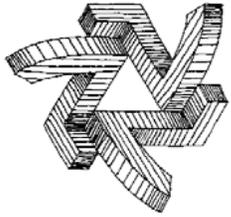


NuMI



MINOS

NuMI Director's Review
February 12-13, 2004
Page 1

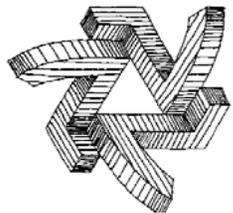
NuMI Project Status and Update

Rob Plunkett

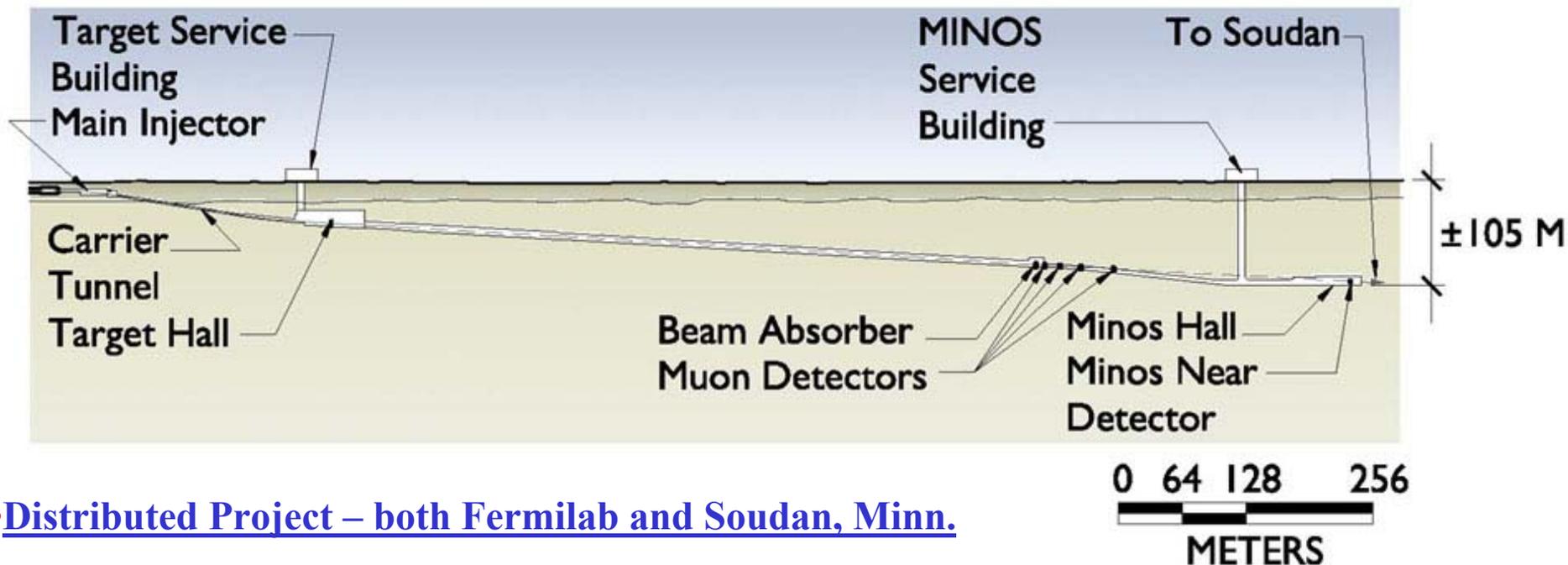
NuMI Deputy Project Manager

Director's Review of the NuMI Project

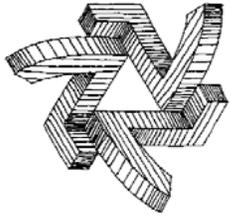
12-13 February, 2004



The NuMI Project Scope and Challenge



- Distributed Project – both Fermilab and Soudan, Minn.
- At FNAL – Three (really 3.5) major technical installations in three different areas:
 - Several hundred feet of accelerator enclosure—half of which is between two operating machines
 - Downstream end of carrier tunnel, Pre-Target and Target Areas--primary beam focus, 8KT neutrino beam target station
 - MINOS area—beam monitoring, ~1 KT hadron absorber and ~ 1 KT neutrino detector



