



Conventional Facilities Overview (WBS 121.06)

Breakout Session

Steve Dixon

PIP-II IPR

4-6 December 2018

In partnership with:

India/DAE

Italy/INFN

UK/STFC

France/CEA/Irfu, CNRS/IN2P3

Charge Questions Addressed

1. Is the project making adequate technical progress to ensure that the completed project will perform as planned and meet the key performance parameters?
2. Will execution of PIP II design plans and planned R&D program activities ensure most major technical risks will be appropriately mitigated or retired prior to CD-3?
3. Has the project made adequate progress on its resource-loaded schedule to complete it by the time of CD-2?
4. Are preparations for defining, documenting, and managing the international in-kind contributions suitable to ensure their timely delivery and technical fidelity?
5. Is the proposed CD-2 timeline reasonable and consistent with the current project status?
6. Is ESH&Q being handled appropriately?
7. Are the proposed risk mitigation strategies reasonable and are the proposed contingencies acceptable?
8. Has the project satisfactorily responded to the recommendations from previous reviews?
9. Are there any other significant issues that require HEP or project's attention?

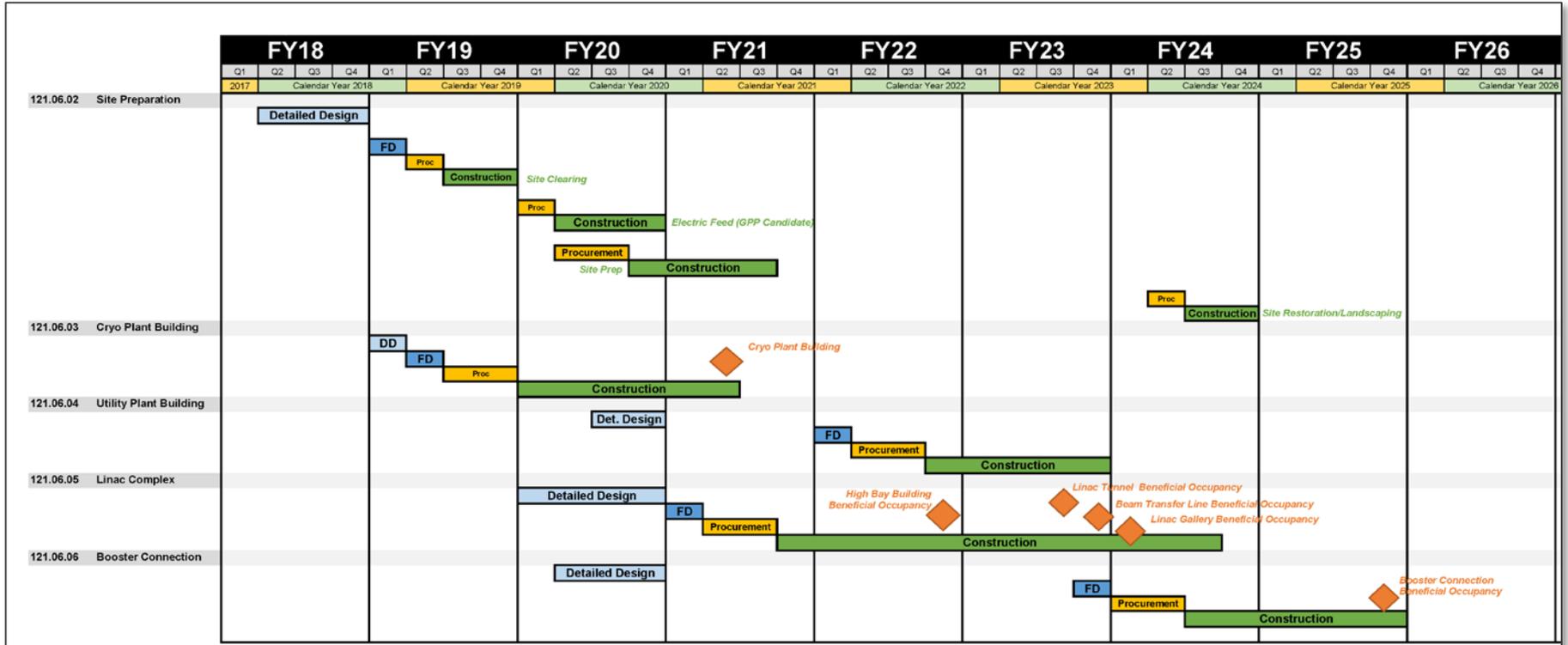
Outline

- Technical Progress
- Interfaces
- Risks and Mitigations
- ESH&Q
- Previous Review Recommendations
- Summary

