DØ WBS 1.5 Installation Schedule

Focusing on Silicon Layer 0 Installation

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Focus on Layer 0 Silicon

Minimizes Tevatron Shutdown Time for Installation

- Detector Not Removed from Collision Hall
- L0 Silicon Schedule predicts Tevatron Shutdown 6/30/05 – 8/18/05 => ~ 7 weeks
- Leave Collision Hall ASAP – Complete Technical Commissioning after Tevatron resumes operation
- Detector Closed up for Physics Commissioning ~3 weeks later (depending on Tevatron startup efficiency)
- Major Trigger Hardware Elements (L1 Cal) installed in same shutdown as L0 Silicon; other infrastructure tasks requiring access to Collision Hall are completed during other prior Tevatron down days (e.g. Summer 2004) before shutdown

Layer 0 Installation Principal Elements

- WBS 1.5.1 L0 Silicon
  - Delivery from SiDet determines Tevatron RunIIb shutdown date
    - RunIIa Silicon warmed only to Collision Hall dewpoint if necessary
  - "Infrastructure" tasks: refurbish dry gas system, prepare installation fixturing, etc. prior to shutdown
  - Reclosing of Be Beampipe determines resumption of beam
    - Includes time for full checkout of electrical integrity of all new and existing silicon channels
  - L0 Silicon (mounted on new beryllium beampipe) can be installed via EC beampipe into existing RunIIa silicon, after RunIIa beryllium beampipe and H-disks are removed (inner H-disks will be reinstalled before new beryllium beampipe is reconnected).
    - Cable plant, readout system, power supplies re-used
    - Substantial availability of RunIIa-trained installation experts on hand

