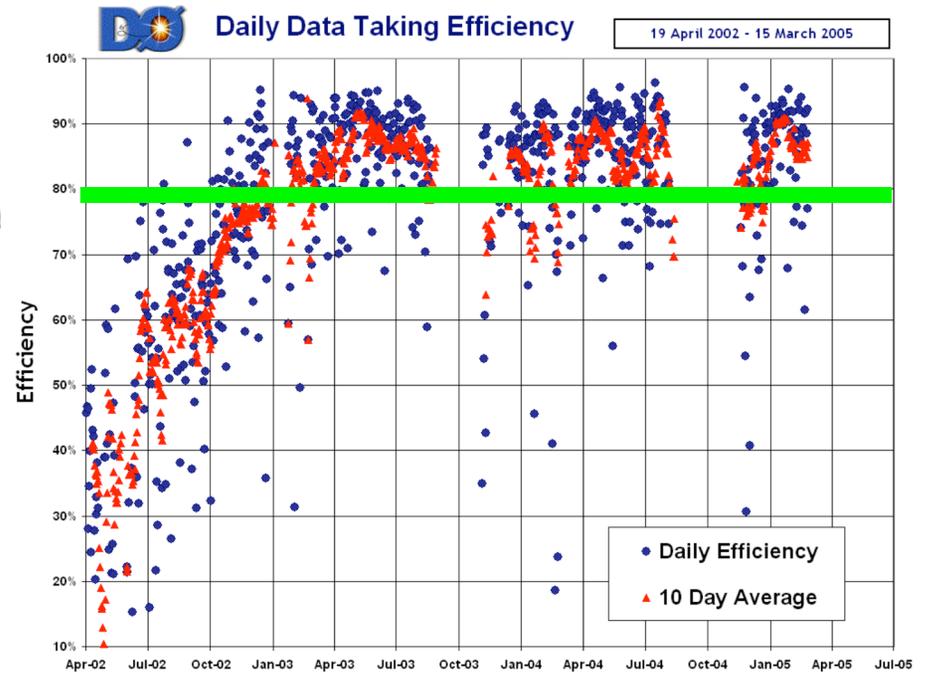
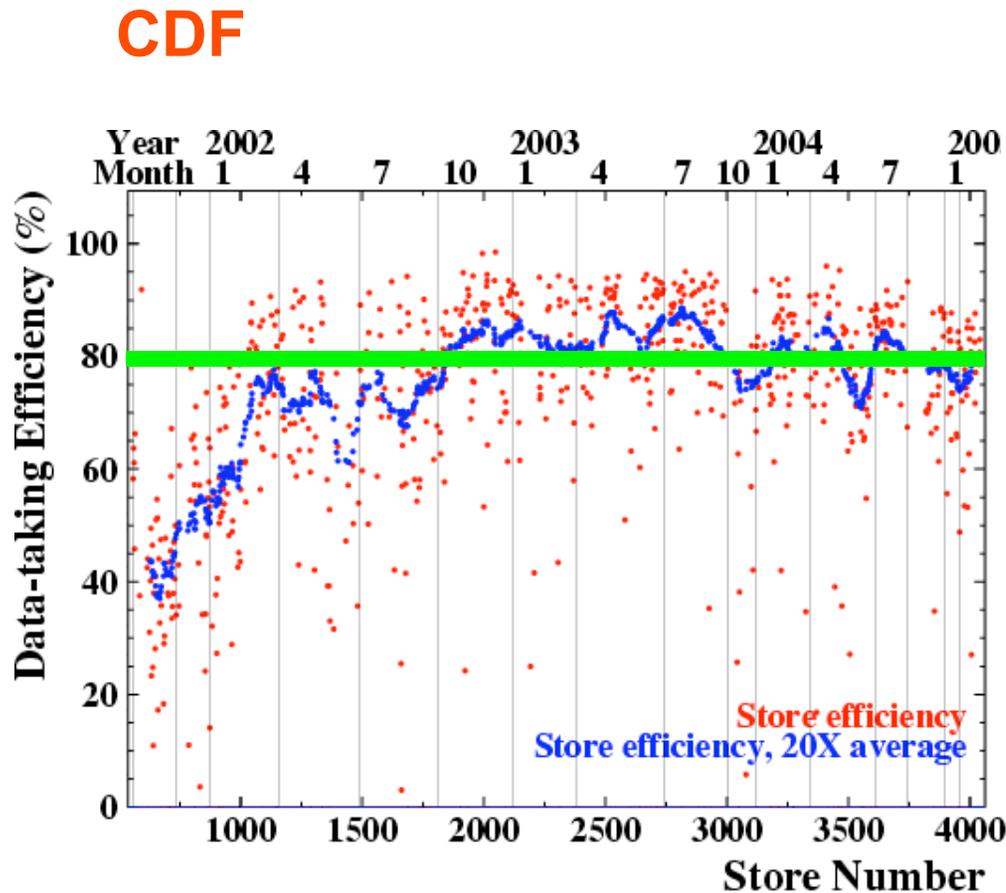


