All Experimenters’ Meeting
Mu2e Status

K. Byrum
Electrical Integration Team Leader
5/23/16
Overview

• CD-3c Review (Jun 14-16, 2016)
  – Directors Review
    • Design Reviews
      – Grounding & Shielding Review
        • Construction Readiness Reviews
          • Reviews
            • Reviews
            • Reviews
D**ector’s CD-3c Review of Mu2e
April 19-21, 2016

Chairperson
Greg Bock, FNAL

Project Management
Elaine McChesney, FNAL*
Greg Bock, FNAL

Cost and Schedule
Bill Freeman, FNAL*
Jeff Reiser, ANL
Mohammed Ebrahimi, FNAL

FUSE
Jim Floyd, LBNL*
Mike Bondalaki, FNAL
David Rodgers, LBNL (Observer)

Solenoids
George Bitlasis, JLAB*
Alain Bross, FNAL

Accelerator
Keith Gollwitzer, FNAL*
Paul Derwent, FNAL
Jim Hylen, FNAL

Tracker/Trigger/DAQ
Kevin Pitts, Univ of IL*
Tom LeCompte, ANL
Andrew Norman, FNAL

Calorimeter/CVR
Debbie Harris, FNAL*
Adam Pan, FNAL

Muon Beamline
Rich Andrews, FNAL*
Rick Torello, FNAL

*Lead

Observers
Pepin Carolan, DOE/FSO
Paul Philip, DOE/FSO
Ted Lavine, DOE/SC
Lavada Cartwright, ANL
Brian Smith, ANL

REVIEW COMMITTEE PARTICIPANTS

bock@fnal.gov 630-840-4302
mch@fnal.gov 630-840-2193
reiser@anl.gov 630-252-1124
mehra@fnal.gov 630-840-8697
jgfloyd@lbl.gov 510-486-7840
bookalaki@fnal.gov 630-840-8448
drogers@lbl.gov 510-486-7675
bitlasis@jlab.org 757-299-7333
bross@fnal.gov 630-840-4680

gollwitzer@fnal.gov 630-840-8282
derwent@fnal.gov 630-840-8220
jhyl@fnal.gov 630-840-8122
kpitts@illinois.edu 217-333-3846
lecompte@anl.gov 630-252-1634
norman@fnal.gov 630-840-4016

harris@fnal.gov 630-840-4545
pan@fnal.gov 630-840-2132

andrew@fnal.gov 630-840-4455
mart@anl.gov 630-840-8609

pepin.carolan@science.doe.gov paul.philip@science.doe.gov
ted.lavine@science.doe.gov cartwright@anl.gov
brian.smith@anl.gov

K. Byrum | CD-3c Director’s Review

5/23/2016
## Design Reviews

<table>
<thead>
<tr>
<th>Project</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS Coil Modules</td>
<td>Dec 5, 2014</td>
<td>Dec 11, 2015</td>
</tr>
<tr>
<td>Proton Absorber</td>
<td>Feb 23, 2015</td>
<td>Dec 11, 2015</td>
</tr>
<tr>
<td>TS Module Readiness Review</td>
<td>Sept 2, 2015</td>
<td></td>
</tr>
<tr>
<td>External Beamline</td>
<td>Oct 6-7, 2015</td>
<td>Jan 26, 2016</td>
</tr>
<tr>
<td>Accelerator Inst./Controls</td>
<td>Oct 6-7, 2015</td>
<td>Jan 29, 2016</td>
</tr>
<tr>
<td>Radiation Safety</td>
<td>Oct 20, 2015</td>
<td>Feb 16-17, 2016</td>
</tr>
<tr>
<td>Target, Target Handling, HRS</td>
<td>Nov 16-18, 2015</td>
<td>Mar 4, 2016</td>
</tr>
<tr>
<td>Delivery Ring RF</td>
<td>Nov 19, 2015</td>
<td>Mar 15, 2016</td>
</tr>
</tbody>
</table>

Final reports from design reviews are posted to the web page.
## Overall Design is Mature

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Design Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerator</td>
<td>85%</td>
</tr>
<tr>
<td>Conventional Construction</td>
<td>100%</td>
</tr>
<tr>
<td>Solenoids</td>
<td>85%</td>
</tr>
<tr>
<td>Muon Beamline</td>
<td>65%</td>
</tr>
<tr>
<td>Tracker</td>
<td>85%</td>
</tr>
<tr>
<td>Calorimeter</td>
<td>75%</td>
</tr>
<tr>
<td>Cosmic Ray Veto</td>
<td>85%</td>
</tr>
<tr>
<td>DAQ</td>
<td>90%</td>
</tr>
<tr>
<td>Overall design</td>
<td>85%</td>
</tr>
</tbody>
</table>
Mu2e Grounding and Shielding

- “Basic Detector Grounding Principles” presented at Integration Meeting (with examples of Grounding and Shielding plans of other experiments (CDF, ATLAS))

- L2’s identified leads for their system/subsystems to form “Mu2e Grounding and Shielding committee”

- Committee includes David Mertz (Lab AHJ, Electrical Safety Engineer)
  - Best Practice: Integrate Safety into design from beginning

- Integration Team worked w/ Civil Construction to install grounding rods

- Subsystem leads present grounding plans (and updates) for their detector subsystem at weekly meetings; subsystem leads contribute text for their subsystem.

- Docdb 7254; External review held on May 10, 2016
Integration Electrical Grounding and Shielding

Basic Grounding Scheme

- Signal reference on detectors will be isolated from support structure
- Reference to ground provided by Detector Ground
- Detector Ground shall form no ground loops
- Detector Ground is a separate branch from the Safety Ground structure
- Detector Ground must have a (one) connection to Safety Ground
- Many details spelled out in the document
  - Safety considerations
  - Power supplies
  - Data links
  - Monitoring & controls
  - …
Integration Electrical Grounding and Shielding

Example: Tracker Subsystem

[Diagram showing electrical components and grounding systems]
Conventional Construction >60% Complete
Cranes in Building
Transition to Operations Task Group

- Expect Beneficial Occupancy of the Mu2e Building in early November (11/11/16).
- Transition to Operation Group, with many individuals from the Integration Team.
- The transition and responsibilities are outlined in the Transition to Operation-Detector Building (docdb-5844).
Summary (from Ron’s Directors Review Talk)

- Significant peer review and oversight of design and procurement process.
- Overall design 85% complete.
- Project is performing well on cost, schedule and contingency
- CD-3 documentation complete
- Recommendations from previous reviews are being addressed
- ESH&Q fully integrated into all aspects of Project
- Integration Team active and functioning extremely well

We are ready for CD-3c: Jun 14-16, 2016