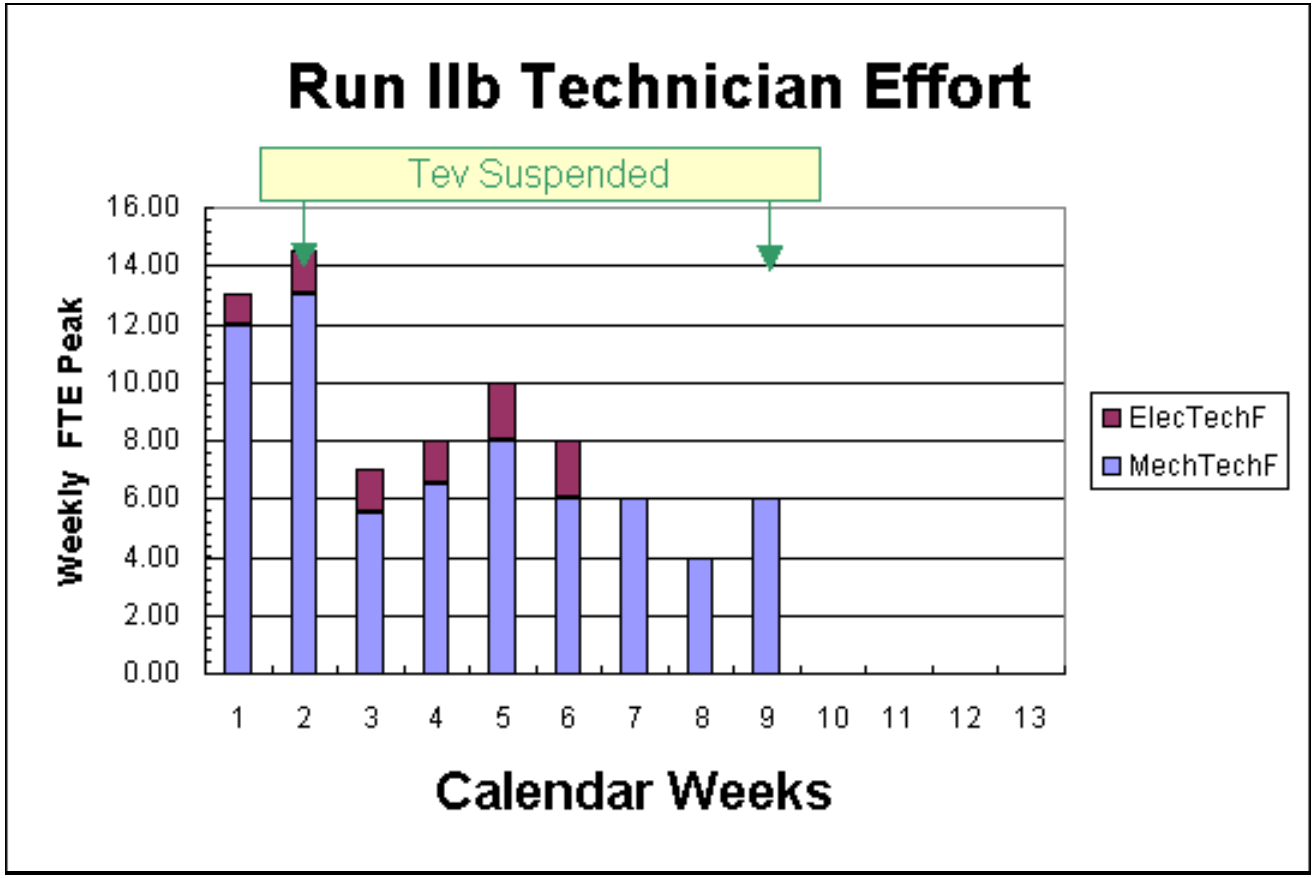
Silicon Installation Milestone Overview

ID	WBS	Task Name	Start_Date	Finish_Date	Duration
3	1.5.1.1	Silicon Ready To Move To DAB	7/21/05	7/21/05	0 w
4	1.5.1.2	Shutdown for Installation Begins	6/30/05	6/30/05	0 w
16	1.5.1.3.11	Silicon Infrastructure Prepared	5/3/05	5/3/05	0 w
25	1.5.1.4.8	Detector Open and Ready for Access	7/11/05	7/11/05	0 w
31	1.5.1.5.5	Run IIa Beampipe & Silicon H-Disks Removed	7/18/05	7/18/05	0 w
37	1.5.1.6.5	L0 Silicon Detector Installed In RunIIa Silicon	7/29/05	7/29/05	0 w
43	1.5.1.7.5	L0 Silicon Cable-up Complete	8/11/05	8/11/05	0 w
47	1.5.1.8.2	Run IIb Beam Tube Installed	8/18/05	8/18/05	0 w
50	1.5.1.10	Silicon Ready for Resumption of Tevatron Operation	8/18/05	8/18/05	0 w
54	1.5.1.12	Silicon System Ready for Physics Commissioning	9/8/05	9/8/05	0 w

Tevatron Downtime ~ 7 weeks

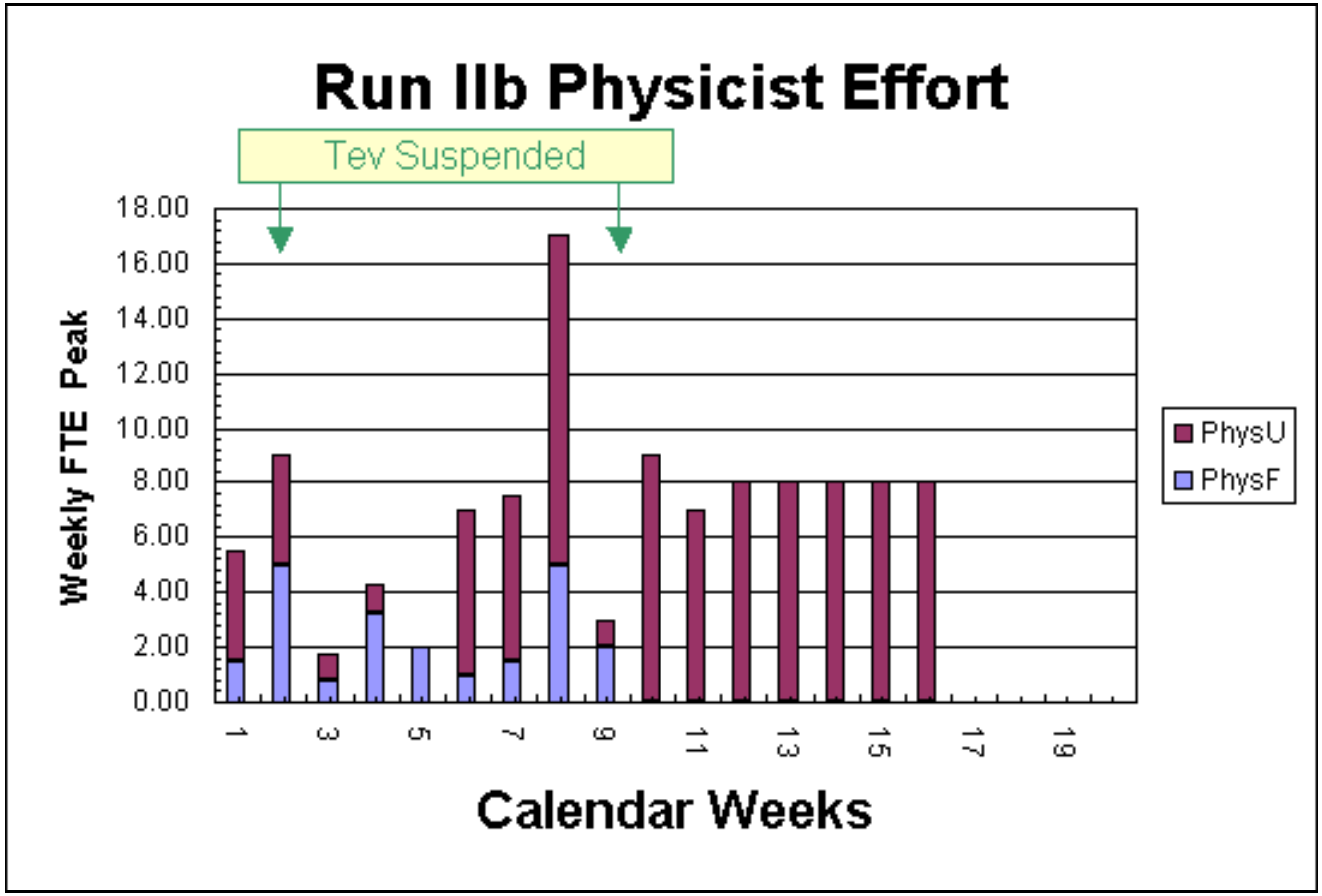
Installation Schedule predicts time advance needed (~ 3 weeks) to prepare detector for arrival of L0