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Data Taking Efficiency

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Budgets – Physics Program

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Direct Costs

	<u>FY04</u>	<u>FY05</u>	<u>FY06 PBR</u>	<u>FY07 FLAT</u>	<u>FY08 FLAT</u>	<u>FY09 FLAT</u>
SUBTOTAL SWF	47,355.1	49,907.8	43,621.3	43,234.2	43,237.7	43,929.1
SUBTOTAL M&S	22,743.3	21,598.4	17,783.1	17,747.5	16,350.4	16,456.4
TOTAL SWF + M&S	70,098.4	71,506.3	61,404.4	60,981.8	59,588.1	60,385.5
SWF + M&S						
CDF/D-ZERO OPS & COMPUTING	22,648.8	23,472.2	23,725.6	24,269.9	22,849.2	23,044.6
CDF/D-ZERO UPGRADES	4,923.8	3,129.9	613.1	53.5	0.0	0.0
BTeV SUPPORT and CLOSEOUT	1,904.2	5,948.0	0.0	0.0	0.0	0.0
EXPERIMENTAL INITIATIVES & EXT BEAMS	1,379.6	1,083.7	882.6	815.4	817.5	824.6
MINIBOONE	334.6	326.3	451.6	391.4	391.6	394.3
NuMI / MINOS	4,335.6	3,240.6	3,020.0	3,078.5	3,136.5	3,204.4
OTHER DIRECT SUPPORT	31,552.3	30,886.4	28,812.3	28,322.4	28,322.4	28,590.9
LHC SUPPORT KA 11 01	3,019.5	3,419.3	3,899.3	4,050.6	4,070.9	4,326.8

- Note that Flat means a reduction of 4% per annum
- >20% reduction over this period beyond what you see

Strategy I

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- Current Operations maintained flat-flat
 - _ Collider
 - _ Neutrinos
- Protect LHC Support
- Salaries Wages and Fringe Costs
 - _ In general will reduce with inflation
- Materials and Services
 - _ Identify specific reductions