Where does the NuMI Project Stand

-
- Since your last chance to review us, there is massive change.
 - Upstream area civil construction completed, in heavy use.
 - Downstream civil construction completion truly immanent.
 - Project is now fully into an installation phase.
 - Integrated project management of all installations.
 - Combined absorber and detector installation efforts working well.
 - Successful installation of accelerator components in Summer/Fall 2003.
 - Revamped and documented safety approval procedures
 - Upstream technical installation on or ahead of schedule
 - Working within project financial and schedule constraints.



Beam is Coming

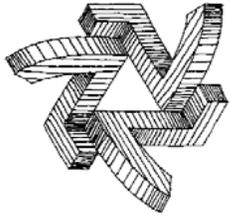




Key Points of Schedule

- Upstream Beneficial Occupancy – **Done 10/20/03**
- Accelerator Shutdown 2003 – **Done**
- Minos B.O. – will be **3/4/04** with good confidence.
- 1st Near Detector Planes Underground – **4/15/04**
- L2 Milestone – “Begin Commissioning Near DAQ (with cosmic rays)”
– current projection **5/19/04**
- Accelerator 2004 Shutdown – probably **9/04 to 10/04**
- Completion of upstream installation – aiming for **11/1/04**
- Ready for First Beam: **BEFORE END 2004!**

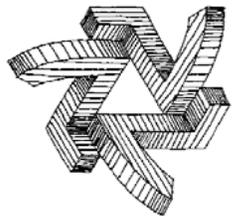
Our challenge is to maintain this schedule – making good use of unscheduled shutdown time. (See R. Ford talk)



Installation Management

(See R. Andrews talk)

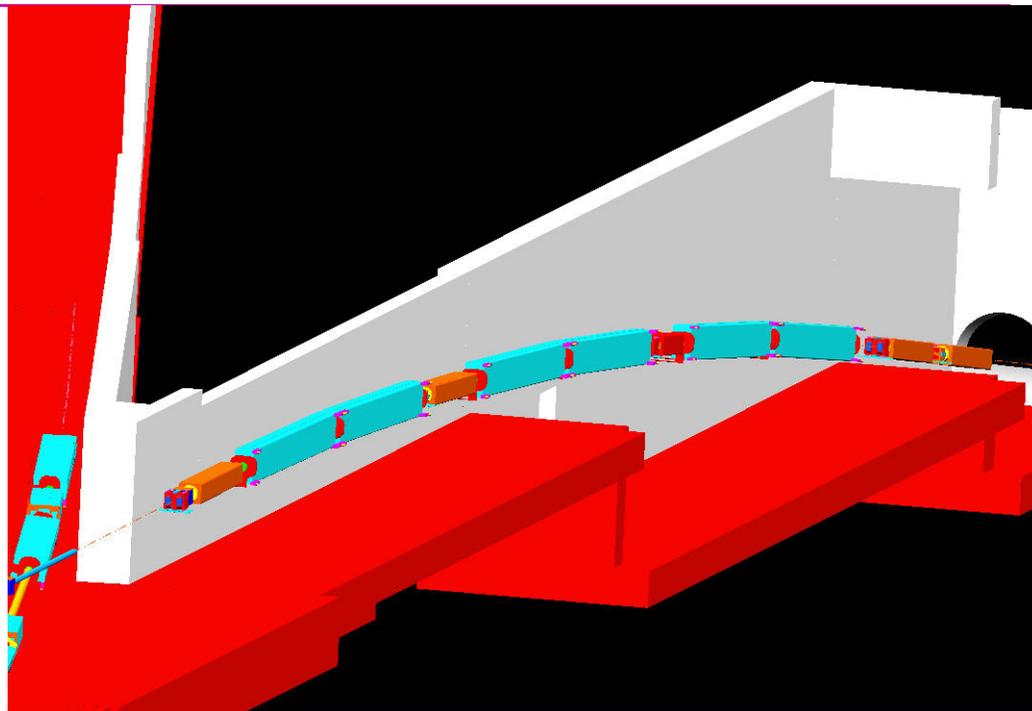
-
- Have gained significant experience with fully staffed installation management organization.
 - A key aspect is assuring Q/A and safety signoffs.
 - Revised documentation system in heavy use.
 - Floor manager positions proving crucial to the organization. We have excellent staff in these positions.
 - All parts of the project communicating effectively
 - Accelerator installation was challenging, but ultimately highly satisfactory.
 - Unified ES&H and hazard analysis throughout project.