About Me:

- PIP-II Level 2 Manager for Conventional Facilities
- Relevant Experience
 - Licensed Architect;
 - Project Management Professional (PMP);
 - LEED Accredited Professional;
 - 26+ years at Fermilab;
 - NOvA Project L2 Manager for Site and Buildings;
 - 2014 CD-4
 - 2015 U.S. DOE Secretary's Award for Excellence
 - General Plant Project Manager for 15+ years
 - Short Baseline Neutrino (SBN) Near Detector Building;
 - Short Baseline Neutrino (SBN) Far Detector Building;
 - Experimental Operations Center;

CF Schedule Overview



Progress to Date Since CD-1

Charge #1, 2

- General Progress Milestones
 - January 2018 - Value Engineering Workshop with the CF team [1]
 - April 2018 – Received updated cost/schedule estimate [2]
 - June 2018
 - Completed Geotechnical Engineering Investigation [3]
 - Chartered and held the first meeting of the PIP-II Architectural Advisory Board [4]
 - July 2018
 - Received favorable wetland determination for the US ACOE [5]
 - Developed preliminary shielding strategy for Cryogenics Plant Building with 121.03 (Accelerator Systems)
 - November 2018 – Preliminary Design Report
 - December 2018 – Completed the A/E recompile process

[1] See PIP-II-doc-1377

[2] See PIP-II-doc-333

[3] See PIP-II-doc-1533

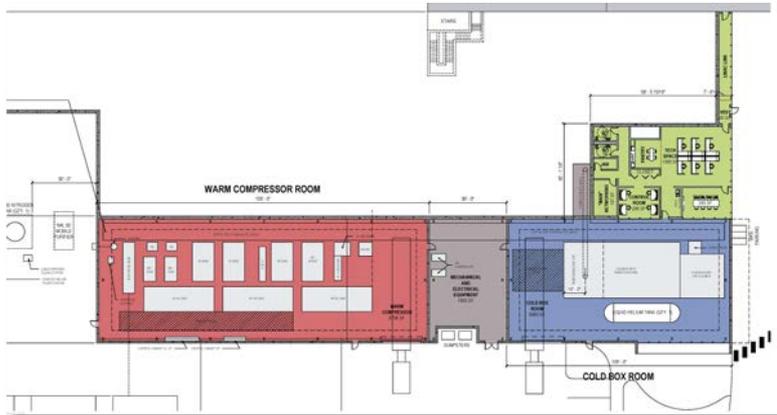
[4] See PIP-II-doc-1308 and PIP-II-doc-1548

[5] See PIP-II-doc-1630

Technical Progress – In Progress

Charge #1

- Site Preparation (WBS 121.06.02)
 - Site Clearing package^[1] (*Authorization to Proceed Approved*)
 - Site Work package^[2]
 - Electrical Feeder package^[2]
 - Site Restoration/Landscaping package^[2]
- Cryogenics Plant Building (WBS 121.06.03)
 - Technical Requirements Complete ^[3]
 - Completed Water Quality Testing ^[4]



Cryogenic Plant Building Plan



View Looking Southwest

[1] See TeamCenter ED0008374

[2] See TeamCenter ED0008459

[3] See TeamCenter ED0008373

[4] See PIP-II-doc-155

Technical Progress – Planned

- Utility Plant Building (WBS 121.06.04)
- Linac Complex (WBS 121.06.05)
 - Combined into one WBS
 - High Bay Building
 - Linac Tunnel
 - Linac Gallery
 - Beam Transfer Line
- Booster Connection (WBS 121.06.06)
 - Discussion of interface point between Linac Complex and Booster Connection based on accelerator shutdowns

