Near Detector Status & Schedule

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Fermilab PMG meeting
3/23/10

NOvA Schedule Overview

Near Detector Surface Building

Near Detector Construction & Assembly Status

Near Detector Schedule

Color Code

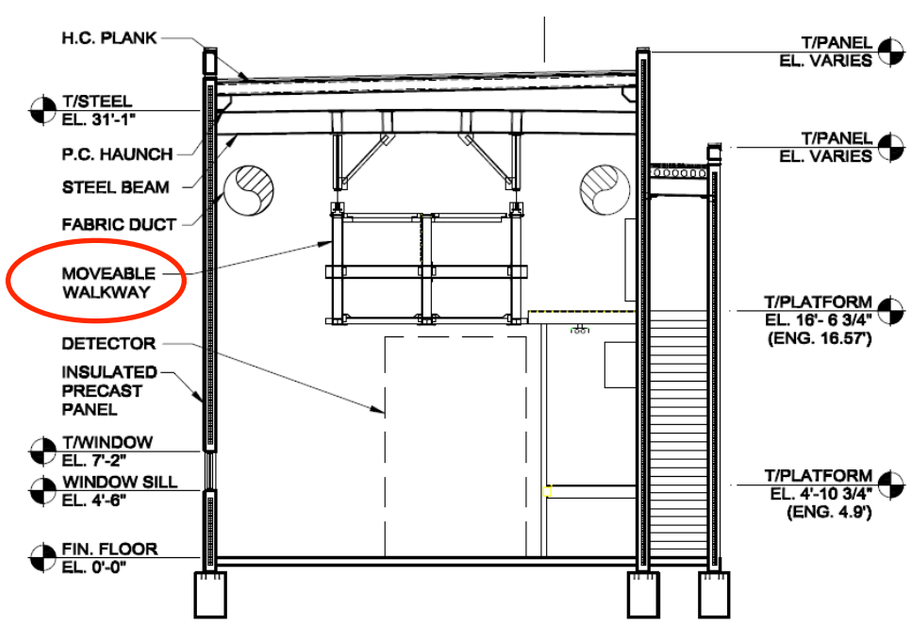
- Information/plans
- ✓ Good status/completed
- ➡ Something to watch

Near Detector Building

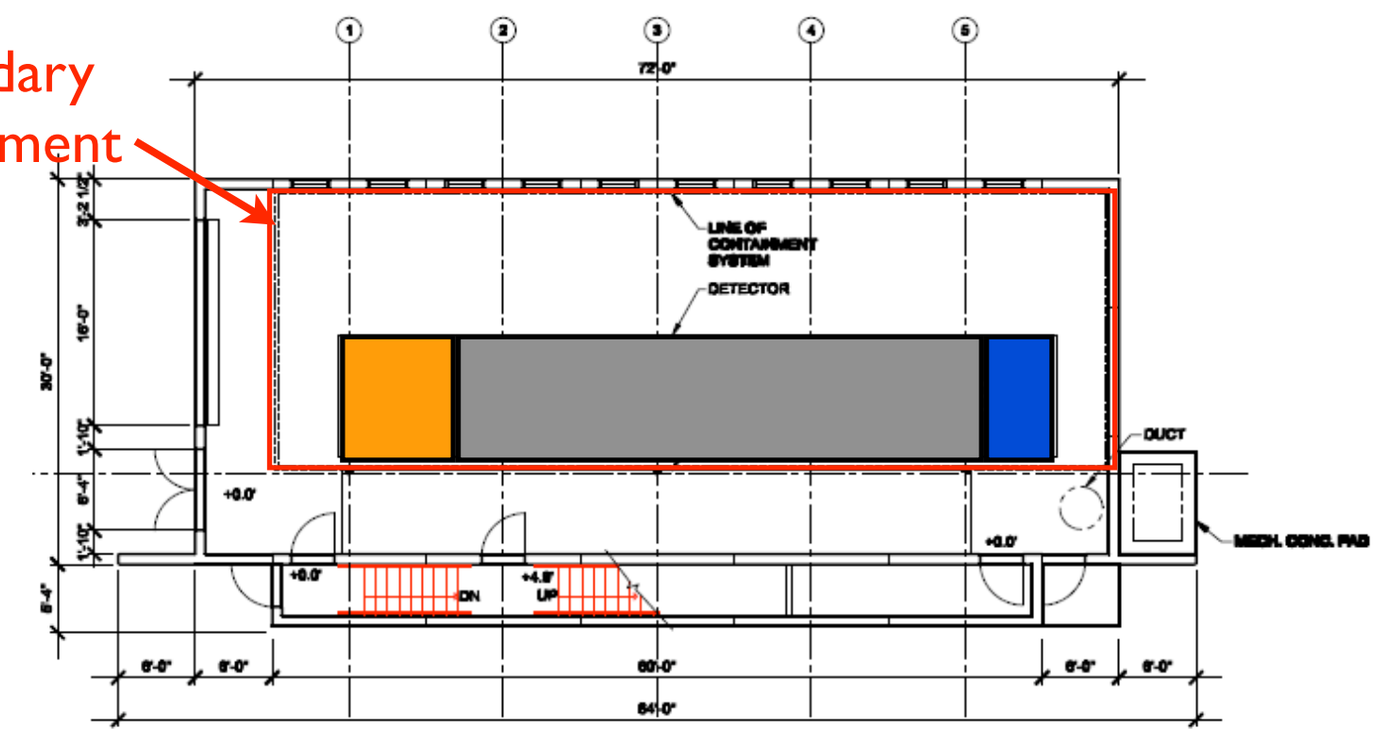
Temporary new building near MINOS service building (M.S.B.)

