



Run IIb DZero PMG April/May '03 Reporting Period

- Silicon update (Ginther - 15')
- Trigger update (Padley - 15')
- Project status/update (O'Dell - 15')
- Closing remarks (Kotcher -10')

Jon Kotcher
Fermilab PMG
July 15, 2003



Run IIb Project Organization

DO Run IIb Project
J. Kotcher, Project Manager
R. Partridge, Deputy; V. O'Dell, Associate; W. Freeman, Assistant
M. Johnson, Technical Coordinator
E. Arroyo, Budget Officer; T. Erickson, Administration

**WBS 1.1
Silicon**
M. Demarteau
G. Ginther

1.1.1 Sensors
R. Demina, F. Lehner

1.1.2 Readout System
A. Nomerotski, E. von Toerne

1.1.3, 1.1.5 Mechanics & Assembly
W. Cooper, K. Krempetz

1.1.4 Production
J. Fast

1.1.4 QA, Testing, & Burn-in
C. Gerber

1.1.6 Monitoring
M. Corcoran, S. de Jong

1.1.7 Software & Simulation
F. Rizatdinova, L. Shabalina

1.1.8 Administration
(M. Demarteau)

**WBS 1.2
Trigger**
P. Padley
D. Wood

1.2.1 L1 Cal Upgrade
M. Abolins, (H. Evans),
P. LeDu

1.2.2 L1 Cal/Track Match
K. Johns

1.2.3 L1 Track Trigger
M. Narain

1.2.4 L2 β Upgrade
R. Hirosky

1.2.5 Silicon Track Trigger
U. Heintz

1.2.6 Simulation
M. Hildreth, E. Perez

1.2.7 Administration
(D. Wood)

**WBS 1.3
DAQ/Online**
S. Fuess
P. Slattery

1.3.1 Level 3 Systems
D. Chapin, G. Watts

1.3.2 Network & Host
Systems
J. Fitzmaurice,
S. Krzywdzinski

1.3.3 Control Systems
F. Bartlett, G. Savage,
V. Sirotenko

1.3.4 DAQ/Online
Management
(P. Slattery)

**WBS 1.4
Project
Administration**

**WBS 1.5
Installation**
R. Smith

1.5.1 Silicon Installation
Mechanical:
H. Lubatti
Electronics:
L. Bagby, R. Sidwell

1.5.2 Trigger Installation
D. Edmunds



L1 Calorimeter Trigger Personnel

- As of mid-June, Saclay dropping out of production of ADC-Digital Filter Boards (ADF) for L1 Calorimeter Trigger
 - ◆ Cold feet regarding Tevatron schedule
 - ◆ Their engineer designed, built ADF prototype
 - ◆ Have committed to completion of prototype and analysis of data from integration test this summer/fall
- Discussions have been underway since ~ January with a number of university groups about taking on this responsibility
 - ◆ Meeting in July/Aug with principals to resolve new roles
 - ▲ Taking on another's design not usual approach
 - ▲ Time constraints do not allow full rework
 - ◆ Want to redefine sub-project prior to integration test
 - ◆ Making additions to support to this sub-project as well
 - ▲ Software, commissioning, etc.



MoUs/FY03 SoWs in Queue

- **Kansas State University - \$8k EQU, \$105k R&D**
 - ◆ Sensor irradiation, testing, probing
 - ◆ Silicon readout cards (purple, adapter), cables, backplanes
 - ◆ Awaiting Directorate signature
- **Boston University - \$138 EQU**
 - ◆ Procure DFEA pre-production FPGA's for Central Track Trigger
 - ◆ Procure boards (link transmitter, STC module, etc.) for Silicon Track Trigger
 - ◆ Awaiting Directorate signature
 - ◆ Also, method for covering extension of sabbatical for Ulrich Heintz under discussion
- **University of Rochester - \$55k EQU**
 - ◆ Probe station setup, layers 0/1 sensor probing
 - ◆ Silicon sub-project administration
 - ◆ In PPD/Laboratory's hands