- Project Interfaces (*Managed through PIP-II processes*) ^[1]
 - ED0007698 – Interface Control Document
 - WBS 121.02 - SRF & Cryo Systems
 - WBS 121.02.05 – Cryo Plant (B. Hansen)
 - WBS 121.02.06 – Cryogenic Distribution (A. Dalesandro)
- Fermilab Interfaces
 - Infrastructure Connections (*Managed through FESS processes*)
 - General Plant Projects (*Managed through FESS processes*)
- International Interface (*Managed through WBS 121.02*)
 - Cryogenic plant is Indian partner deliverable

As a reminder, Subproject Requirement Changes is the highest Conventional Facilities risk

FESS is the Facilities Engineering Services Section

[1] See PIP-II Systems Engineering Management Plan at PIP-II-doc-1539

Conventional Facilities Risks

- **0 High Risks**
- **15 Medium Risks**
- **31 Low Risks**

Top 3 Risks

- RT-121-06-001 – Subproject Requirement Changes
- RT-121-06-002 – Accelerator Shutdown Schedule
- RT-121-06-003 – Construction Bids Exceed Estimates

Link to Risk Register:

<https://fermipoint.fnal.gov/organization/ocoo/ippm/Lists/Risk%20Register/all-risks.aspx>

Consider and plan for ES&H issues throughout the project life cycle

- Conceptual Design Phase
 - ES&H input includes review of the design, input from Tritium Task Force and Life Safety Analysis [1]
- Design Phase
 - ES&H is considered in A/E selection process;
 - ES&H is included in design reviews;
 - Implement Safety by Design process;
 - Incorporate Hazard Analysis Report hazards in the design process [2]
- Procurement/Construction Phase
 - Include safety performance as part of the subcontractor selection process;
 - Detail the responsibilities for team members including the Construction Subcontractor and Fermilab Construction Coordinator;
 - Independent oversight by ESH&Q Section

[1] Life Safety Analysis can be found at PIP-II-doc-120

[2] Hazard Analysis Report can be found at PIP-II-doc-140

Quality Management

- Process to date include:
 - Requirement and Specification Review (PIP-II process) [1]
 - Comment and Compliance Review (FESS/E process)
 - QAQC Process Report (A/E process)