- ✓ Construction started 12/07/09
- ✓ Walls windows doors up 02/08/10
- ✓ Floors poured 02/19/10
- ✓ Complete stairways 02/25/10
- Power tie into M.S.B. TBA
- Beneficial occupancy 05/06/10
- Ready for 1st block 05/13/10
- Movable platform installed 05/24/10

Experiment electrical work part of construction outfitting package



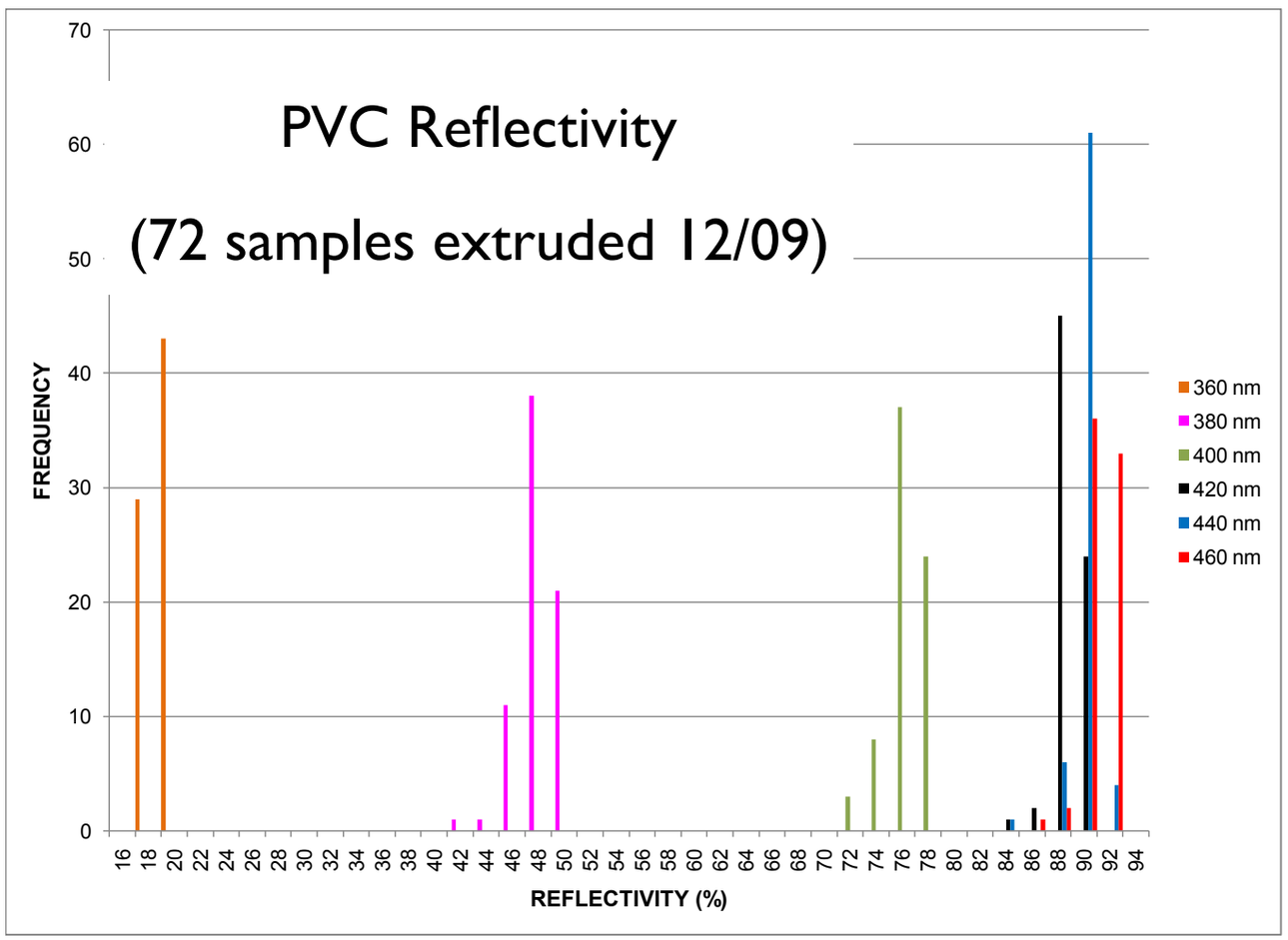
secondary containment

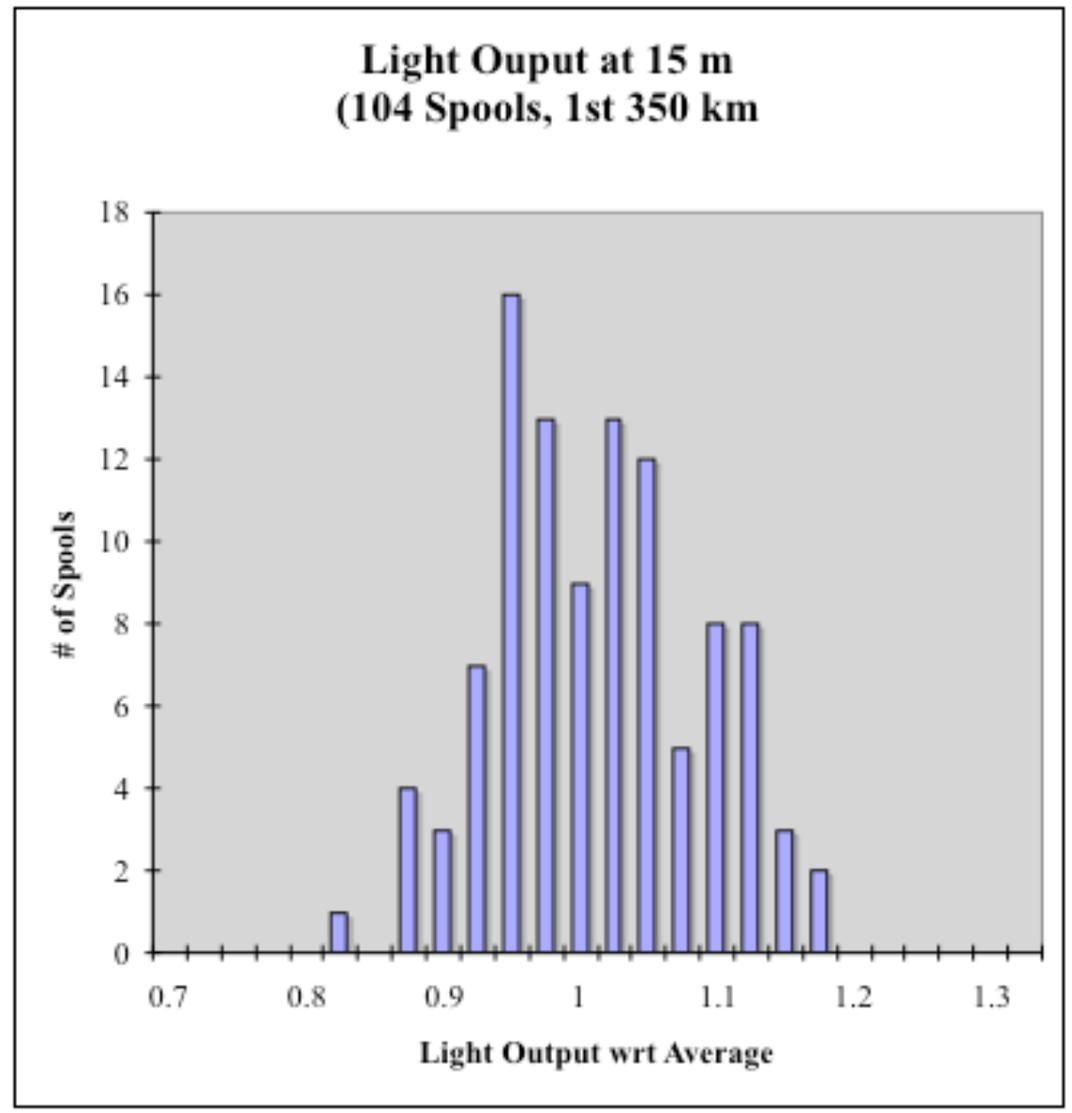


PVC Extrusions/WLS Fiber

All PVC Extrusions in hand

All WLS Fiber in hand





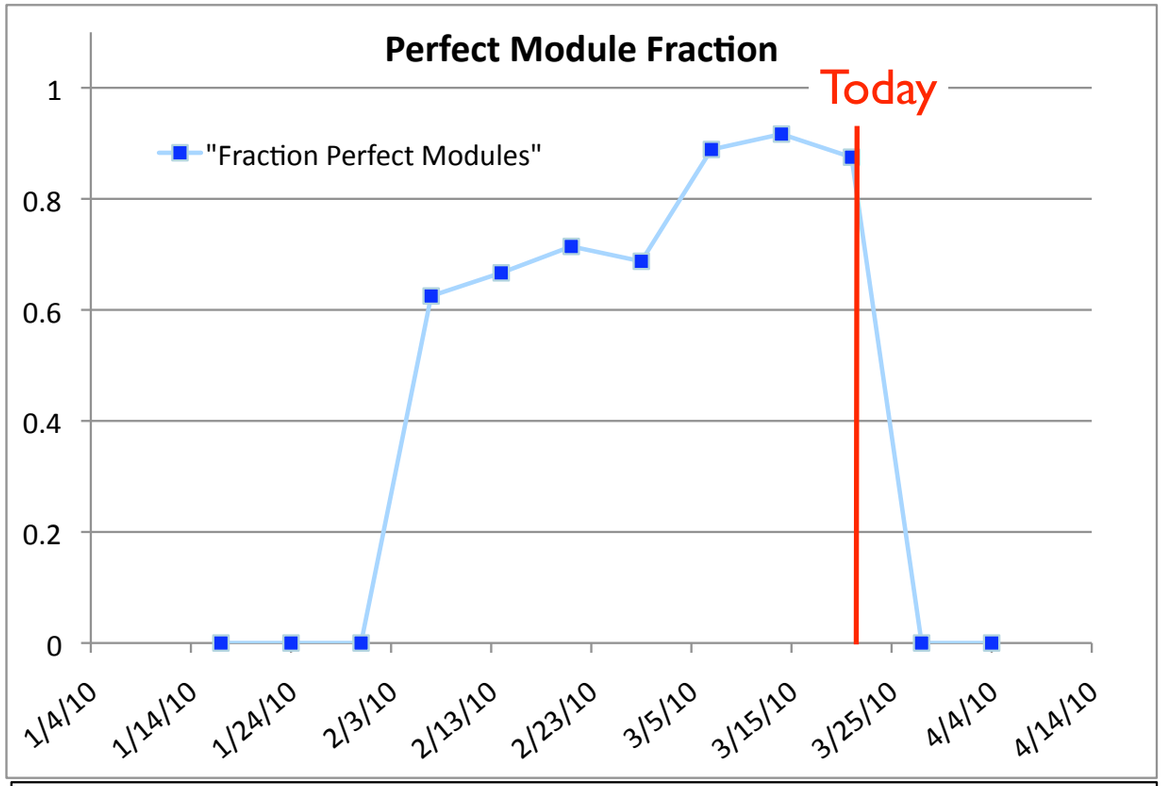
Module Production

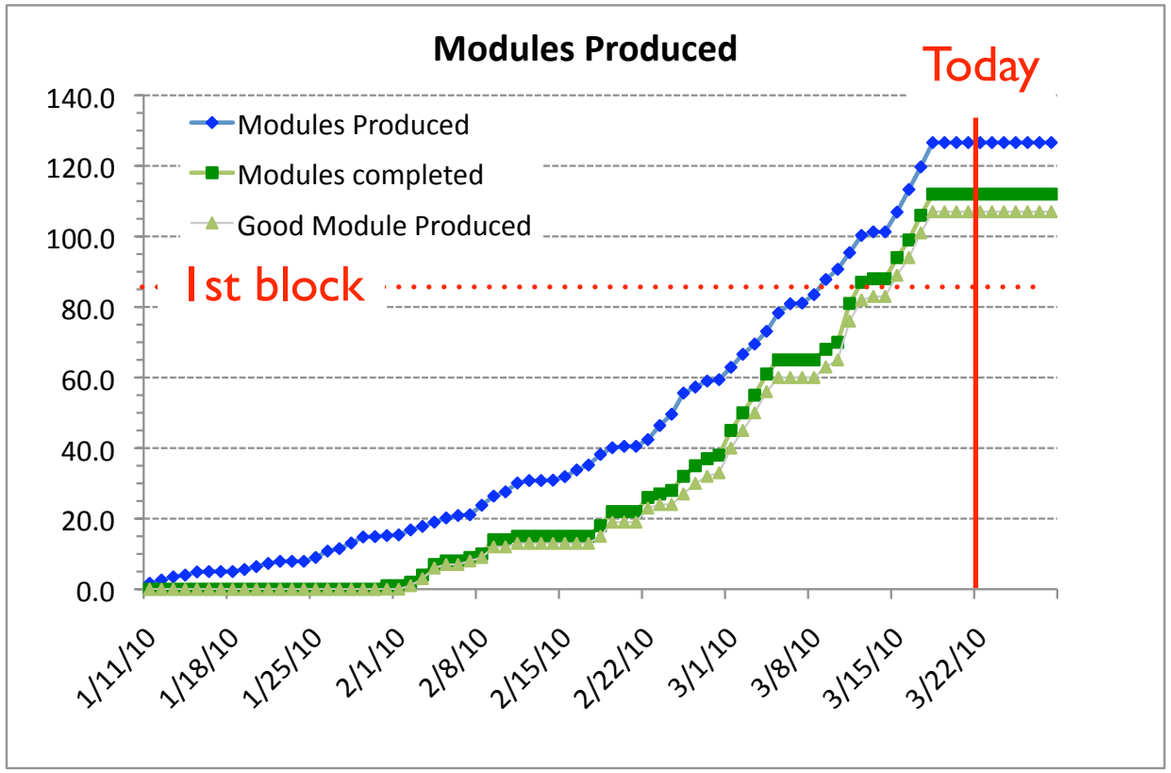
1st block of modules complete (83)

