



Interfaces with Other Projects

Breakout Session

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PIP-II IPR

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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

- Interfaces
- Risks and Mitigations
- Summary

About Me:

- PIP-II Deputy Manager for Conventional Facilities
- Relevant Experience
 - Licensed Professional Engineer;
 - Project Management Professional (PMP);
 - 9+ years at Fermilab;
 - 18+ years utility and infrastructure engineering;
 - UUP-SLI Project L3 Manager for High Voltage Infrastructure;
 - 2018 CD-4
 - General Plant Project Manager
 - Master Substation Bypass;
 - Computer System Upgrades – VoIP;

Functional Requirements Specification ^[1]

Charge #2

Requirement #	Requirement Statement
F-121.06.03-A008	The CPB shall connect to existing Fermilab infrastructure. This includes electrical, domestic water, industrial cooling water, sanitary sewer, chilled water and data/communication.

[1] See TeamCenter Document ED0006718

Interfaces

- Project Interfaces (*Managed through PIP-II processes*) ^[1]
 - ED0007697 – Interface Control Document
- Fermilab Interfaces
 - Infrastructure Connections (*Managed through FESS processes*)
 - General Plant Projects (*Managed through FESS processes*)
- International Interface
 - None

FESS is the Facilities Engineering Services Section

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

• Project Assumptions^[1]

Conventional Facilities Assumptions

4 CONVENTIONAL FACILITIES ASSUMPTIONS

Conventional facilities include all facilities and systems required to house and provide utilities support for the technical equipment for PIP-II technical equipment. The conventional facilities are described in the *PIP-II Conceptual Design Report*, and extend existing Fermilab utility infrastructure to the project site. This section outlines the assumptions that are used in developing the estimates and budget for the conventional facilities.

- 1,400 gallons per minute of industrial cooling water (ICW) will be available for PIP-II process loads. This flow will be available in all operating conditions. The connection location from the existing site-wide ICW will be in the vicinity of AZero;
- ICW will be utilized for Fire Protection. The connection location will be in the vicinity of AZero;
- The PIP-II ICW return discharge will be routed to the existing AZero cooling pond. It is assumed that the existing system to pump the ICW to the Casey's Pond system is adequate for this flow.
- 250 tons of chilled water will be available from the Central Utility Building (CUB) for use by PIP-II. The connection point for the chilled water will be in the vicinity of CUB;
- PIP-II will require six (6) 13.8 electrical feeders, fed from the Master Substation (MSS);
- Existing feeder 46A, fed from the Kautz Road Substation, will be used for backup of critical PIP-II systems;
- PIP-II will install new electrical breakers at MSS;
- Existing electrical ductbanks will be utilized for PIP-II feeders from MSS to manhole P-71 in the main ring;
- New PIP-II electrical ductbanks will be extended from the existing electrical system at manhole P-71;
- New electrical ductbanks will follow the latest safety isolation standards;
- A new utility corridor with natural gas, domestic water supply (DWS), sanitary sewer, data/communications and chilled water will be extended from the vicinity of CUB to the PIP-II project site;
- Maintenance of systems/buildings/structures will be transferred from the PIP-II project to Fermilab at the time of Beneficial Occupancy;
- Conventional facilities will be responsible for the mechanical equipment required for oxygen deficiency hazard (ODH) mitigation. The design, installation and commissioning of the control portion of the ODH system will be accomplished by the Accelerator Division (AD) controls group;
- The maintenance interface point for systems utilizing ICW will be the heat exchanger. FESS will be responsible for operation and maintenance of the system up to and including the heat exchanger while AD will be responsible for the process side of the system as defined as the flanges on the process side of the heat exchanger;
- For systems utilizing ICW without heat exchangers, the interface point will be the strainer/filter. FESS will be responsible for operation and maintenance of the system up to and including the strainer/filter while AD will be responsible for the process side of the system as defined as the pipe flanges on the downstream side of the strainer/filter;
- The maintenance interface point for electrical systems will be the transformers. FESS will be responsible for the operation and maintenance of the system up to and including the transformers and secondary connections at the incoming service panelboards. AD will be responsible for the electrical distribution systems within the buildings.

