



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
SCIENCE

DOE/SC CD-2 Review
of the
SuperCDMS-SNOLAB Project
Conducted at
Fermi National Accelerator Laboratory
July 19-20, 2016

Kurt Fisher
Committee Chair
Office of Science, U.S. Department of Energy

<http://www.science.doe.gov/opa/>



- **Closeout report (prepared in PowerPoint)**
 - Presented Wednesday, July 20
 - Instructions—slide 12
 - Template—slide 14
- **Final report draft (prepared in MS Word)**
 - Due Monday, July 25 to Casey
(casey.clark@science.doe.gov)
 - Instructions—slide 13



DOE EXECUTIVE SESSION AGENDA

Tuesday, July 19, 2016—Wilson Hall, Comitium

- | | | |
|-----------|---|-----------|
| 8:00 a.m. | DOE Executive Session..... | K. Fisher |
| 8:15 a.m. | Program Perspective..... | S. Rolli |
| 8:30 a.m. | Federal Project Director Perspective..... | H. Lee |
| 8:45 a.m. | Questions | |
| 8:55 a.m. | Adjourn | |

Project and review information is available at:

<http://supercdms-docdb.fnal.gov:8080/cgi-bin/DisplayMeeting?conferenceid=6>

Username: review

Password: snolab2015



Review Committee Participants

Kurt Fisher, DOE/SC, Chairperson

Review Committee

*Subcommittee 1—Technical**

Frank Calaprice, Princeton
Andy Hocker, FNAL
Huan Huang, UCLA
Jalena Maricic, U of Hawaii
Dan McCammon, U of Wisconsin