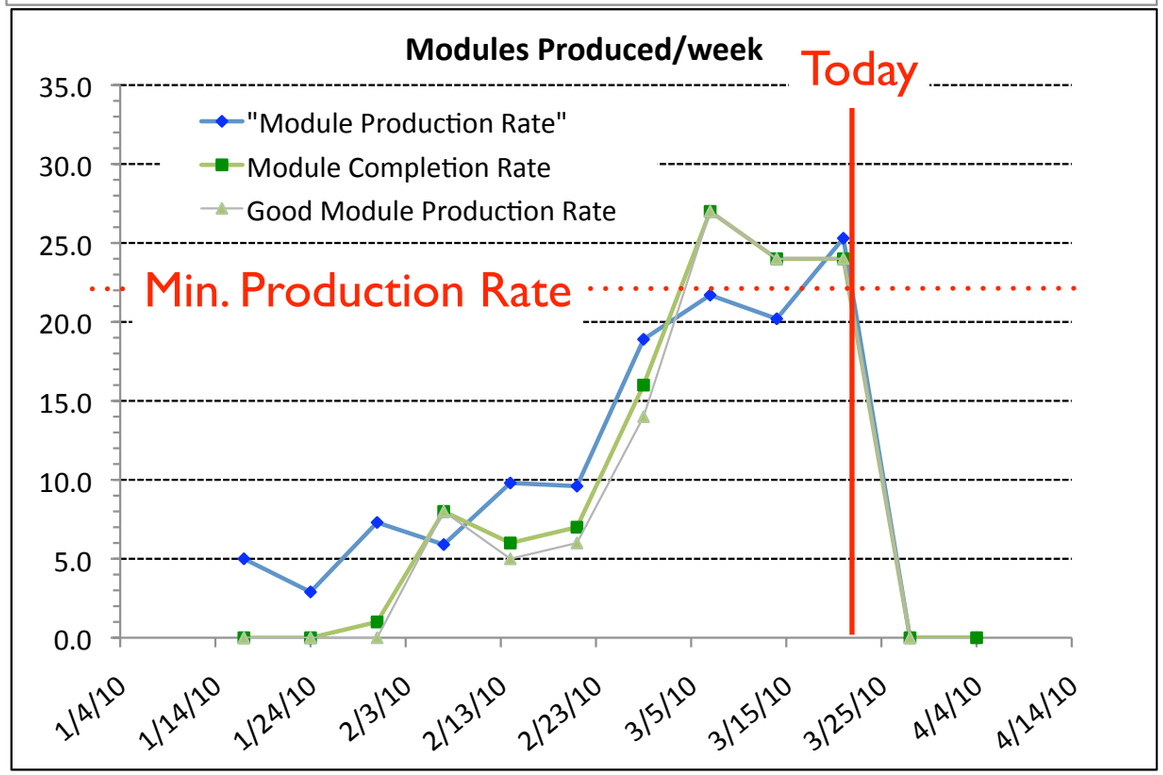
- ✓ 10% spare modules
- ✓ 59 modules at Argonne
- Includes 5 modules >1 damaged fibers to practice stacking (to be discarded)

Production rate

- ✓ Completion rate above 22/wk minimum to meet 4 block milestone (7/12/10)
- Fiber damage rates down







Module Assembly Fiber Damage

Fiber damage during assembly

- 32 fibers/module,
- 64 fiber ends to check
- Fiber is "damaged" if one end is bad

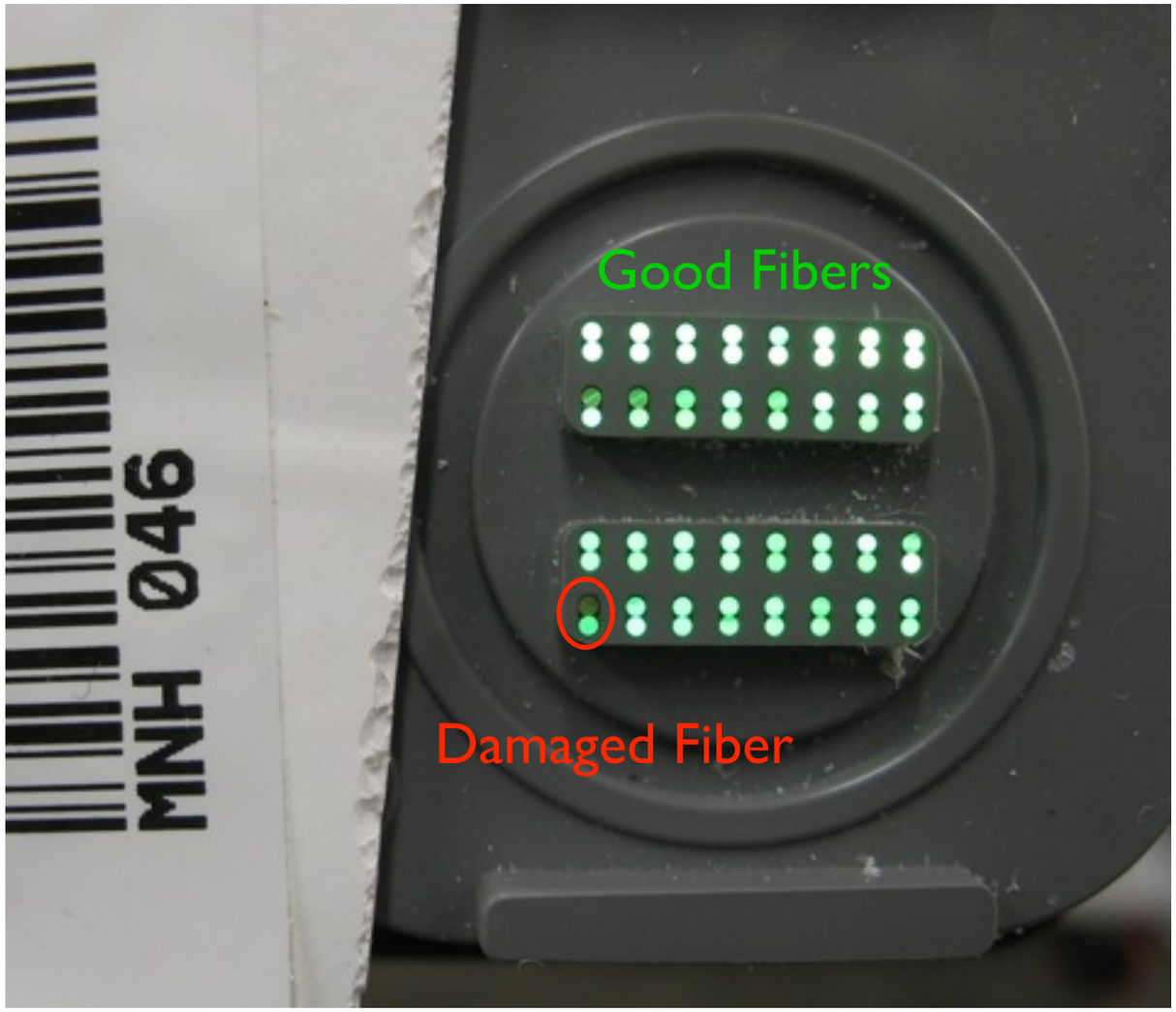
Module autopsies identify problem location