Run IIb Financial Status

as of end May '03 - provided to PAC

- Equipment Funds:

- ◆ Project was allocated \$3,376k in equipment funds for FY03
 - ▲ Includes base M&S and labor costs, G&A, & escalation
 - ▲ Also includes FY02 carry-over, which was earmarked prior to baselining
 - ▲ \$2,876k in contingency was also allocated this FY
- ◆ Approval for equipment spending granted Feb '03
- ◆ Have obligated 51% (\$1,732k) to date
- ◆ Remaining \$1,644k will take us to Sep '03, assuming no contingency is needed
- ◆ Remaining \$1,644k + \$2,876k = \$4,520k will take us to end of calendar year (Jan '04), again assuming no contingency is required

- R&D Funds:

- ◆ Have obligated \$3.7M to date
- ◆ Funds exhausted, most R&D work complete

- In Kind:

- ◆ Have spent ~ \$2.5M to date
- ◆ This includes ~ \$2.0M spent on NSF MRI's (silicon and trigger)
 - ▲ Remainder consists of contributions from base grants at universities and other Laboratories (i.e., salaries of technical personnel)
- ◆ Total In Kind budgeted for Run IIb = \$4.1M (\$3.1M in NSF MRI's)

- Total obligations to date = \$7,932k



R&D and Equipment: Obligations, Costs To Date

AYk\$ - contingency, G&A, & in kind not included	M&S EQ	M&S R&D	M&S TOTAL	LABOR EQ	LABOR R&D	LABOR TOTAL	TOTAL EQ	TOTAL R&D	GRAND TOTAL
Funding need: Silicon	4703	1403	6105	3452	1458	4910	8155	2860	11015
Trigger	1235	22	1257	137	0	137	1372	22	1394
Online	652	0	652	229	0	229	881	0	881
Administrative	126	0	126	1022	0	1022	1148	0	1148
TOTAL	6716	1424	8140	4840	1458	6298	11556	2882	14438
Obligated to date	1678	1217	2895	354	1824	2178	2032	3041	5073
Fraction obligated to date	0.25	0.85	0.36	0.07	1.25	0.35	0.18	1.06	0.35
Costed to date	7	1016	1023	354	1824	2178	361	2840	3201
Fraction costed to date	0.00	0.71	0.13	0.07	1.25	0.35	0.03	0.99	0.22

R&D fully obligated
Equipment 18% obligated (M&S 25% obligated)



Run IIb Large Procurements

All single procurements over \$100k

Item	Cost (FY02 k\$)	Procurement Date
SVX4 2 nd Prototype Chip	158	04/04/03 (obligated)
Layer 2-5 Sensors	1,453	04/16/03 (obligated)
Layer 0 & 1 Sensors	316	07/14/03
SVX4 Production Chips	475	09/26/03
Layer 2-5 Production Hybrids	382	11/14/03
Analog Cables	167	12/10/03
Layer 2-5 Digital Jumper Cables	263	01/15/04
Twisted Pair Cables	256	08/30/04
TOTAL	3,470	

Layer 0/1
sensors
placed on
hold by
Directorate



All procurements >\$100k are associated with silicon sub-project only - none in trigger, DAQ/online

