DO Installation and Commissioning Review

7-8 November 99

We thank the D0 Upgrade Project personnel for their hospitality and openness in discussing their plans for installation and commissioning. We are encouraged by the formulation of these plans over a relatively short, recent time scale. We especially appreciate their frank discussion of potential problem areas and concerns which were noted both by D0 itself and by this review panel.

We were asked to review:
- Installation of components and infrastructure
- Commissioning of detector subsystems
- Electronics testing, installation, and commissioning
- DAQ commissioning and readiness for detector sub-system commissioning

Reports by three sub-panels (by underlined members):

Electronics/DAQ/OnLine/Trigger:

Don Hartill, Margaret Votava, Aesook Byon-Wagner

Detector Installation & Commissioning:

Peter Garbincius, Jim Siegrist, Jim Krebs, Dave Pushka

Management/Schedule/Manpower:

Dennis Theriot, Jim Strait

Summary & Recapitulation

Electronics & DAQ

- Generally in good shape
- Concern about PC board production and testing (manpower and schedule) in muon, calorimeter and tracking systems
- DAQ hardware schedule is back loaded (Trigger, VRC, SB, ETG schedule very tight)
- FPGA support
- NT issue - one master student (NIU) is not enough
- Computer security an issue
- Very dependent on a few key people
- Long range plan for maintenance of electronics hardware
- Test equipment at DAB (ex: pulse generators are in short supply)
- TBA in Installation/Commissioning should be experienced in DAQ/Electronics
  - 1st task should be to lay out an integrated commissioning plan

Detector Installation, Commissioning, & Infrastructure

Schedule is a good start

We note there is much complexity in manpower, space, crane, utilities, time, etc.

Recommend expanding schedule to more details and finer time structure

System Shortfalls

– must be monitored and prioritized on weekly basis by D0 management

Silicon Cooling – long lead time

Muon Gas Systems

Electrical Power Requirements of Muon Systems – need to start now

Lack of Liquid Helium for VLPC right in middle of commissioning period

we are encouraged by D0's identification of this problem and

investigation of work-arounds to this

potentially very disruptive occurrence

we also encourage investigation of other schedule conflict optimizations

we also encourage continued optimization of MAKE/BUY decisions

including contract engineering, assemblies, and manpower help

We recommend the (re-)institution of a permanent "HALL CREW"

who would report to Jon, Kurt, and Rick

who would supervise and facilitate and participate in the installation

this group needs to be adequately staffed

and committed through the installation and early operations

they would be the "constant factor" planning, installation, & SAFETY activities

and represent continued "institutional memory"

(Such a group of 7-8 people did support the Run I installation & commissioning

but have largely been reassigned to the detector fabrication sub-groups)

It appears that Fermilab is unable to accommodate the additional manpower request of 14-15 people, including Mechanical Engineering, Technicians, and Designers

We note that this request arose from the initial evaluation of this resource-loaded installation & commissioning schedule

What appears now to be need is a

GLOBAL MANPOWER OPTIMIZATION

within D0 – production vs installation/commissioning

both Fermilab & D0 collaborating institutions

within the Fermilab Particle Physics Division

and within Fermilab (as a whole)

Management / Schedule / Manpower

Good first pass. Structure in place to refine in future.

Worried about time estimates. Could change delivery dates. Probably poorest on installation.

Mechanical Infrastructure - Biggest hole in manpower.

Engineers - Too late for new hires. Need to reassign FNAL personnel.

① Any spare cryo engineers
② Xfer design to sub-systems
③ Draft by Project Management

Techs - ① Look within BD, PPD, etc.
② Contract personnel for unskilled
③ Potential T+M

Need to account for manpower in transition from installation to operation. Define a date for "start of operations" and extend manpower projections until that date.

Basic plan of depending on sub systems for main installation manpower is good. Worried about groups stumbling over one another if installation tasks stretch out.

Resource loading of installation schedule should include:

- Manpower
- Crane Usage
- Floor Space
- DAQ needs
- Time-Shift assignments

Installation Group needs more physicists to handle integration issues. Interact with ~~other~~ subsystems on gas, pipes, AC power, etc. Make lists for engineers for packaging and execution.

Installation Task Force: weekly mtg
Cabinet + Project Eng + Floor Manager

Job Description - Responsibility and Authority

Kotcher
Krempetz
Hance

Integrate installation milestones into reportable milestones

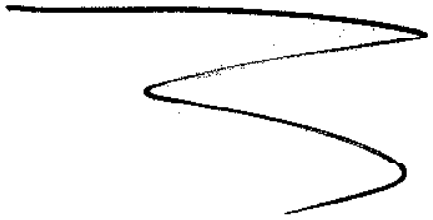
Develope some project management tool to show more clearly connections in time. (PERT Chart?, calendar table?, etc.

Need to look at load-leveling in installation tasks. Need to look into subproject schedules, squeeze out contingency, and put it into installation contingency.

No show stoppers!

Schedule Looks tight

Good luck



Can D0 meet the Installation and Commissioning Schedule Deadline of 1 March 01?

Maybe! - we do not see any obvious show-stoppers

- very tight – very little, if any, float or time contingency
- late deliveries of electronics would be fatal
- the impact of manpower peak shaving or load balancing in early CY00 must be evaluated

Consideration of De-Scoping seem to be premature

- planning effort may be better spent in addressing these manpower optimizations

We believe that the D0 Upgrade Project has a good grasp of the problems that they are facing and have shown a commitment to attack and overcome these

The viability of the March 01 deadline for collider experiment opreations will require constant vigilance on the part of D0 and Fermilab management. It appears that the D0 PMG may be the appropriate vehicle for oversight of the Installation and Commissioning activities, especially if there is positive progress However, if concerns remain after 6 months, an additional review of this scope may be warranted.