Effort Schedule



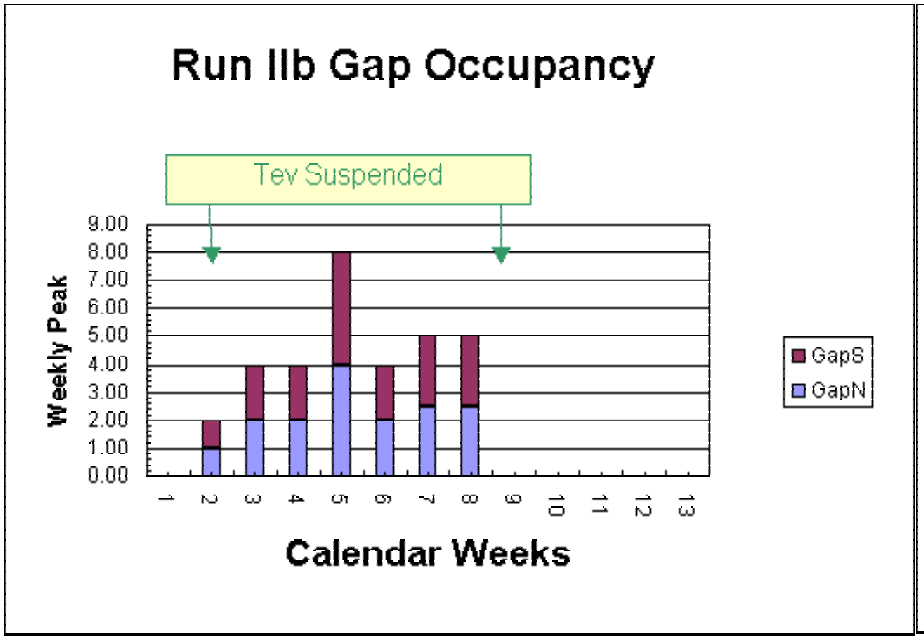
Workweek = Standard 5 days per week, except a few two-shifts days (e.g. open detector)