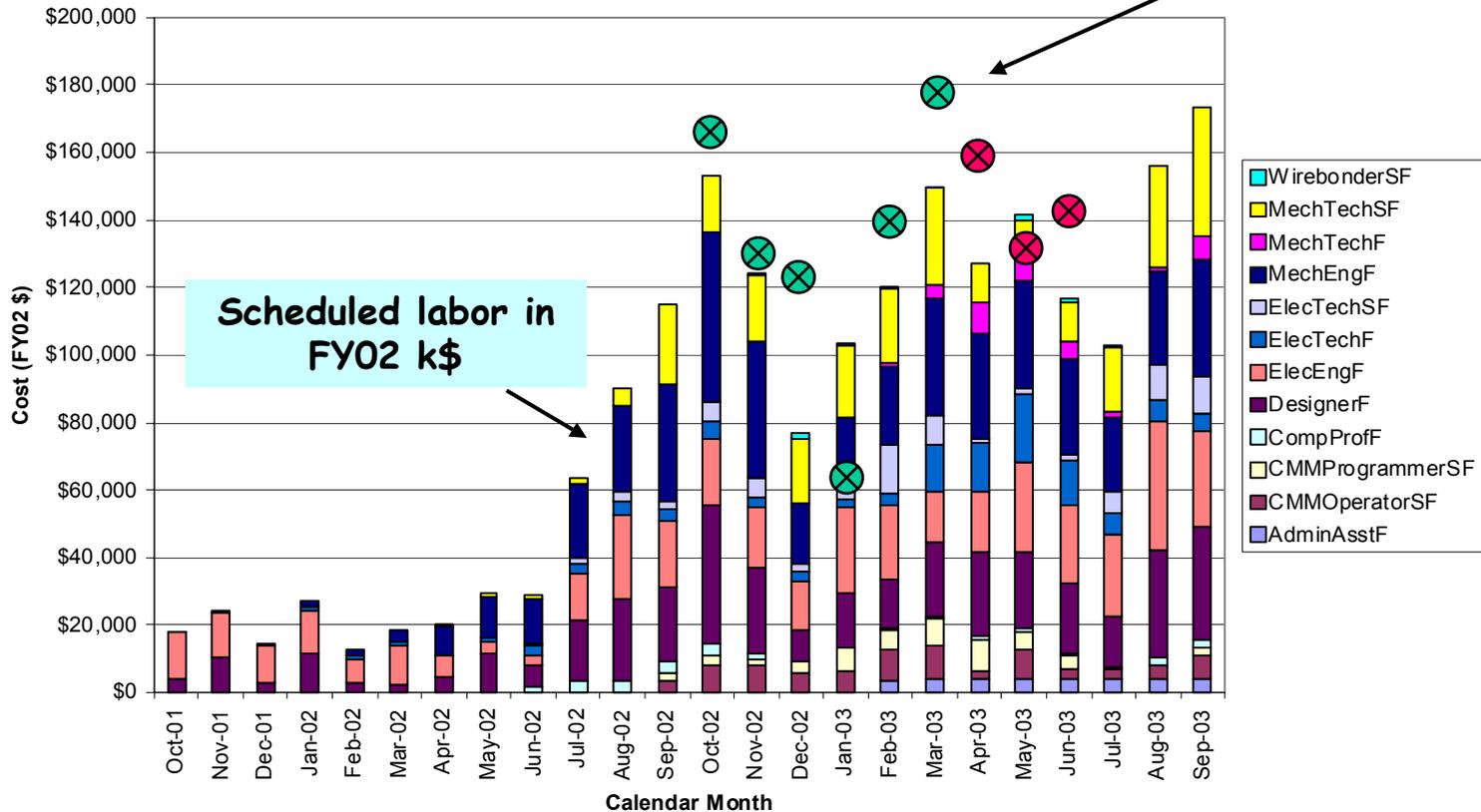


Labor Cost Extracted from Schedule vs. Actuals

Through June '03

FNAL Technical Labor
All Funding Sources
FY02 & FY03

Actuals in FY02 k\$



Numbers shown include EQ + R&D
Burdening not included



Update on Recent Studies

- Summarized in letter to Director on July 9
- Study assuming complete loss of sensitivity in Layer 1 of current detector gives 40% drop in double b-tagging efficiency
 - ◆ Additional factor of 1.7 for increased sensitivity with Run IIb detector - X3 overall relative to degraded IIa device
- Higgs sensitivity yields 20% improvement over previous Working Group results
 - ◆ First steps, more will follow - we will get smarter
- Reconsideration of installation schedule allows Tevatron start up 3 months into shutdown
 - ◆ Double-shifting, reassessed logic of some key tasks in MS Project
 - ◆ Silicon and beam pipe hooked up after 3 months, an additional 1 month needed for completion of technical commissioning
 - ◆ Fleshing out geographical constraints, supervisory & other labor needs, full commissioning approach in MS Project
 - ◆ Believe remaining physics commissioning can be done in an additional 2-3 months: **6-7 months total to physics**
 - ◆ Will require serious commitment from Laboratory & collaboration
- Collaboration remains strongly behind upgrade, physics opportunity



Does Resolving Run IIb Matter?