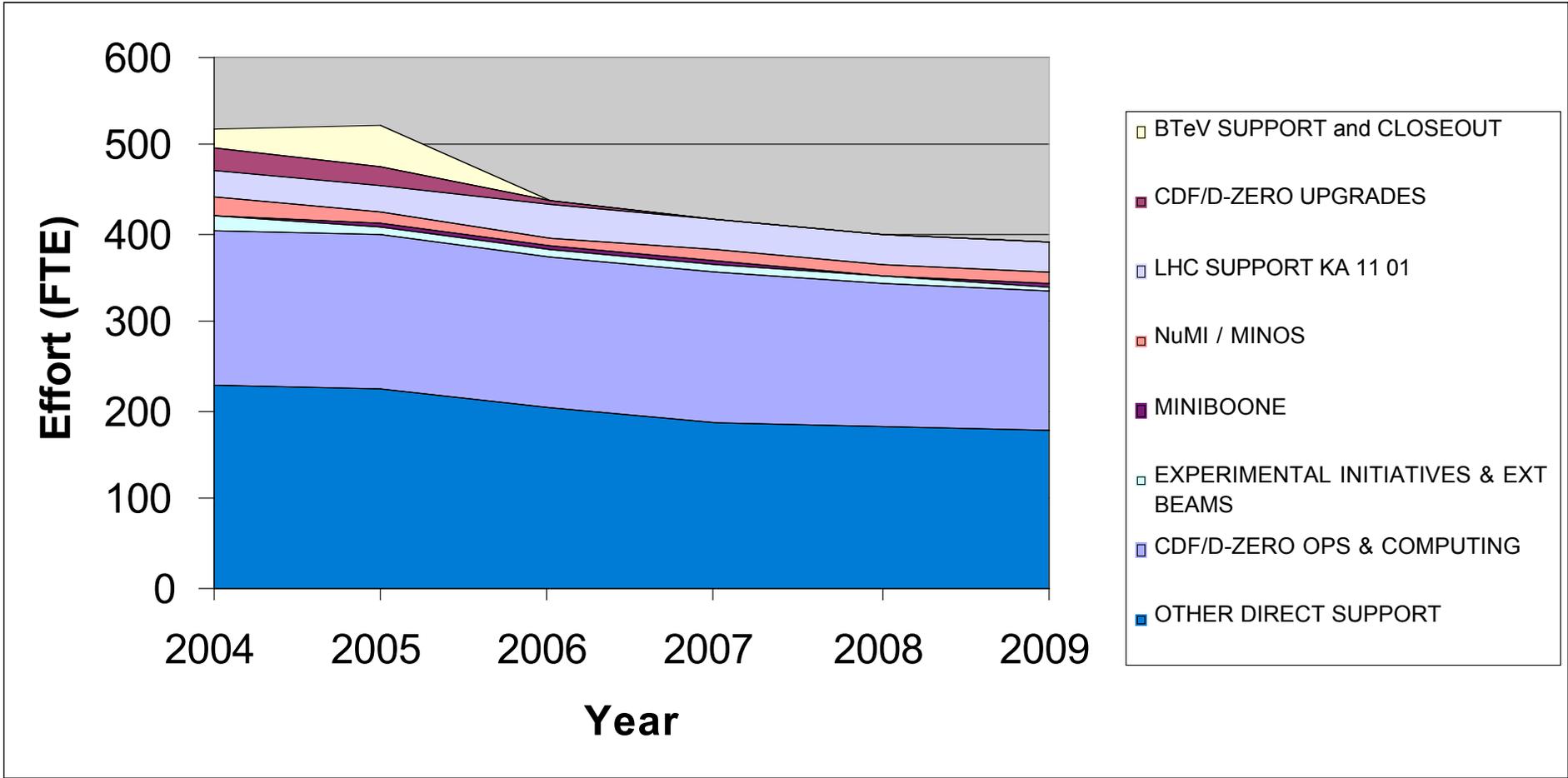
Strategy II

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- Collider Operations
 - _ Hold Flat (- 4% per year) to 08
 - _ Mitigate by improved efficiency?
 - _ Start to see a roll off in FY2008, FY2009
- NuMI MINOS makes transition to Flat Operations
 - _ FY2004, 2005 contain transition from project to Soudan Operations
- Other Direct Support Decreases; given the effects of inflation, this is dramatic for some areas
- LHC Support Shows slight rise
 - _ Expect migration of physicists into CMS
 - _ Try to provide inflation in SWF

Staffing – Physics Program

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Accomplishments



- **Collider Experiments**
 - _ Some detector issues mitigated
 - _ Some Upgrades already implemented
 - _ Data taking efficiencies maintained, tightened in range near 90%
- **Collider Computing**
 - _ Initial Data Processing keeping pace
 - _ Data analysis computing adequate
 - _ External computing contributions integrated
- **Neutrino Operations**
 - _ MiniBooNE operations maintained
 - _ MINOS Operations being established