- Near fiber ring
- In fiber raceway
- Near where fiber enters raceway

Assembly procedures changed to reduce fraction of modules with damaged fibers

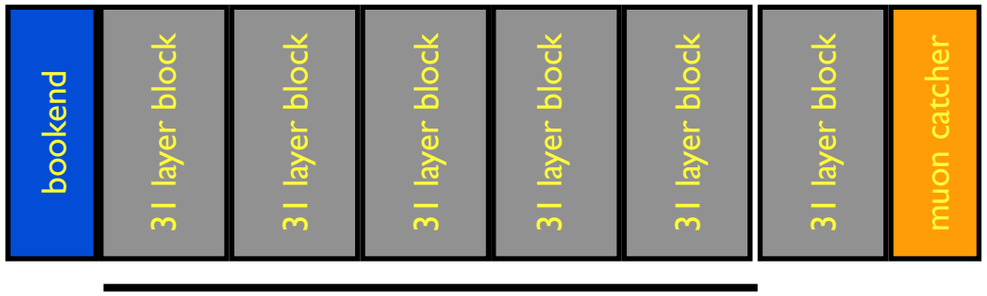
- Old fraction ~40%
- Using modified procedures ~10%

Module factory working to further improve fraction of modules with damaged fibers



Near Detector Assembly

Near Detector Schematic



Prototype near detector block(31 planes)

- ✓ Glued prototype assembly completed 2/11/10
- ✓ Arrived in MINOS service building 3/16/10
- ✓ Assembly rate ~1hr/plane (2-3 modules/plane) twice the needed rate!
- Alignment tests this week