Subcommittee 2—ES&H

*Scott Robinson, LBNL

Subcommittee 3—Cost and Schedule

*Jennifer Fortner, ANL
Dean Hoffer, FNAL

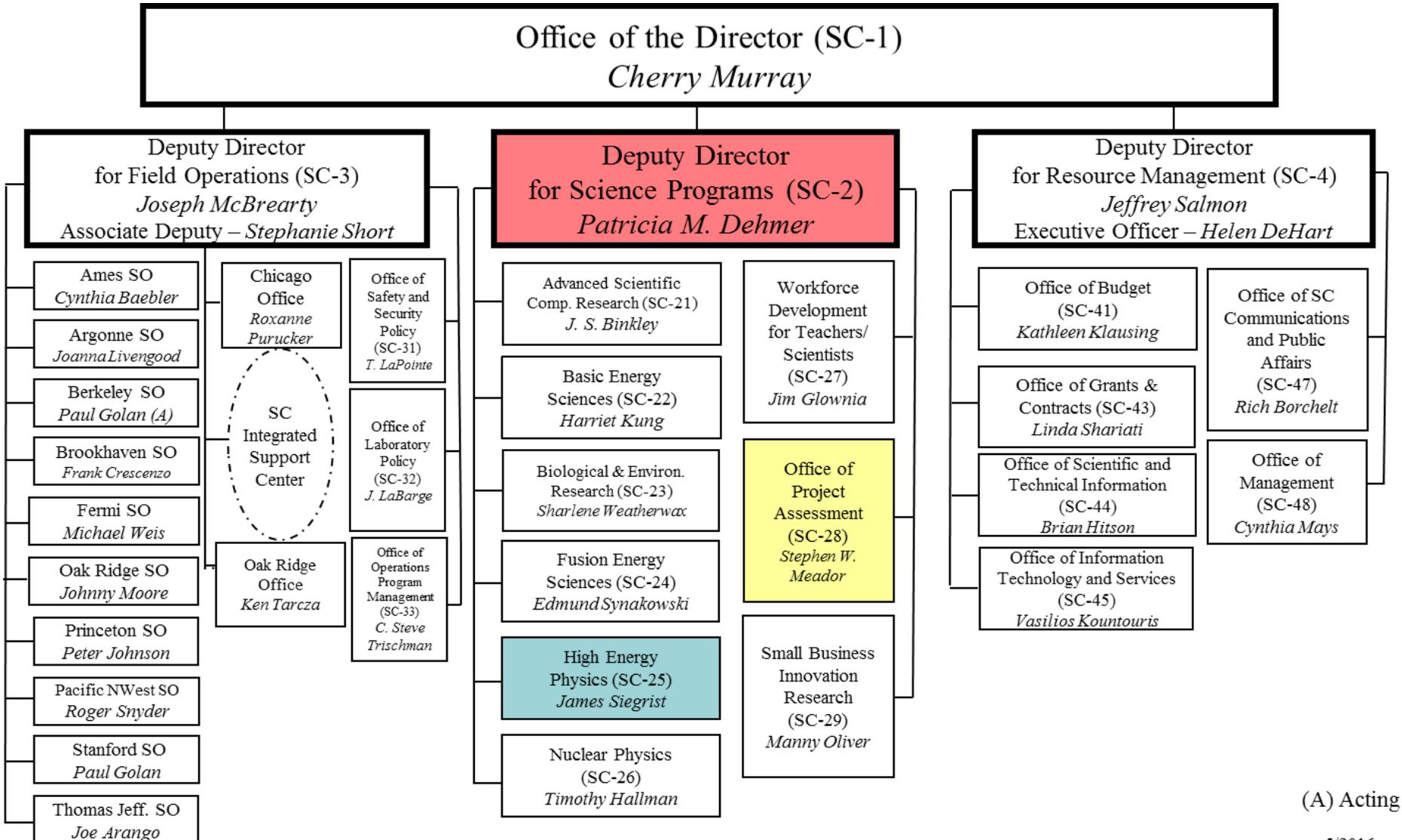
Subcommittee 4—Project Management

*Jon Kotcher, BNL
John Post, LLNL
John Wilkerson, UNC

*Lead

Observers

Mike Procario, DOE/SC
Simona Rolli, DOE/SC
Hanley Lee, DOE/SSO
Paul Golan, DOE/SSO
Jim Whitmore, NSF



(A) Acting



1. Design Maturity: Is the project on track to complete a preliminary design that will deliver the proposed technical scope within the cost envelope established at CD-1? Is the current design maturity and the project on track for CD-2 in the first half of FY 2017? Are there any outstanding R&D issues that need to be addressed before freezing a cost and schedule baseline in preparation for CD-2?
2. Cost, Schedule & Risk:
 - a. **Estimates**: Is the quality of the current cost, schedule and staffing estimates appropriate at this stage of the project?
 - b. **Tailoring Strategy**: Is the status of the project tailoring strategy appropriate at this stage of the project? Is the project considering any long lead procurements and in such case, is the project developing an appropriate procurement plan?
 - c. **Risk and Contingency**: What is the status of the risk analysis and risk registry? Is the contingency at a level commensurate with the current state of project development?
3. Management: Is the management structure appropriate to deliver the scope of the project? Are management roles well defined and conducive to a smooth execution of the project?
 - a. **DOE-NSF Coordination**: Is the management structure appropriate and are the resources adequate for DOE and NSF awardees? Is the communication between the two agencies and the understanding of interfaces between the two different scopes working well?
 - b. **DOE Multi-Lab Partnership**: Do the technical and managerial tasks between SLAC and Fermilab appear to be working well? Is there adequate support from SLAC, the partner laboratories and institutions in all necessary areas (e.g., safety, procurement, human resources, facility support)? Is there any area of concern in terms of resources and/or communication?
4. Previous Reviews Recommendations: What is the status of addressing the post-CD-1 recommendations from the CD-1 IPR?