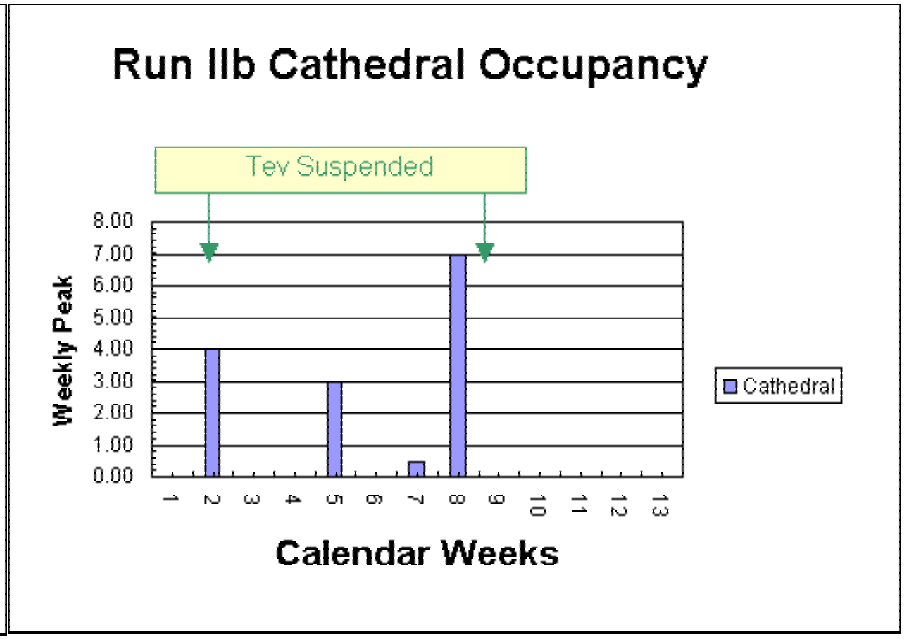
Effort Schedule



Workweek = Standard 5 days per week, some two-shifts per day

Occupancy Schedule





Two Shift Gap Limit: 8, Cathedral Limit: 12

Conclusions

- WBS Planning Tool In Place
  - Tasks detailed to fourth sublevel
  - Resources (Effort, M&S) loaded
  - WBS Dictionary and BOE in place
- Installation Management Team in place
- Detailed Planning Activities Underway

L0 Installation Appendix

L0 Infrastructure Tasks

ID	WBS	Task Name	Start_Date	Finish_Date	Duration
5	**1.5.1.3**	**Prepare Silicon Infrastructure**	**1/5/04**	**5/3/05**	**66.6 w**
6	1.5.1.3.1	Prepare L0 Adapter Card and Mounting	1/5/04	3/1/04	8 w
7	1.5.1.3.2	Label and Test TempMon Cables	3/2/04	3/3/04	0.4 w
8	1.5.1.3.3	Refurbish dry gas system	3/9/05	5/3/05	8 w
9	1.5.1.3.4	Install L0 Temperature Monitoring Cables	3/4/04	3/8/04	0.5 w
10	1.5.1.3.5	Design, Fabricate, and Test Silicon Transport Fixture	9/28/04	10/25/04	4 w
11	1.5.1.3.6	Design, Fabricate, and Test Silicon Installation Fixture	10/26/04	11/22/04	4 w
12	1.5.1.3.7	Design and Fabricate Silicon Alignment Fixtures	11/23/04	12/8/04	2 w
13	1.5.1.3.8	Design, fabricate and test Beampipe Insertion Fixtures	12/9/04	12/22/04	2 w
14	1.5.1.3.9	Modify RunIIa L3/Offline Silicon Software	1/5/04	4/26/04	16 w
15	1.5.1.3.10	Prepare Safety and PORC documentation	4/6/05	5/3/05	4 w
16	**1.5.1.3.11**	**Silicon Infrastructure Prepared**	**5/3/05**	**5/3/05**	**0 w**

L0 Installation Appendix

Open Detector, Remove RunIIa beampipe, H-disks

ID	WBS	Task Name	Start_Date	Finish_Date	Duration
17	**1.5.1.4**	**Open Detector and Install CC-EC Scaffolding**	**6/30/05**	**7/11/05**	**1.2 w**
18	1.5.1.4.1	Retract N Muon Shield and N EF, Disconnect Tev Beampipe	6/30/05	7/5/05	0.4 w
19	1.5.1.4.2	Open S EF, CF steel	7/5/05	7/6/05	0.2 w
20	1.5.1.4.3	Open EC's	7/6/05	7/7/05	0.2 w
21	1.5.1.4.4	Remove four blocks in Collision Hall Shield Wall	7/5/05	7/5/05	0.2 w
22	1.5.1.4.5	Install accesways, CC-EC gap scaffolds	7/7/05	7/8/05	0.2 w
23	1.5.1.4.6	Perform CH Rad Survey, Be assay of beampipe	7/8/05	7/11/05	0.2 w
24	1.5.1.4.7	Install L0 Installation trolley	7/8/05	7/8/05	0.2 w
25	**1.5.1.4.8**	**Detector Open and Ready for Access**	**7/11/05**	**7/11/05**	**0 w**
26	**1.5.1.5**	**Remove RunIIa Beampipe, H Disks**	**6/30/05**	**7/18/05**	**2.2 w**
27	1.5.1.5.1	Warm Silcon to CH Dewpoint	6/30/05	6/30/05	0.2 w
28	1.5.1.5.2	Remove EC Beampipe flanges and bellows	7/11/05	7/12/05	0.2 w
29	1.5.1.5.3	Remove beryllium beam pipe	7/12/05	7/14/05	0.4 w
30	1.5.1.5.4	Remove H-disks	7/14/05	7/18/05	0.4 w
31	**1.5.1.5.5**	**Run IIa Beampipe & Silicon H-Disks Removed**	**7/18/05**	**7/18/05**	**0 w**