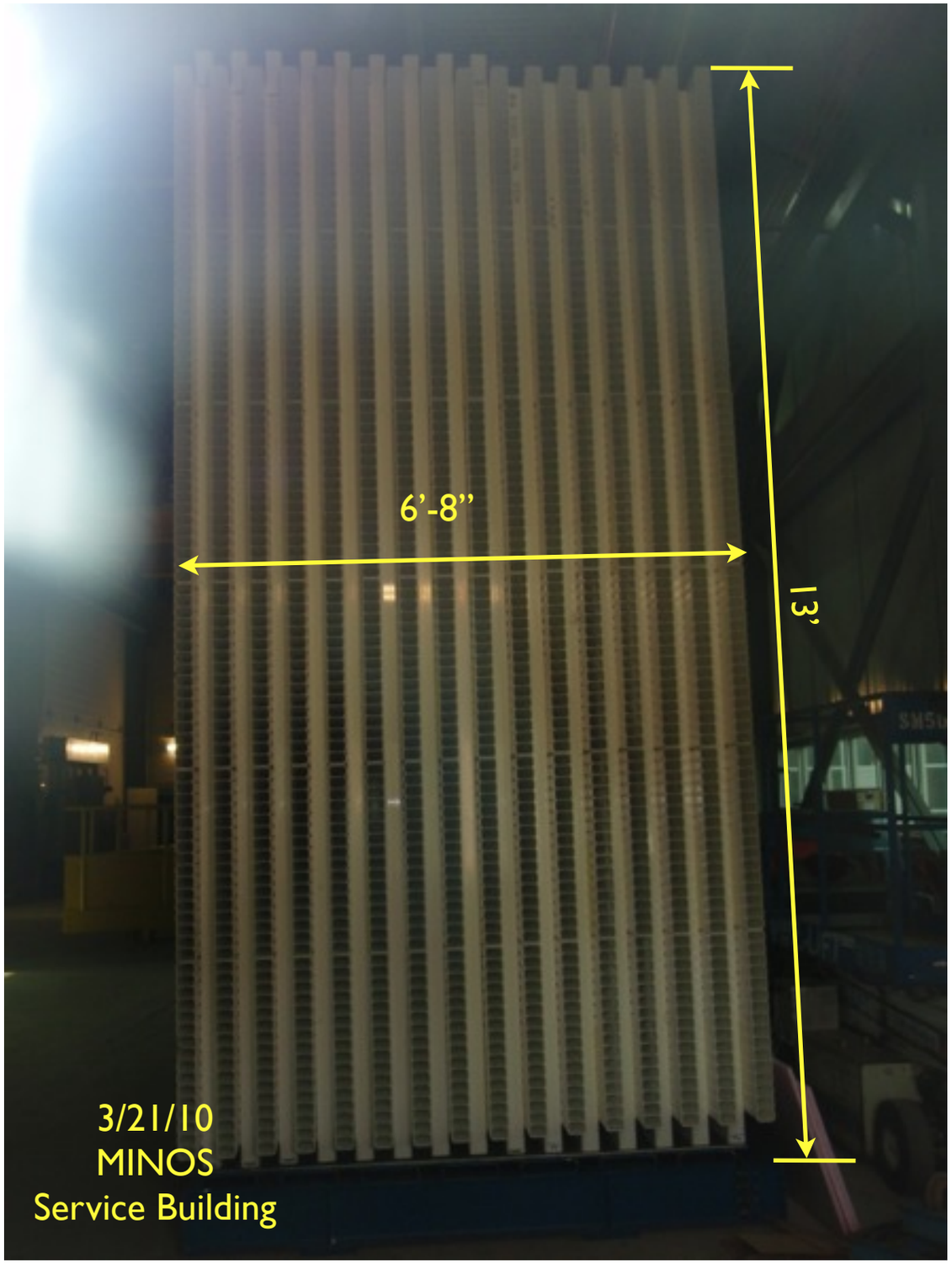
Near Detector block assembly

- Assembly to begin next week (4/1/10)
- Need to paint production blocks black

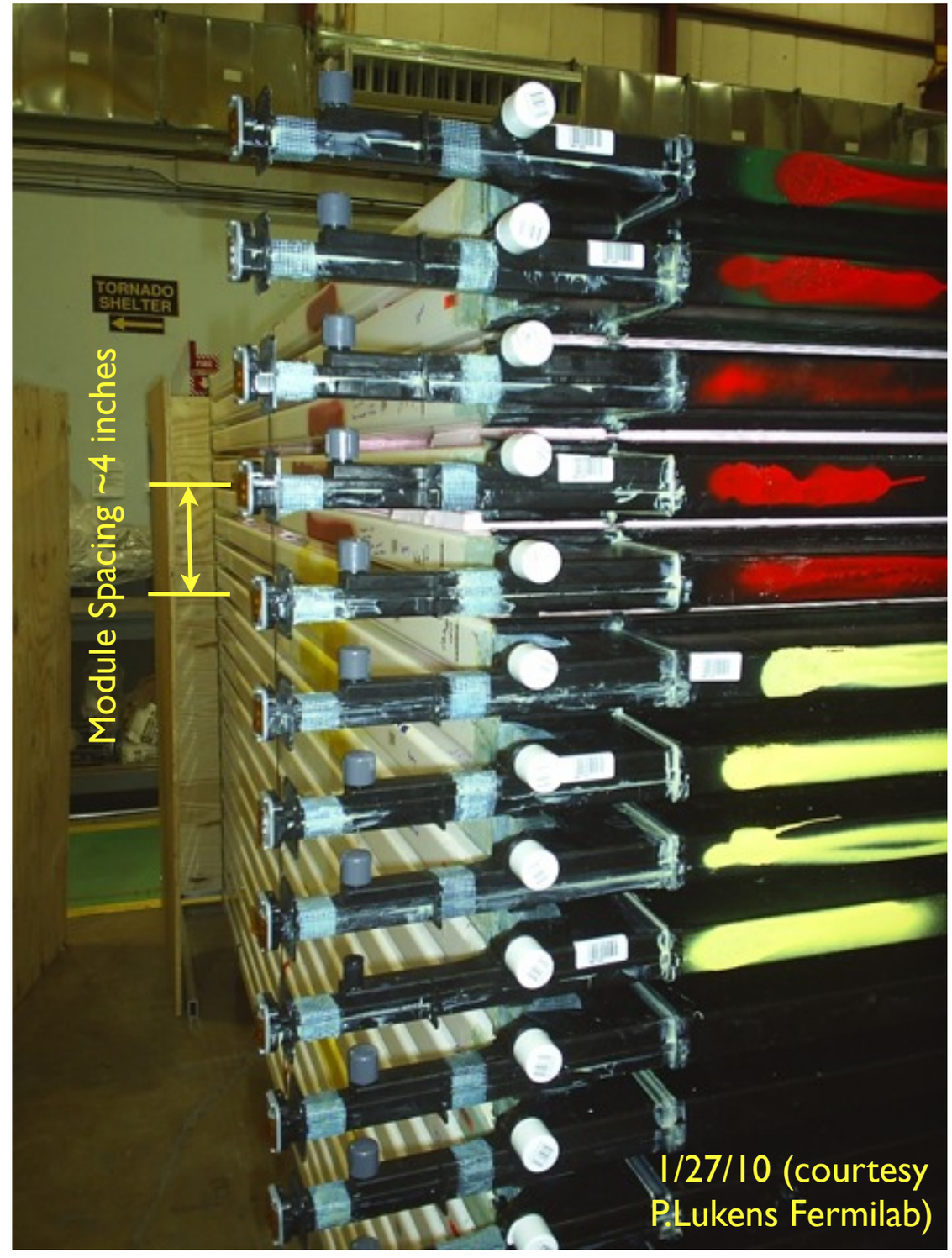
➡ QA for modules difficult (next slide)

Muon Catcher Design

- Engineering nearly complete (E.Villegas, FNAL)
- Order parts this week?



Near Detector Module QA



Pressure/Leak tests at UMn (20 psi)

- Constrain manifolds at pressure
- Modules on carts during tests

Pressure/Leak tests at ANL

- Manifold constraints won't fit
- Need for 20 psi? (ND max ~ 5psi)

Engineering solution in progress

Scintillator

Deliveries continue for waveshifting powder for 14 kT

- ✓ Powders in hand for near detector
- Complete 14 kT (original recipe) order in March