TOTAL PROJECT COST (TPC)		\$750M or more	Less than \$750M to \$400M	Less than \$400M to \$100M	Less than \$100M to \$50M*	Less than \$50M* to \$20M	Less than \$20M to \$10M**
DECISION / REQUIREMENTS ¹ / APPROVAL ²							Delegation Allowed
CD-2--APPROVE PERFORMANCE BASELINE		S-4	SC-1	SC-2	SC-AD	SC-AD	SC-AD
PRIOR TO CD-2--PRELIMINARY DESIGN	Approve updated Acquisition Strategy if changes are major	SC-1 with SC-28 concurrence	SC-1 with SC-28 concurrence	SC-1 with SC-28 concurrence	SC-1 with SC-28 concurrence	SC-AD with SC-28 concurrence	SC-AD with SC-28 concurrence
	Establish a Performance Baseline (PB)	FPD	FPD	FPD	FPD	FPD	FPD
	Approve updated PEP	S-4	SC-1	SC-2	SC-AD	SC-AD	SC-AD
	Prepare a Baseline Fund. Profile & reflect in budget docs. & PEP. Consider full funding if TPC < \$50M	S-4	SC-1	SC-2	SC-AD	SC-AD	SC-AD
	Approval of Long-Lead Procurement	S-4	SC-1	SC-2	SC-AD	SC-AD	SC-AD
	Develop Project Management Plan, if applicable	N/A	N/A	N/A	N/A	N/A	N/A
	Complete Preliminary Design	Project		Project	Project	Project	Project
	Incorporate High Perf. & Sustainable Bldg. & Sustainable Environmental Stewardship	Project	Project	Project	Project	Project	Project
	Conduct a Preliminary Design Review	Team external to project	Team external to project	Team external to project	Team external to project	Team external to project	Team external to project
	Complete Preliminary Design Report	Project	Project	Project	Project	Project	Project
	Perform Baseline Validation Review	ICE or ICR by PM & SC-28	ICE or ICR by PM & SC-28	ICE or ICR by PM & SC-28	SC-28	SC-28	SC-28
	Conduct a Project Definition Rating Index analysis as part of an EIR	N/A	N/A	N/A	N/A	N/A	N/A
	Conduct a Technical Readiness Assessment & develop a Technical Maturation Plan	N/A	N/A	N/A	N/A	N/A	N/A
	Employ an EVMS compliant with ANSI/EIA-748A, or as defined in the contract	Contractor	Contractor	Contractor	Contractor	Contractor	N/A
	Prepare a Hazard Analysis Report	Field Organization (Site Office) or Lab	Site Office or Lab	Site Office or Lab	Site Office or Lab	Site Office or Lab	Site Office or Lab
	Continue with Quality Assurance Program	Site Office or Lab	Site Office or Lab	Site Office or Lab	Site Office or Lab	Site Office or Lab	Site Office or Lab
	Conduct Preliminary Security Vulnerability Assessment, if necessary	Site Office or Lab	Site Office or Lab	Site Office or Lab	Site Office or Lab	Site Office or Lab	Site Office or Lab
	Issue Final NEPA determination (i.e., FONSI)	SC-1 or Site Office	SC-1 or Site Office	SC-1 or Site Office	SC-1 or Site Office	SC-1 or Site Office	SC-1 or Site Office
	Update budget documents and Exhibit 300 if applicable	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Nuclear Facility	Hazard Cat. 1,2,3 Nuclear Facility--Update Safety Design Strategy (SDS)	SBAA & FPD, w/CNS or CDNS concurrence, as appropriate	SBAA & FPD, w/CNS or CDNS concurrence, as appropriate	SBAA & FPD, w/CNS or CDNS concurrence, as appropriate	SBAA & FPD, w/CNS or CDNS concurrence, as appropriate	SBAA & FPD, w/CNS or CDNS concurrence, as appropriate
Hazard Cat. 1,2,3 Nuclear Facility--Prepare a Preliminary Safety Design Report updating the CSDR		SBAA via the PSVR	SBAA via the PSVR	SBAA via the PSVR	SBAA via the PSVR	SBAA via the PSVR	SBAA via the PSVR
Hazard Cat. 1,2,3 Nuclear Facility--Prepare a Preliminary Safety Validation Report (PSVR)		SBAA	SBAA	SBAA	SBAA	SBAA	SBAA
Hazard Cat. 1,2,3 Nuclear Facility--Conduct a Technical Independent Project Review		PSO	PSO	PSO	PSO	PSO	PSO
Hazard Cat. 1,2,3 Nuclear Facility--Place Code of Record under Configuration Control		Project	Project	Project	Project	Project	Project
POST CD-2	Submit approved CD or equivalent documents to APM. If applicable, any PB BCP to APM	SC-28	SC-28	SC-28	SC-28	SC-28	SC-28
	Submit budget request for the remainder of TPC	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD	SC-AD
	Funding profile changes that negatively impact project	S-4	SC-1	SC-2	SC-2	SC-2	SC-2
	Update PARS II with monthly status	Prog. Mgr., FPD, and Contractor	Prog. Mgr., FPD, and Contractor	Prog. Mgr., FPD, and Contractor	Prog. Mgr., FPD, and Contractor	Prog. Mgr., FPD, and Contractor	Prog. Mgr. & FPD No Earned Value (EV)
	Continue with Monthly or Quarterly Project Reporting/Meeting	SC-AD Invite SC-1 and SC-28	SC-AD Invite SC-1 and SC-28	SC-AD Invite SC-2 and SC-28	SC-AD to invite SC-28	SC-AD to invite SC-28	SC-AD to invite SC-28
	SC-AD Request Annual Project Peer Review by PMSO	SC-28	SC-28	SC-28	SC-28	SC-28 Tailored	SC-28 Tailored