Risks / Challenges

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- **Flat _ Flat Budgets imply reduction**
 - _ We strive to maintain a match between work force and program (balance M&S and SWF)
 - _ In Flat-Flat scenario for 5 years we necessarily reduce the program
- **Maintenance of Collider Collaboration Effort**
 - _ Transition management
 - _ Fermilab maintaining the effort
 - _ LPC as mitigation
 - _ Exposure to external pressures
- **Computing Infrastructure**
 - _ Power and cooling limitations of installed infrastructure is limited
 - _ Need expansion

Mitigations

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- Flat Budgets
 - _ Convince someone that without a present, one cannot build a future
- Maintenance of Collider Collaboration Effort
 - _ Better efficiency in operations (automation)
 - _ MOU management
- Computing Infrastructure
 - _ Aggressive GPP Program
 - _ Supplemented from operations budget

Collider Collaboration Commitments

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- Both collaborations had an extensive suite of pre-existing MOUs from circa 2001
- CDF has completed a new cycle of MOU discussions with large fraction of institutions for period through 2007.
- D0 has nearly completed a bottoms up estimate of needed effort and will start to generate the corresponding MoUs.
- We have been discussing progress in this area over the past couple of months, Assoc. Dir., Division Management, FNAL Dept. Hds, both Experiments, Spokes, Tech. Coords, Project Managers.
- We think that annual renewal of MOUs is too burdensome, will go to two years.

LHC Support –Program Wide

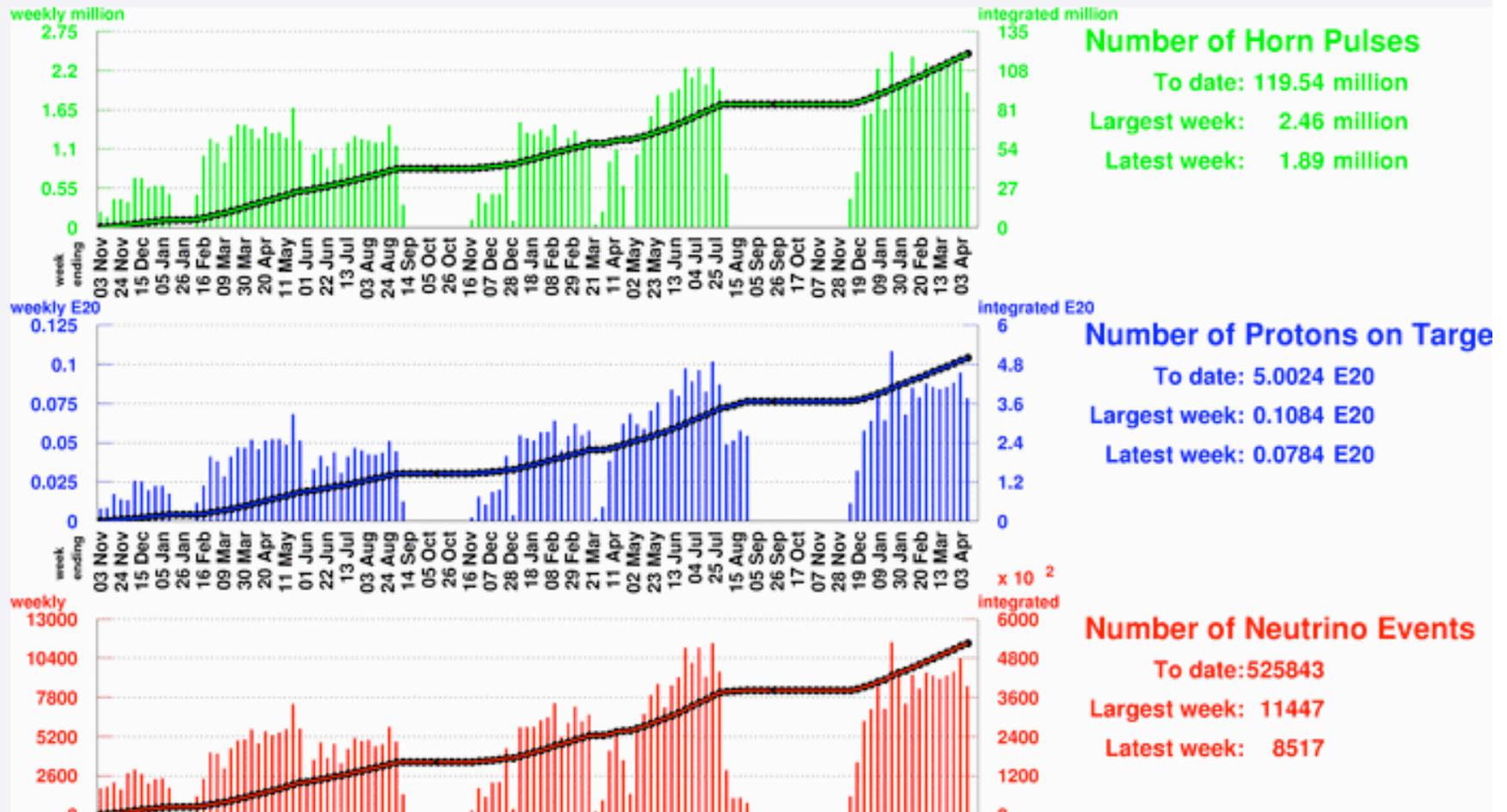
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- CMS is an integral part of Fermilab Physics
 - _ Physicists, their support
 - _ Postdocs, started in past year
 - _ LHC Physics Center
 - Infrastructure
 - Synergy
 - Part of managing the transition Tevatron to