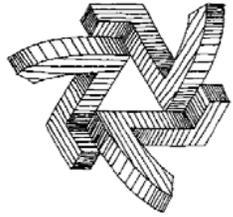
Beamline Installation at start of shutdown was on paper.



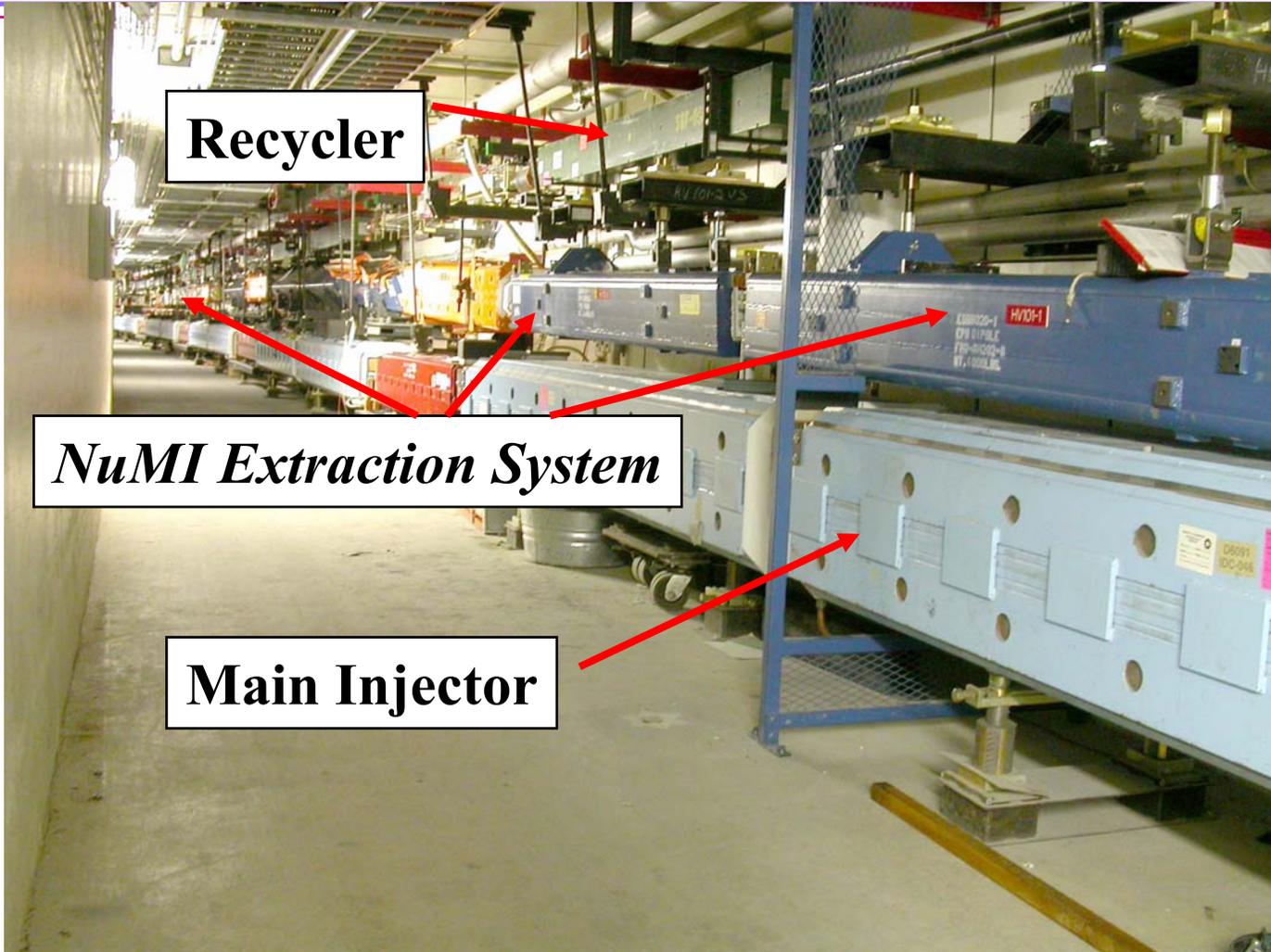
MI ring on bottom,
Recycler on top, NuMI
in the middle
(fit between two accelerators)