Tuesday, July 19, 2016—Wilson Hall, The Comitium

- 8:00 am DOE Full Committee Executive Session Fisher
- 9:00 am Project Overview and Technical Overview..... Cabrera
- 10:15 am Break
- 10:30 am Project Management OverviewFouts
- 11:30 am ES&H Overview Picker
- 12:00 pm Lunch
- 12:50 pm Review Photo
- 1:00 pm Breakouts Sessions (see schedule below)

Subsystem Status Breakouts

- 1:00 pm WBS 1.7 Backgrounds Control..... Orrell
- 2:00 pm Infrastructure (WBS 1.2, 1.3, 1.4, 1.5, 1.9, 1.10) Lukens
- 3:00 pm Break
- 3:15 pm WBS 1.1 Detector Towers..... Partridge
- 4:15 pm WBS 1.6 DAQ and Trigger Oser
- 4:40 pm WBS 1.8 Computing and Software.....Cartaro

Management/Cost & Schedule/ES&H Breakouts

- 1:00 pm Project Management (Risk Mgmt/Contingency Assessment)Fouts
- 1:30 pm ES&H Picker
- 2:00 pm Detector Towers Cost and Schedule (WBS 1.1) Tran, Partridge
- 3:00 pm Break
- 3:15 pm DAQ, Background, Computing (WBS 1.6, 1.7, 1.8, 1.11) Tran, Fouts
- 4:00 pm Infrastructure Cost and Schedule (WBS 1.2, 1.3, 1.4, 1.9, 1.10)..... Tran, Lukens
- 5:00 pm DOE Full Committee Executive Session..... Fisher
- 6:00 pm Adjourn



Wednesday, July 20, 2016

8:00 am	Q&A with the project team.....	All
9:00 am	Executive Session/Writing	Fisher
10:30 am	Break	
11:00 am	Executive Session/Dry Run	
12:00 pm	Lunch	
1:00 pm	Closeout Presentation with SuperCDMS-SNOLAB Management.....	Fisher
2:00 pm	Adjourn	



Executive Summary/2-page Summary Report.....Fisher*

1. IntroductionRolli*

2. Technical Systems Evaluation (Charge Questions 1, 4)

 2.1 ScienceMaricic*/SC-1

 2.1.1 Findings

 2.1.2 Comments

 2.1.3 Recommendations

 2.2 Detector Towers (WBS 1.1)..... McCammon*/SC-1

 2.3 Cryo/Shield, Infrastructure and Hocker*/SC-1

 Installation (WBS 1.2, 1.3, 1.4)

 2.4 Electronics, DAQ/Trigger, ComputingHuang*/SC-1

 Computing (WBS 1.5, 1.6, 1.8)