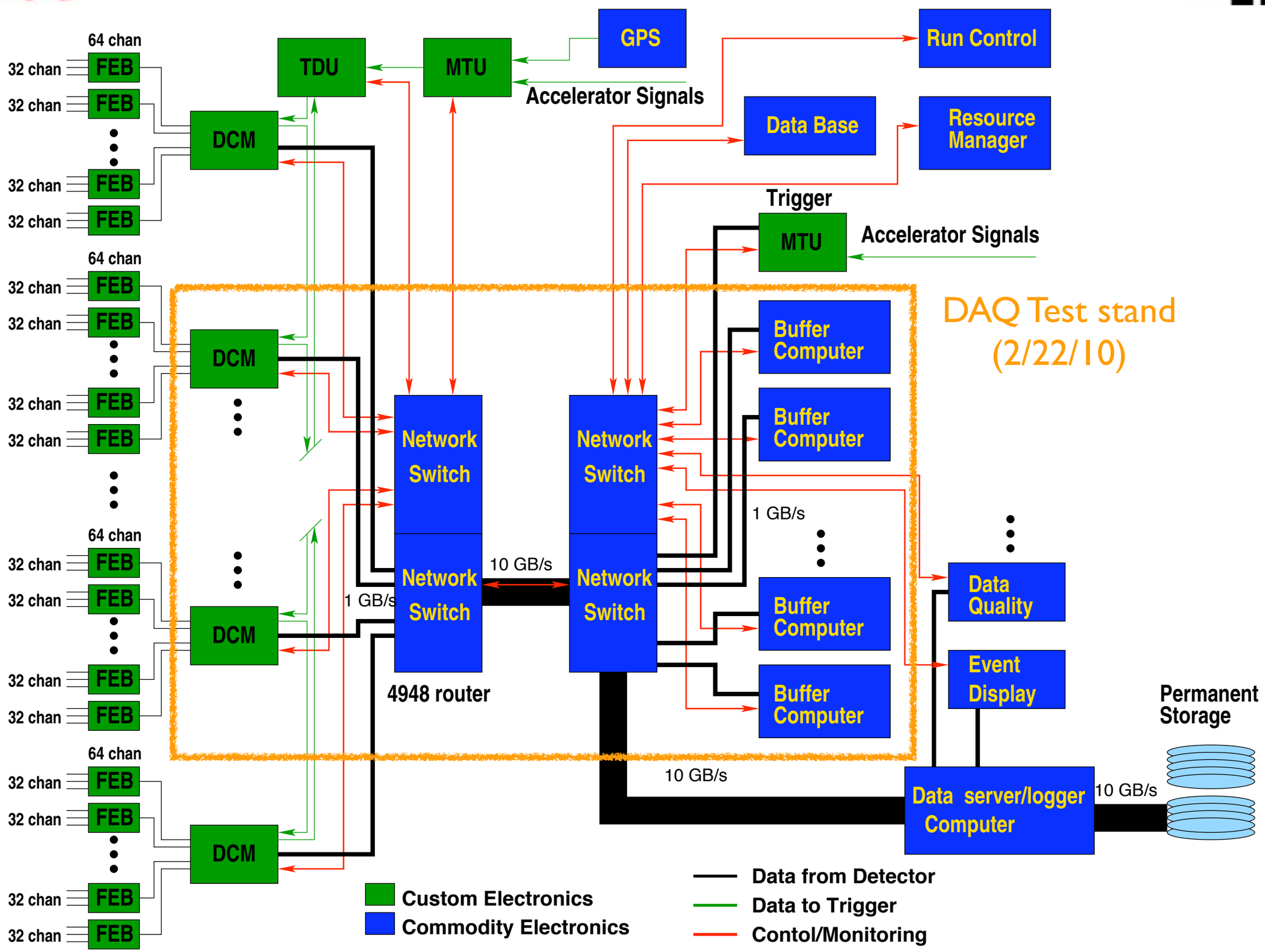
Blend scintillator for Near Detector

- Need 30,000 gallons for Near Detector
- Bids due for mineral oil RFP 3/23/10 (60,000 gallons + options for full 3,000,000 gallons)
- Bids due for toll blending scintillator 4/2/10
  - Select 2 vendors to blend 30,000 gallons each (competition)

Blend scintillator at FNAL for v-slice 5 (full size module)

- ➡ Scintillator blended, failed QA tests (attenuation length)
- Blend 2nd batch eliminating possible degradation in handling (over next 2 weeks)

NOvA Electronics/DAQ Overview



Electronics

Avalanche Photo Diodes (APDs)

- ✓ First 20 APDs arrived (3/11/10)
- ✓ Dark currents very low (agree with Hamamatsu measurements)
- All near detector APDs in hand mid July
- ➡ APDs "just in time delivery"

Front End Board (FEB) v4

- ✓ PCB fabrication began(3/5/10)
- 5 FEBs in hand later this week (3/25/10)
- FEB/DCM/TECC connectivity tests (April)

Data Concentrator Modules(DCM)

- ✓ Prototype DCM (4) in DAQ test stand
- ✓ PO issued for 13 N.D. DCMs (3/12/10)
- Expect DCMs for the near detector in early May

Time Distribution Units (TDU)

- ✓ 2 boards stuffed, checked and booting
- firmware development/tests underway
- expect TDUs for the near detector in mid April

Networking/Computers

- Purchase requisitions for networking computers in procurement

Power Distribution

- ✓ HV/LV power supplies ordered (3/5/10)
- ✓ Prototype Power Dist. Board (3/15/10)
- PDB ready for installation end of May
- ➡ Parts not yet ordered, connectors may be a problem (~12 week delivery)

DAQ Software

Significant replanning of tasks (P.Shanahan)

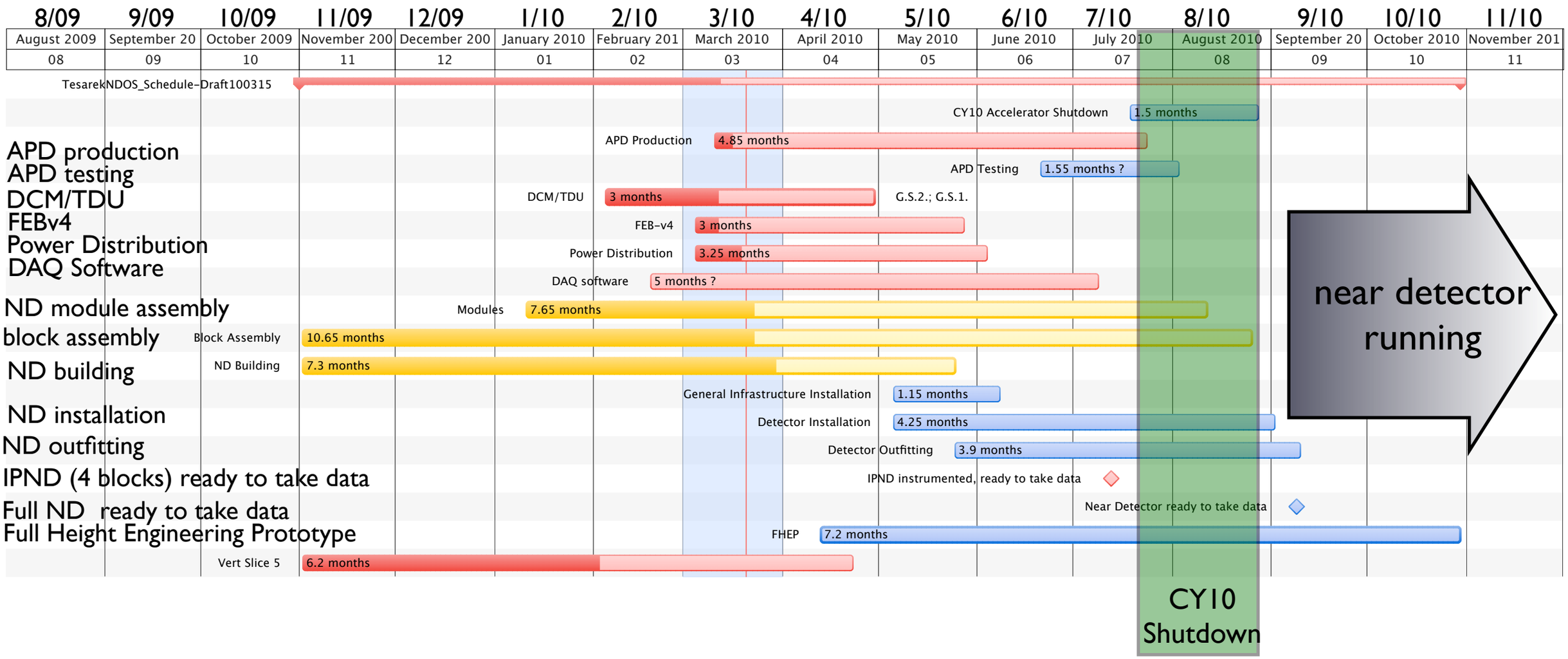
- ✓ Re-planning completed
- DAQ schedule completes "just in time" for IPND milestone
- De-scope DAQ activities to meet IPND milestone