NuMI Stub and Extension
(needs cranes, utilities etc.)



Now it's Real





Civil Construction (see Dixon talk)

- Service Buildings and Outfitting Contract is approaching its finish with lots of hard work.
- We have been working in MI-65 since late October.
- Completion of the MINOS Hall, shaft, and connecting spaces is immanent.
- We are going to finish this job safely and use what we learn for the rest of the project!
- The emphasis must now shift quickly to the near detector; there are final hookup jobs to be done in the hall, then planes will arrive underground.



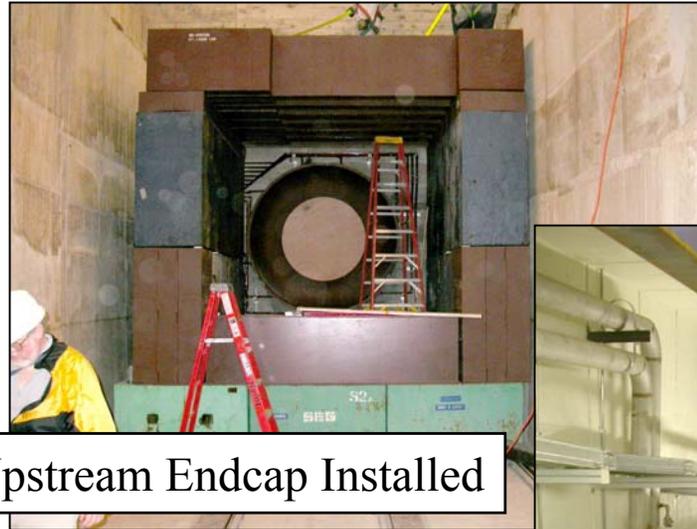
Minos Building 2 months ago



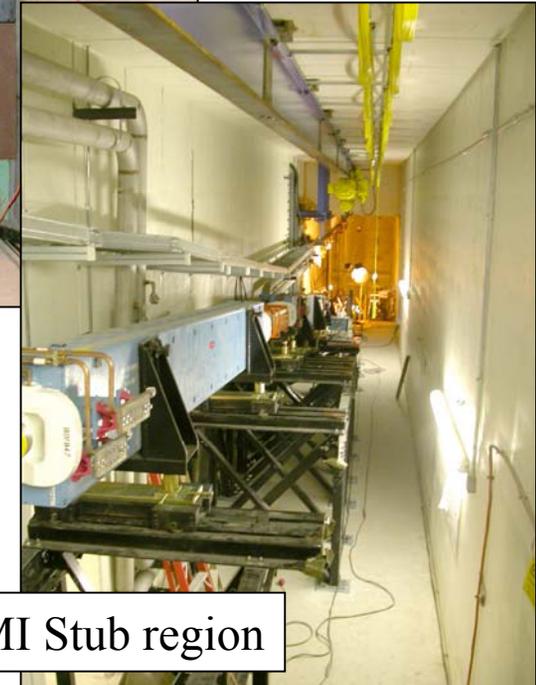
Tech Component Progress

(see Baller, Ford talks)

- MI shutdown work enabled installation of extraction magnets
- All pre-target magnets are installed! (except correctors)
- Upstream decay pipe cap installed.
- Horns moving from testing to final pre-installation configurations
- Other programs making appropriate progress.
 - Power supplies
 - Instrumentation
 - Recycler shielding studies