<u>FY04</u>	<u>FY05</u>	<u>FY06 PBR</u>	<u>FY07 FLAT</u>	<u>FY08 FLAT</u>	<u>FY09 FLAT</u>
3,019.5	3,419.3	3,899.3	4,050.6	4,070.9	4,326.8

MiniBooNE Beam Delivery

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Conclusions

- Past Year was very successful for the Collider experiments
- Neutrino Program has expanded
- Future has challenges for management
- Future continues to hold great promise for collider physics.
- Advances in luminosity are driven by advances in the use of the Recycler. The electron cooling hardware is all in place and operational. Introduction of electron cooling “ will be a process” , not an event.
- Fermilab continues to be committed to the Tevatron Collider program, and expects that it is not alone.

Direct Support – Program Wide

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Infrastructure

	<u>FY04</u>	<u>FY05</u>	<u>FY06 PBR</u>	<u>FY07 FLAT</u>	<u>FY08 FLAT</u>	<u>FY09 FLAT</u>
<u>Other Support (Direct)</u>	3,398.2	3,430.3	3,342.3	3,438.0	3,438.0	3,460.4
Buildings/Facilities	2,697.0	2,637.8	2,559.7	2,625.4	2,625.4	2,640.9
ES&H	701.2	792.5	782.6	812.7	812.7	819.4

Infrastructure support from GPP, eg for satellite Computing centers is vital to the program

Management

	<u>FY04</u>	<u>FY05</u>	<u>FY06 PBR</u>	<u>FY07 FLAT</u>	<u>FY08 FLAT</u>	<u>FY09 FLAT</u>
Management/Supervision	5,688.6	6,102.2	6,001.7	6,158.3	6,158.3	6,207.1
General Purpose Equipment and Support	32.3	96.1	96.6	96.6	96.6	96.6
Computing Support/Information Systems	1,706.1	1,799.6	1,868.3	1,925.8	1,925.8	1,944.1
Training and Education	339.3	322.6	257.2	267.2	267.2	270.5

Safety is an integral part of line management in the Divisions
_ they are doing a superb job.