PIP-II Project Assumptions/11-13-17

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Conventional Facilities Assumptions

- Compliance with "One-for-One" Replacement legislation will be accomplished by design the conventional facilities to meet design guidance and reporting of square footage to DOE through standard FESS methods [8].
- Where readily available, Fermilab will provide to the PIP-II project existing precast concrete shield blocks at no charge. The type and quantity will be determined as part of the refinement of the design of the conventional facilities. In the event substantial effort is required to access existing shielding, the project will be responsible for access.
- The existing Booster Tower Southeast (RIMS No. 208) will be demolished as part of the PIP-II project after decommissioning by Fermilab. Delineation of the responsibilities for this work are found in the PIP-II Fermilab Interface document [9].

PIP-II Project Assumptions/11-13-17

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[1] See PIP-II Project Assumptions Document at PIP-II-doc-144

• Fermilab- PIP-II Interfaces^[1]

Conventional Facilities

5 CONVENTIONAL FACILITIES

The PIP-II Project includes significant new on-site Conventional Facilities. These facilities must be developed to tie into existing conventional infrastructure. The Conventional Facilities effort will be led by the Project with assistance from the Facilities Engineering Support Section (FESS) and an outside Architectural Engineering (and possibly Construction Management) firm. More specifically:

- The PIP-II Project is accountable and holds responsibility for the planning, design, and construction of the Conventional Facilities necessary to house the apparatus and related support equipment for the PIP-II accelerator and beamlines on the Fermilab site. This includes buildings, below grade enclosures, shielding berms and related site improvements.
- The PIP-II Conventional Facilities will be managed, planned, designed and constructed by an integrated team of design and construction professionals consisting of consultants and in-house experts, including members of FESS, to achieve the project goals. The PIP-II Associate Project Manager for Conventional Facilities will manage this integrated team, and collaborate with FESS for all necessary design and construction resources to ensure the Project's needs are satisfied and long-term engineering expertise is maintained within FESS.
- To promote coordination and continuity with existing laboratory processes, procedures, and facilities, FESS will assign a PIP-II project liaison to facilitate the management of FESS resources during the design, procurement and construction phases.
- FESS will be responsible for providing knowledgeable technical subject matter experts to oversee specific technical aspects of the work during planning, design, and construction of the PIP-II conventional facilities.
- The PIP-II Project and FESS will assure that the conventional facilities comply with the Fermilab Engineering Manual and will utilize FESS Engineering's Comment and Compliance Review and Construction Document Signoff processes, tailored to PIP-II's requirements, to capture design approvals and to ensure dissemination of design information and allow FESS and Fermilab to comment on, and therefore influence, PIP-II conventional facilities designs.
- Electronic documentation related to the PIP-II conventional facilities will be stored on the FESS servers during project development. PIP-II project documentation will follow standard FESS project naming conventions as well as applicable CAD standards.
- Fermilab will assure that access to existing site infrastructure is provided for tie-in to the PIP-II Conventional Facilities. Detailed requirements are contained in Section 4 of the PIP-II Assumptions Document.

The primary interface between the PIP-II conventional facilities and the existing accelerator complex is located at the connection of the PIP-II Beam Transfer Line into the Booster. To accommodate this connection, the Booster Tower Southeast (FIMS No. 208) will be demolished as part of the PIP-II work scope. Listed below are the specific items and responsibilities of this work:

- Fermilab will relocate the existing occupants and functions currently housed in the building;
- Fermilab will mitigate lead, asbestos and activated components within the building;
- Fermilab will terminate existing utilities (electrical, industrial cooling water, domestic water, sanitary sewer, natural gas, data/communication) to a point outside the building demolition limits;

Conventional Facilities

- Fermilab will prepare and submit paperwork and notification of demolition in accordance with current procedures;
- Fermilab demolition preparation will be completed by October 2023;
- PIP-II will demolish the Booster Tower Southeast building;
- At the conclusion of the PIP-II work an earthen shielding berm will be installed above the existing Booster enclosure and new PIP-II enclosures;
- PIP-II will replace the existing exit stair from the Booster enclosure;
- PIP-II will install a weathertight entrance to the east Booster Gallery.