 2.5 Backgrounds, Calibrations, and Simulations (WBS 1.7, 1.10) ...Calaprice*/SC-1

3. Environment, Safety and Health (Charge Questions 3, 4).....Robinson*/SC-2

4. Cost and Schedule (Charge Questions 1, 2, 4) Fortner*/SC-3

5. Project Management (Charge Questions 3, 4) Kotcher*/SC-4

*Lead



Closeout Presentation and Final Report Procedures



(Use PowerPoint / No Smaller than 18 pt Font)

2.1 Use Section Number/Title corresponding to writing assignment list.

List Review Subcommittee Members

List Assigned Charge Questions and Review Committee Answers

2.1.1 Findings – What the project told us

- In bullet form, include your account of factual technical, cost, schedule, and management. Information provided/presented by the Project

2.1.2 Comments – What we think about what the project told us

- In bullet form, include your assessment of project status (observations, concerns, feedback, suggestions, etc.) based on the findings. This section carries more emphasis than the Findings, but does not require an action as do the Recommendations. Do not number your comments.

2.1.3 Recommendations – What we think the project needs to do

- 1. Beginning with an action verb, provide a brief, concise, and clear statement with a due date.**

For Critical Decision reviews, include a specific recommendation addressing how the Committee judged the readiness for the CD, *i.e.*:

- **The project is ready to proceed to CD-2; *or***
- **The project is ready to proceed to CD-2, after addressing the following recommendations**



Format: Final Report

(Use MS Word / 12pt Font)

2.1 Use Section Number/Title corresponding to writing assignment list.

2.1.1 Findings – What the project told us

Include a brief narrative description of technical, cost, schedule, management information provided by the project. Each subcommittee will emphasize their area of responsibility.

Cost and schedule subcommittee should provide attachments for approved project cost breakdown and schedule. Management subcommittee should provide attachment for approved project organization and names of personnel.

2.1.2 Comments – What we think about what the project told us

Descriptive material assessing the findings and making observations and conclusions based on the findings. **The committee's answer to the charge questions should be contained within the text of the Comments Section.** Do not number your comments.

2.1.3 Recommendations – What we think the project needs to do

1. Beginning with an action verb, provide a brief, concise, and clear statement with a due date.
- 2.

Please Note: Recommendations are approved by the full committee and presented at the review closeout briefing. Recommendations SHOULD NOT be changed or altered from the closeout report to the Final Report.



**Closeout Report on the
DOE/SC CD-2 Review of the
SuperCDMS-SNOLAB Project
Conducted at
Fermi National Accelerator Laboratory
July 19-20, 2016**

Kurt Fisher

Committee Chair

Office of Science, U.S. Department of Energy

<http://www.science.doe.gov/opa/>



1. Design Maturity: Is the project on track to complete a preliminary design that will deliver the proposed technical scope within the cost envelope established at CD-1? Is the current design maturity and the project on track for CD-2 in the first half of FY 2017? Are there any outstanding R&D issues that need to be addressed before freezing a cost and schedule baseline in preparation for CD-2?

4. Previous Reviews Recommendations: What is the status of addressing the post-CD-1 recommendations from the CD-1 IPR?
 - **Findings**
 - **Comments**
 - **Recommendations**



1. Design Maturity: Is the project on track to complete a preliminary design that will deliver the proposed technical scope within the cost envelope established at CD-1? Is the current design maturity and the project on track for CD-2 in the first half of FY 2017? Are there any outstanding R&D issues that need to be addressed before freezing a cost and schedule baseline in preparation for CD-2?

4. Previous Reviews Recommendations: What is the status of addressing the post-CD-1 recommendations from the CD-1 IPR?
 - **Findings**
 - **Comments**
 - **Recommendations**



1. Design Maturity: Is the project on track to complete a preliminary design that will deliver the proposed technical scope within the cost envelope established at CD-1? Is the current design maturity and the project on track for CD-2 in the first half of FY 2017? Are there any outstanding R&D issues that need to be addressed before freezing a cost and schedule baseline in preparation for CD-2?

4. Previous Reviews Recommendations: What is the status of addressing the post-CD-1 recommendations from the CD-1 IPR?
 - **Findings**
 - **Comments**
 - **Recommendations**



1. Design Maturity: Is the project on track to complete a preliminary design that will deliver the proposed technical scope within the cost envelope established at CD-1? Is the current design maturity and the project on track for CD-2 in the first half of FY 2017? Are there any outstanding R&D issues that need to be addressed before freezing a cost and schedule baseline in preparation for CD-2?