Upstream Endcap Installed



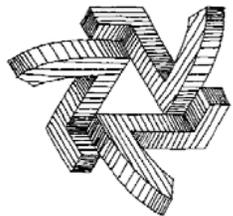
NuMI Stub region



MINOS Experiment

(see Rameika, James, Shanahan talks)

-
- MINOS far detector is in routine operation with excellent uptimes for this stage.
 - Focus is now on installation of near detector.
 - Above ground checkout of 1st section is well advanced.
 - We WILL translate successful ES&H and planning culture to the downstream area.
 - We expect to have a running detector for the first pulse of beam.



View of the MINOS Hall - looking at the beam



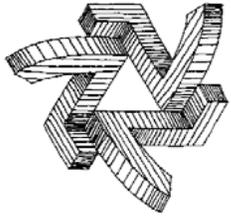


MINOS

Financial Summary as of December 31, 2003

WBS	Amount	Estimated	ETC	%	Obligated	
	Authorized	Cost	(BAC - BCWP)	Complete	\$	%
As of December 31, 2003						
TEC	109,242	99,791	7,733	92%	95,102	95%
1.1		27,614	5,873	79%	23,291	84%
1.2		68,047	1,109	98%	69,024	101%
1.3		4,130	752	82%	2,788	67%
OPC	62,200	58,964	976	98%	57,473	97%
2.0		42,585	976	98%	41,330	97%
3.0		16,378	(0)	100%	16,142	99%
TPC	171,442	158,755	8,709	95%	152,575	96%

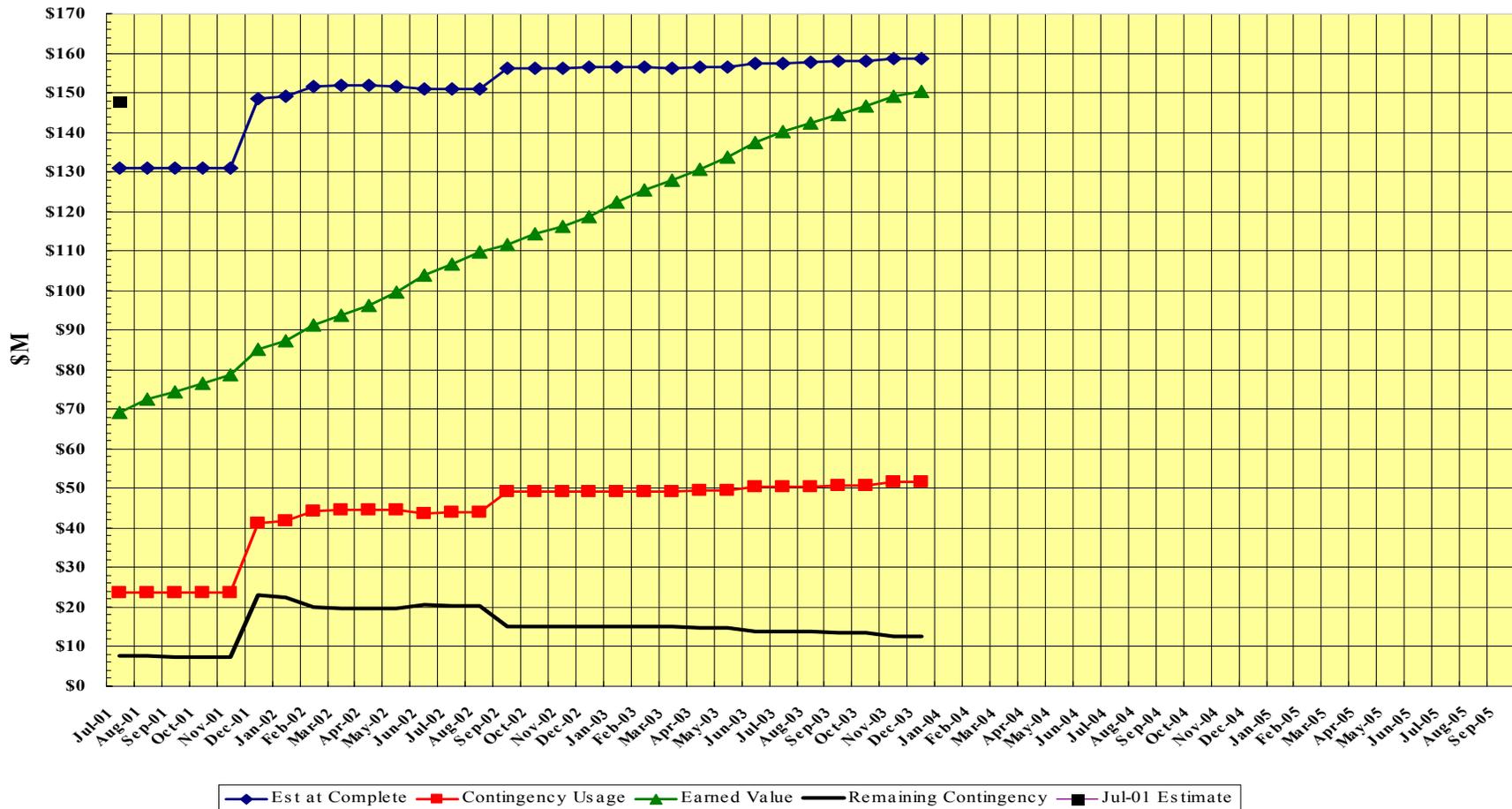
Report Date	% Complete
March 2002	62%
January 2003	78%
September 2003	92%
December 2003	95%