- Morale not great, but project continues to move forward
- Uncertainty of people's futures weighing increasingly heavily throughout experiment, IIa as well as IIb
 - ◆ Particularly on the younger set
- Everyone in a position of authority that I've spoken with has a different notion of when a decision will be made, how, and by whom
- Project personnel deserve to have this decided quickly, decisively



Conclusions

- Technical progress continues to be excellent
- Project personnel, and experiment, remain dedicated to seeing the upgrade through to completion
- Ongoing studies continue to underscore DZero's need to upgrade its silicon, and its ability to accommodate more restrictive shutdown
- Obligations-to-date roughly consistent with elapsed calendar time, predicted project duration
- Cost accruals, schedule change control have been integrated as part of monthly "statussing" procedure



Total Project Cost in AY k\$

Includes G&A, contingency, & escalation

AY k\$	Base	Cont %	Cont	Total
Silicon	15986	31	4904	20890
Trigger	3276	37	1216	4492
Online	1062	31	332	1393
Administrative	1463	25	366	1829
TOTAL PROJECT COST	21787	31	6818	28604

Cost by subsystem

AY k\$	M&S +				Cost+				Total				
	R&D		Cont		Cont		M&S +		Cont		Total		
	Cost	G&A	%	Cont	Total	R&D	FNAL	G&A	%	Cont	Total	Labor	Total
Silicon	8589	1082	32	3084	11673	12755	4910	1405	29	1820	6730	8135	20890
Trigger	2877	223	37	1151	4028	4251	137	39	37	65	202	241	4492
Online	652	116	29	223	874	990	229	66	37	109	338	404	1393
Administrative	126	22.3	25	37	163	185	1022	293	25	329	1351	1644	1829
TOTAL PROJECT COST	12243	1442	33	4495	16738	18180	6298	1803	29	2323	8621	10424	28604

Cost broken out into M&S + R&D, FNAL labor

Fermilab escalation, G&A rates applied

FNAL ESCALATION RATES		FY01	FY02	FY03	FY04	FY05	FY06
EQUIPMENT	BY YEAR	-2.9%	N/A	2.3%	2.8%	2.7%	2.6%
	CUMULATIVE	0.971	1	1.023	1.052	1.080	1.108
LABOR	BY YEAR	-4.0%	N/A	4.0%	4.0%	4.0%	4.0%
	CUMULATIVE	0.960	1	1.040	1.082	1.125	1.170

	EQUIPMENT	LABOR
G&A	17.72%	28.62%

Total Project Cost = \$28,604k
Includes total contingency of 31% (\$6,818k)



Obligation Profiles in AY k\$

Obligation Profile in AY k\$ (by subsystem)	FY01	FY02	FY03	FY04	FY05	FY06	TOTAL
Silicon (incl. G&A and FNAL labor)	17	1326	3407	5079	2463	168	12459
Trigger (incl. G&A and FNAL labor)	0	468	947	660	1135	40	3251
Online (incl. G&A and FNAL labor)	0	0	64	311	377	311	1062
Administration (incl. G&A and FNAL labor)	0	0	274	399	413	377	1463
Sub Total	17	1794	4693	6449	4387	895	18235
R&D (incl. G&A and FNAL labor)	0	1360	2191	0	0	0	3552
Contingency	0	0	2285	2567	1701	265	6818
Total Project Cost	17	3154	9169	9016	6088	1160	28604
Percentage by FY	0	11	32	32	21	4	