PIP-II will maintain access to the electrical substation located southeast of the Booster Tower Southeast;

[1] See Fermilab - PIP-II Interface Document at PIP-II-doc-528

Opportunity for the Laboratory to Provide Infrastructure Improvements Funding Through HEP

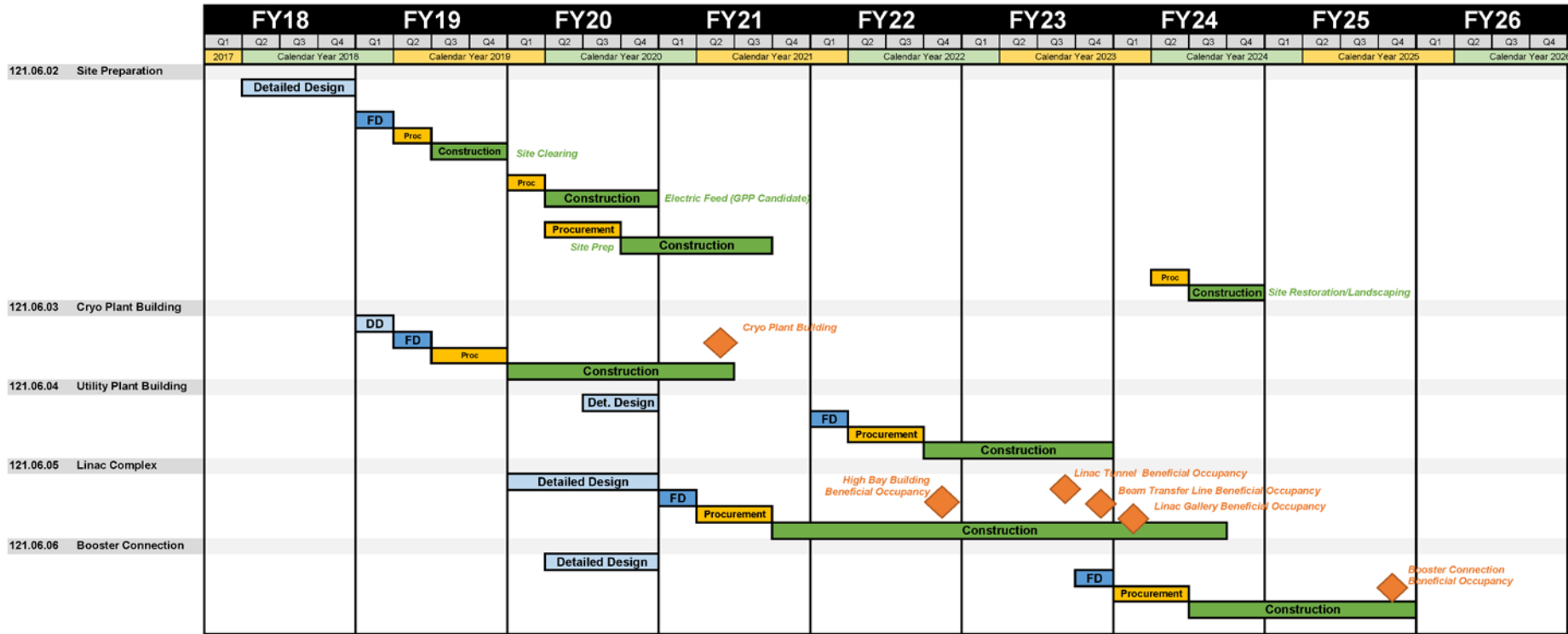
- Utility Corridor
 - Design Phase (~90% Design)
 - Anticipate Complete December 2018;
 - Construction Phase
 - 3Q FY19 – Support the Construction of the Cryo Plant Building
- Electrical Feeder Package – Kautz Road Substation
 - Design Phase
 - 1Q FY20
 - Construction Phase
 - 3Q FY20
- Electrical Feeder Package – Master Substation
 - Design Phase
 - 1Q FY23
 - Construction Phase
 - 1Q F23

Opportunity for the Laboratory to Provide Infrastructure Improvements Funding Through SLI

- CUB Building Expansion
 - Design Phase
 - 1Q FY20;
 - Construction Phase
 - 3Q FY20
- Booster Tower Personnel Relocation
 - Design Phase
 - 1Q FY21;
 - Construction Phase
 - 3Q FY21
- Booster Tower Demolition Make Ready
 - Design Phase
 - 1Q FY22;
 - Construction Phase
 - 3Q FY22

Schedule Detail

Charge #2



Summary

- Project/Fermilab interfaces are defined and approved;
- Potential Fermilab opportunities are being tracked within the project
- Risks are understood and are being managed
- Project team is motivated, qualified, and ready to deliver
- We look forward to your feedback
- Thank you for your attention

END