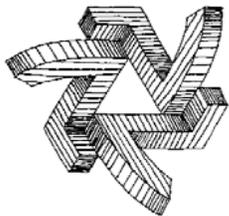


Project Costing Status

MINOS

NuMI Total Project Cost





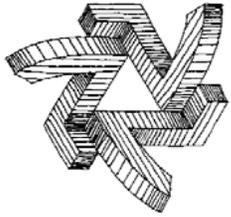
DOE Milestone Status

(December 31, 2003)

Milestone Description	PEP Milestone #	DOE Milestones (As of 12/2001)	Last Month's Forecast Milestone (11/2003)	Current Month's Forecast Milestone (12/2003)	DOE Milestone Variance (Cal Days)	Monthly Variance (Cal Days)	Notes
Fermilab Underground Construction 50% Complete	L-2-5	2/6/2001	6/29/2001	6/29/2001	(143)	0	Complete
Magnets for MI Stub Refurbished	L-2-8	4/30/2001	4/30/2001	4/30/2001	0	0	Complete
Outfitting of Far Detector Enclosure Complete	L-2-9	4/30/2001	7/19/2001	7/19/2001	(80)	0	Complete
Cosmic Rays Observed in Far Detector	L-2-10	3/22/2002	8/31/2001	8/31/2001	203	0	Complete
Technology Choice Made for Muon Monitors	L-2-16	5/30/2002	12/10/2001	12/10/2001	171	0	Complete
Service Building & Outfitting Bid Package Out	L-1-10	7/30/2002	2/25/2002	2/25/2002	155	0	Complete
75% Scintillator Produced	L-2-19	8/30/2002	5/24/2002	5/24/2002	98	0	Complete
Near Detector Hall Excavation Complete	L-2-7	12/30/2002	8/30/2002	8/30/2002	122	0	Complete
Target Hall Excavation Complete	L-1-5	12/30/2002	10/4/2002	10/4/2002	87	0	Complete
Lambertson & C-Magnets Assembled & Tested	L-2-12	2/1/2003	10/31/2002	10/31/2002	93	0	Complete
First Far Detector Super Mod Complete & Tested	L-1-7	3/15/2003	7/24/2002	7/24/2002	234	0	Complete
Inner & Outer Conductors for First Production Horn Assembled	L-1-6	4/14/2003	2/5/2003	2/5/2003	68	0	Complete
Target Service Building Shell Complete	L-2-18	9/30/2003	6/17/2003	6/17/2003	105	0	Complete
Near Plane Pre-assembly Complete	L-2-20	10/10/2003	12/17/2002	12/17/2002	297	0	Complete
Far Detector Complete & Tested	L-1-8	4/25/2004	7/9/2003	7/9/2003	291	0	Complete
Beneficial Occupancy of Service Buildings at Fermilab	L-2-11	5/31/2004	2/16/2004	2/16/2004	105	0	
Start Commissioning with Both Near and Far DAQ	L-2-21	8/30/2004	5/19/2004	5/19/2004	103	0	
Complete Installation of Horn Power Supply	L-2-17	9/1/2004	2/3/2004	3/17/2004	168	(43)	
MI Stub Installation Complete	L-2-15	3/11/2005	9/1/2004	9/1/2004	191	0	
Near Detector Complete & Tested	L-2-14	3/31/2005	1/4/2005	1/4/2005	86	0	
First Horn Installed	L-2-13	4/7/2005	6/14/2004	6/14/2004	297	0	
Start Commissioning	L-1-9	9/1/2005	12/2/2004	12/2/2004	273	0	
CD-4 Start Operations	L-0-3	9/30/2005	1/11/2005	1/11/2005	262	0	End of Commissioning