L0 Installation Appendix

Install and Cable L0 Silicon, Inner H-disks

ID	WBS	Task Name	Start_Date	Finish_Date	Duration
32	**1.5.1.6**	**Install RunIIb L0 Silicon Detector**	**7/18/05**	**7/29/05**	**2 w**
33	1.5.1.6.1	Install and Verify Performance of L0 Installation, Alignment Fixturing	7/18/05	7/22/05	0.8 w
34	1.5.1.6.2	Transport silicon detector to DAB	7/21/05	7/21/05	0.2 w
35	1.5.1.6.3	Install Silicon Detector	7/22/05	7/27/05	0.8 w
36	1.5.1.6.4	Connect inner SS beam pipe spools to beryllium pipe	7/28/05	7/29/05	0.4 w
37	**1.5.1.6.5**	**L0 Silicon Detector Installed In RunIIa Silicon**	**7/29/05**	**7/29/05**	**0 w**
38	**1.5.1.7**	**Cable L0 Silicon, Reconnect Cooling System**	**8/1/05**	**8/11/05**	**1.8 w**
39	1.5.1.7.2	Reinstall inner H-disks	8/1/05	8/2/05	0.4 w
40	1.5.1.7.6	Install L0 Junction Cards, Adapter cards	8/3/05	8/4/05	0.4 w
41	1.5.1.7.3	Make up Cooling and Dry Gas Connections	8/5/05	8/5/05	0.2 w
42	1.5.1.7.4	Reconnect & Check 80-conductor, clock cables	8/5/05	8/11/05	1 w
43	**1.5.1.7.5**	**L0 Silicon Cable-up Complete**	**8/11/05**	**8/11/05**	**0 w**

LO Installation Appendix

Reconnect Beam Pipe, Commission Detector

ID	WBS	Task Name	Start_Date	Finish_Date	Duration
44	1.5.1.8	Reconnect Tev Beam Tube	8/11/05	8/18/05	1.2 w
45	1.5.1.8.3	Begin Silicon Cooldown	8/11/05	8/11/05	0.2 w
46	1.5.1.8.1	Make Connections to Beryllium Beam Pipe	8/12/05	8/18/05	1 w
47	1.5.1.8.2	Run IIb Beam Tube Installed	8/18/05	8/18/05	0 w
48	1.5.1.9	Technical commissioning of detector	8/12/05	8/18/05	1 w
49	1.5.1.9.1	Demonstrate Full Operability of all Channels	8/12/05	8/18/05	1 w
50	1.5.1.10	Silicon Ready for Resumption of Tevatron Operation	8/18/05	8/18/05	0 w
51	1.5.1.11	Commission Online Readout Software, Close Detector	8/19/05	9/8/05	2.8 w
52	1.5.1.11.1	Verify functionality of all SMT software	8/19/05	9/1/05	2 w
53	1.5.1.11.2	Close calorimeter and muon system, Survey Detector	9/2/05	9/8/05	0.8 w
54	1.5.1.12	Silicon System Ready for Physics Commissioning	9/8/05	9/8/05	0 w

Trigger Installation Principal Elements

- WBS 1.5.2 Trigger
  - University driven; tested components arrive in advance of shutdown
  - "Infrastructure" tasks prepare all cables, new power supplies, L1CTT and L1CTM platform elements
  - Assemble and test L1 Cal Trig with Cal signals, etc. prior to RunIIa shutdown
  - Dominated by work outside DØ collision hall
  - Do during L0 Silicon Installation:
    - Collision Hall work completed before Be Beampipe reclosed
    - Most laborious task (L1 Cal) done in MCH1
    - Technical commissioning of separate elements completed or well underway when Tevatron resumes
    - STT technical commissioning overlaps Tevatron startup