Obligations by subsystem w/R&D and contingency broken out

Obligation Profile in AY k\$ (by funding type)	FY01	FY02	FY03	FY04	FY05	FY06	TOTAL
M&S (incl. cont and In-Kind contr.)	17	1794	4973	4979	3033	367	15163
R&D (incl. cont. on R&D)	0	649	926	0	0	0	1575
FNAL Labor (M&S and R&D, incl. Cont)	0	464	2217	2999	2325	617	8621
G&A (on M&S and R&D)	0	248	1053	1038	730	176	3245
TOTAL	17	3154	9169	9016	6088	1160	28604

Obligations broken out by funding type

Tables include G&A, contingency, & escalation



Funding Need in AY k\$

Includes G&A, contingency, & escalation

TPC, Obligation Profile In AY k\$	FY01	FY02	FY03	FY04	FY05	FY06	TOTAL
Silicon (incl. Cont + G&A)	17	1326	4860	7165	3443	230	17040
Trigger (incl. Cont + G&A)	0	468	1363	946	1630	56	4462
Online (incl. Cont + G&A)	0	0	84	407	499	404	1393
Administration (incl. Cont + G&A)	0	0	343	499	516	471	1829
Total (excl. R&D)	17	1794	6650	9016	6088	1160	24724
R&D (incl. Cont + G&A)	0	1360	2519	0	0	0	3880
Total Project Cost	17	3154	9169	9016	6088	1160	28604
DOE M&S	0	0	4025	4160	2507	367	11060
DOE SWF	0	0	1045	2999	2325	617	6986
DOE G&A	0	0	631	1038	730	176	2575
TOTAL DOE EQ	0	0	5701	8197	5563	1160	20621
DOE M&S R&D	0	649	926	0	0	0	1575
DOE SWF R&D	0	464	1171	0	0	0	1635
DOE G&A R&D	0	248	422	0	0	0	670
TOTAL DOE R&D	0	1360	2519	0	0	0	3880
In Kind - Foreign	0	258	201	90	49	0	599
In Kind - MRI silicon	17	1326	495	631	0	0	2469
In Kind - MRI trigger	0	0	112	57	430	0	599
In Kind - US base	0	210	141	39	47	0	437
Total In-Kind contributions	17	1794	948	819	526	0	4104
Forward Funding			0			0	
Total Project Cost	17	3154	9169	9016	6088	1160	28604

Funding need broken out by source

Contingency on DOE Equipment Portion = 46%



Project Funding in AY k\$

Includes G&A, contingency, & escalation

Funding guidance provided by Laboratory

Excess in given year will be carried over to subsequent years

Total Project Cost In AY k\$	FY01	FY02	FY03	FY04	FY05	FY06	TOTAL
Silicon (incl. Cont + G&A)	17	1326	4860	7165	3443	230	17040
Trigger (incl. Cont + G&A)	0	468	1363	946	1630	56	4462
Online (incl. Cont + G&A)	0	0	84	407	499	404	1393
Administration (incl. Cont + G&A)	0	0	343	499	516	471	1829
Total Project	17	1794	6650	9016	6088	1160	24724
R&D (incl. Cont + G&A)	0	1360	2519	0	0	0	3880
Total Project Cost	17	3154	9169	9016	6088	1160	28604
Project Funding in AY k\$	FY01	FY02	FY03	FY04	FY05	FY06	TOTAL
DOE EQ	0	3500	2752	8588	5781	0	20621
DOE R&D	0	1499	2380	0	0	0	3880
In Kind - Foreign	0	258	201	90	49	0	599
In Kind - MRI silicon	17	1326	495	631	0	0	2469
In Kind - MRI trigger	0	0	112	57	430	0	599
In Kind - US base	0	210	141	39	47	0	437
Total In-Kind contributions	17	1794	948	819	526	0	4104
Forward Funding	0	0	0	0	0	0	0
Total Funding	17	6793	6080	9407	6307	0	28604





Integral Project Cost & Funding

D0 Run IIb Project
Integral Cost & Funding