Software infrastructure in place

- ✓ DAQ specifications complete
- ✓ Software framework/external software packages complete
- ✓ Event structure/event building emulation complete

Hardware test stand available for software development/tests

Near Detector Schedule



Aggressive schedule to maximize data w/ near detector

- First block active 1st week in July
- IPND(4 blocks) ready to take data 7/12/10 (no float for milestone)
- Full Detector ready to take data 2 weeks after (nominal) shutdown ends

Schedule Constraints

Critical Path (APD delivery schedule):

- ✓ 20 APDs arrive for evaluation 03/15/10 (arrived 3/11/10)
- Evaluation of 20 APDs complete 03/19/10
- 1st 100 productions APDs arrive for testing 06/11/10
- Last APD for 7/12/10 milestone at FNAL 07/12/10 0 days float to IPND milestone

Remove APDs from critical path, check 31 layer block production rate:

Module Production Rate	IPND Ready to take data	Float to IPND Milestone
10 days/block	7/7/10	5 days
13 days/block	7/9/10	3 days
14 days/block	7/14/10	-2 days

Remove APDs from critical path, check block production rate:

Module Production Rate	IPND Ready to Take Data	Float to IPND Milestone
18d/83 modules (23/week)	7/7/10	5 days
19d/83 modules (22/week)	7/12/10	0 days
20d/83 modules (21/week)	7/15/10	-3 days

- Average good module completion rate: 9 modules/week (since 2/7/10)
- Peak good module completion rate: 27 modules/week
- last 3 weeks 25 good modules/week produced

Summary

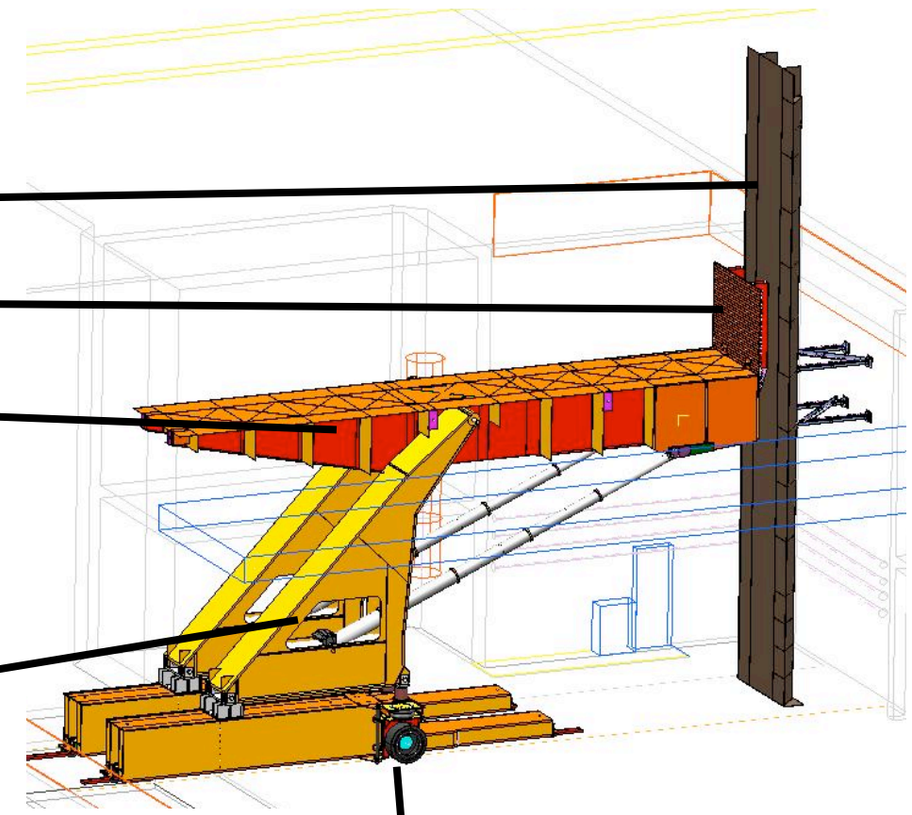
Considerable progress for Near Detector

- ✓ New near detector building is up and ahead of schedule
- ✓ All near detector extrusions in hand
- ✓ All near detector WLS fiber in hand
- ✓ >100 modules produced of both types(H-thin wall, V-thick wall)
- ✓ 1st shipment of completed modules to ANL (2/25/10)
- ✓ 1st glued stack of near detector prototype block complete
- ✓ FEB prototype production started
- ✓ DCM/Buffer computer test stand for software development

What to watch

- ➡ QA for modules used in block assembly at ANL
- ➡ Power Distribution Board production
- ➡ Scintillator production (4500 gal in storage now).
- ➡ APD delivery/testing schedule
- ➡ DAQ progress
- ➡ Muon Catcher procurement/assembly

Other progress

- FHEP block pivoter parts arriving

FHEP Pivoter Parts