4. Previous Reviews Recommendations: What is the status of addressing the post-CD-1 recommendations from the CD-1 IPR?
 - **Findings**
 - **Comments**
 - **Recommendations**



1. Design Maturity: Is the project on track to complete a preliminary design that will deliver the proposed technical scope within the cost envelope established at CD-1? Is the current design maturity and the project on track for CD-2 in the first half of FY 2017? Are there any outstanding R&D issues that need to be addressed before freezing a cost and schedule baseline in preparation for CD-2?

4. Previous Reviews Recommendations: What is the status of addressing the post-CD-1 recommendations from the CD-1 IPR?
 - **Findings**
 - **Comments**
 - **Recommendations**



3. Management: Is the management structure appropriate to deliver the scope of the project? Are management roles well defined and conducive to a smooth execution of the project?
 - a. **DOE-NSF Coordination**: Is the management structure appropriate and are the resources adequate for DOE and NSF awardees? Is the communication between the two agencies and the understanding of interfaces between the two different scopes working well?
 - b. **DOE Multi-Lab Partnership**: Do the technical and managerial tasks between SLAC and Fermilab appear to be working well? Is there adequate support from SLAC, the partner laboratories and institutions in all necessary areas (e.g., safety, procurement, human resources, facility support)? Is there any area of concern in terms of resources and/or communication?

4. Previous Reviews Recommendations: What is the status of addressing the post-CD-1 recommendations from the CD-1 IPR?
 - **Findings**
 - **Comments**
 - **Recommendations**



1. Design Maturity: Is the project on track to complete a preliminary design that will deliver the proposed technical scope within the cost envelope established at CD-1? Is the current design maturity and the project on track for CD-2 in the first half of FY 2017? Are there any outstanding R&D issues that need to be addressed before freezing a cost and schedule baseline in preparation for CD-2?

2. Cost, Schedule & Risk:
 - a. **Estimates**: Is the quality of the current cost, schedule and staffing estimates appropriate at this stage of the project?
 - b. **Tailoring Strategy**: Is the status of the project tailoring strategy appropriate at this stage of the project? Is the project considering any long lead procurements and in such case, is the project developing an appropriate procurement plan?
 - c. **Risk and Contingency**: What is the status of the risk analysis and risk registry? Is the contingency at a level commensurate with the current state of project development?

4. Previous Reviews Recommendations: What is the status of addressing the post-CD-1 recommendations from the CD-1 IPR?

- **Findings**
- **Comments**
- **Recommendations**



PROJECT STATUS		
Project Type	MIE / Line Item / Cooperative Agreement	
CD-1	Planned:	Actual:
CD-2	Planned:	Actual:
CD-3	Planned:	Actual:
CD-4	Planned:	Actual:
TPC Percent Complete	Planned: _____%	Actual: _____%
TPC Cost to Date		
TPC Committed to Date		
TPC		
TEC		
Contingency Cost (w/Mgmt Reserve)	\$	
Contingency Schedule on CD-4b	_____ months	_____ %
CPI Cumulative		
SPI Cumulative		



3. Management: Is the management structure appropriate to deliver the scope of the project? Are management roles well defined and conducive to a smooth execution of the project?
 - a. **DOE-NSF Coordination**: Is the management structure appropriate and are the resources adequate for DOE and NSF awardees? Is the communication between the two agencies and the understanding of interfaces between the two different scopes working well?
 - b. **DOE Multi-Lab Partnership**: Do the technical and managerial tasks between SLAC and Fermilab appear to be working well? Is there adequate support from SLAC, the partner laboratories and institutions in all necessary areas (e.g., safety, procurement, human resources, facility support)? Is there any area of concern in terms of resources and/or communication?

4. Previous Reviews Recommendations: What is the status of addressing the post-CD-1 recommendations from the CD-1 IPR?

- **Findings**
- **Comments**
- **Recommendations**