Forecasting CD4 achievement several weeks earlier than we forecast 1 year ago.

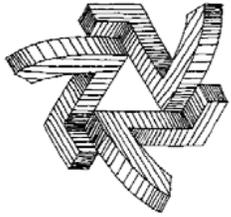
We also track dozens of our own (L3) milestones – expect to miss 10% of these.



ES&H on the NuMI Project

(See M. Andrews talk)

-
- There were 4 injuries in the third incentive period on the SB&O work. Also one during magnet installation.
 - Most serious was a broken bone from being struck by a backing truck.
 - A serious electrical near-miss also occurred.
 - Reaction of RBI was encouraging, especially with regards to tightening electrical oversight.
 - We have also increased our scrutiny.
 - NO injuries so far in current incentive period.
 - We want to pay this!
 - This level of attention is always merited because we are serious about it!
 - Affects all work, not just contractors
 - This includes **collaborators working UNDERGROUND AND ABOVE.**



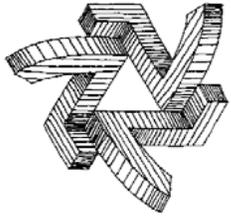
Further ES&H Considerations

- Engineering Note signoffs now handled by smoothly running procedure within and without NuMI
- Underground access system field-testing at MI65, seems to be working well.
- Great cooperation from AD and PPD
 - Creation of joint safety committee insures buy-in from all involved parties.
- Job Hazard Analyses key to our system.
 - 5 person trip to SNS to analyse their system; already resulted in some changes.
- Documentation effort very aggressive
 - Web based databases, tracking of problems.



Responses to Recommendations

-
- Previous Director's Review was in April, 2003.
 - The recommendations categorized as:
 - Improvements to overall project communications, lines of authority, and documentation for Q/A and safety
 - Resources for installation activities
 - These recommendations have been either adopted or modified to fit design changes.
 - Engineering and safety review of installed equipment has been a serious project focus; implementing it has proceeded along the lines of the recommendations.



Further Responses

- Few, but important recommendations from November DOE Review
- Two called for project changes, one for DOE, and one request for presentation at next DOE review
- The two asked for enhanced walkthrough oversight and documentation of the same.
 - We have weekly walkthroughs with our safety personnel
 - Fermilab ES&H staff also walk through
 - We've added a higher level of documented visits by upper management.
 - We've added tools to document not just the visits but problems found.



Conclusions

-
-
-
- Installation means multitasking and adapting to change. We are pushing hard at this challenge.
 - A very large fraction of the project's stuff exists on the ground.
 - Holding onto schedule and cost.
 - Can't relax here!
 - Near Detector checkout moving steadily forward.
 - Other remaining tasks are finite – although certainly not to be underestimated.
 - We need to be efficient during laboratory unscheduled shutdowns.
 - We insist on maintaining and extending safety throughout.
 - Most assuredly can't relax here either!
 - Many “unsung heros” have affected this transition. The lab and the collaboration are all behind it.