Version Date: October 8, 2018

	PIP-II CONVENTIONAL FACILITIES QUALITY ASSURANCE RESPONSIBILITY MATRIX							Notes	
	PIP-II Leadership		Stakeholders		PIP-II CF TEAM	Architect/Engineering Team			Construction Subcontractor
	PIP-II Subprojects	Facilities	Design Team	Commissioning Agent					
PRELIMINARY PHASE									
Functional Requirement Specification (FRS)	Review and Approve FRS	Develop and Document Functional Requirements	Develop and Document Functional Requirements	Review Requirements and Incorporate into FRS	Review and Approve FRS	---			
Notes for High Performance Sustainable Building (HPSB) criteria	Review and Approve HPSB goals	Develop and Document Functional Requirements	Develop and Document Functional Requirements	Review Requirements and Incorporate into FRS	Review and Approve FRS			See PIP-II-doc-104	
Technical Requirements Specification (TRS)	Review and Approve TRS	Develop and Document Functional Requirements	Develop and Document Functional Requirements	Review Requirements and Incorporate into TRS	Review and Approve TRS				
DESIGN PHASE									
Issues of Design (BID) Document	Review BID Document	Review BID Document	Review BID Document	Review BID Document	Review BID Document	Develop BID Document based on FRS and TRS	Review BID Document		
Design, Technical and Support Materials (Design Documents)	Provide input	Provide input	Provide input	Provide input	Provide input	Develop	Review		
Architectural Design Review (ADR)	Participate and Approve	Participate and Approve	Review Design Documents	Lead, Collect Comments and Develop Report	Participate and Approve	Participate	Review Design Documents		
Site Policy Independent Review	Participate	Participate	Participate	Participate	Participate	Lead, Review to ensure team understanding comments	Participate		
Value Engineering Exercises	Participate	Participate	Participate	Coordinate and Lead	Participate	Participate	Participate		
Final Design Review (FDR)	Participate and Approve	Participate and Approve	Review Design Documents	Lead, Collect Comments and Develop Report	Participate and Approve	Participate	Review Design Documents		
Environmental Review Plans	Provide input		Review and Submit to DOE	Develop	Provide input	Provide input	Develop		
Commissioning Plan				Review	Review	Review	Review		
Commissioning Materials (identifications, naming requirements, manuals, drawings, etc)				Review	Review	Develop and Integrate in Subcontract Documents	Review		
Approved Documents (design, specs, and drawings)	Participate and Approve	Participate and Approve	Review Design Documents	Lead, Collect Comments and Develop Report	Participate and Approve	Participate	Review Design Documents		
Production Readiness Review (PRR)	Participate and Approve	Participate and Approve	Review Design Documents	Lead, Collect Comments and Develop Report	Participate and Approve	Participate	Review Design Documents		
DOCUMENTATION PHASE									
Request for Proposals				Assess and Submit to Procurement	Provide Technical Response	Provide Subcontract Documents	Provide Technical Response		
Proposed Technical Questions		Provide Technical Response	Provide Technical Response	Coordinate Response	Provide Technical Response	Provide Technical Response	Provide Technical Response		
Proposed Life-cycle	Review as Required			Perform Technical Evaluation	Review as Required	Review as Required	Provide Technical Response		
Request for information		Provide Technical Response	Provide Technical Response	Coordinate Response	Provide Technical Response	Provide Technical Response	Provide Technical Response		
CONSTRUCTION PHASE									
Submittal Schedule and drawings, material analysis, etc. schedule				Coordinate, Track and Review	Review	Review	Review	Submit	
Construction Commission Meeting				Participate as Needed	Participate as Needed	Participate as Needed	Participate as Needed	Lead	
Engineering Change	Review and Approve	Provide Input, Review and Approve	Participate as Needed	Initiate, Coordinate, Track and Approve	Participate as Needed	Provide Input, Coordinate, Track and Approve	Participate as Needed	Lead	
Construction Milestones				Participate as Needed	Participate as Needed	Participate as Needed	Participate as Needed	Lead	
Commissioning Plan				Participate as Needed	Review	Review	Review	Review	
Commissioning Schedule				Coordinate and Track Progress	Review	Review	Review	Coordinate	
Training - Equipment	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Exclude	
Training - Equipment	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Exclude	
Training - System Functionalities	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Exclude	
Training - Network Communications	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Exclude	
Training - Safety	Review and Approve	Participate as Needed	Participate as Needed	Participate as Needed	Participate as Needed	Participate as Needed	Participate as Needed	Exclude	
Production Commissioning	Review and Approve	Participate as Needed	Participate as Needed	Coordinate Milestones, Document and Approve	Participate as Needed	Participate as Needed	Participate as Needed	Exclude	
Final Acceptance	Review and Approve	Participate as Needed	Participate as Needed	Coordinate Milestones, Document and Approve	Participate as Needed	Participate as Needed	Participate as Needed	Exclude	
POST CONSTRUCTION / OCCUPANCY									
Historical System Functional Test		Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Review Compliance Document	Exclude	
Operability Review		Participate as Needed	Participate as Needed	Participate	Participate as Needed	Participate as Needed	Participate as Needed	Exclude	
Notes									
Review									
Coordinate									
Develop									
Lead									
Participate									
Participate and Approve									
Review and Approve									
Review as Required									
Participate as Needed									
Review									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									
Review and Approve									
Participate as Needed									
Participate and Approve									

Response to Recommendations

- Director's CD-1 Review (October 2017) ^[1]
 - 2 Recommendations, both closed
- DOE CD-1 Review (December 2017) ^[2]
 - 3 Recommendations, all closed
- P2MAC Review (March 2018) ^[3]
 - 3 Recommendations, all closed

Link to iTrack database: <https://www.esh.fnal.gov/pls/cert/iTrackRPT.html>

[1] Review ID 47866

[2] Review ID 48107

[3] Review ID 48469

Summary

- Focus of Technical Progress has been the Site Preparation and Cryogenics Plant Building (CD-3A request) to be ready to receive the cryogenic equipment.
- The Site Preparation work is 90% complete and on track for completion in January 2019;
- Project Management functions (ES&H, Quality, Interfaces and Risk) processes are in place and functioning;
- Previous review recommendations have been incorporated
- Thanks for your time.

END