



Cryogenics Plant Building Overview

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Requirements and Specifications Review

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In partnership with:

India/DAE

Italy/INFN

UK/STFC

France/CEA/Irfu, CNRS/IN2P3

Outline

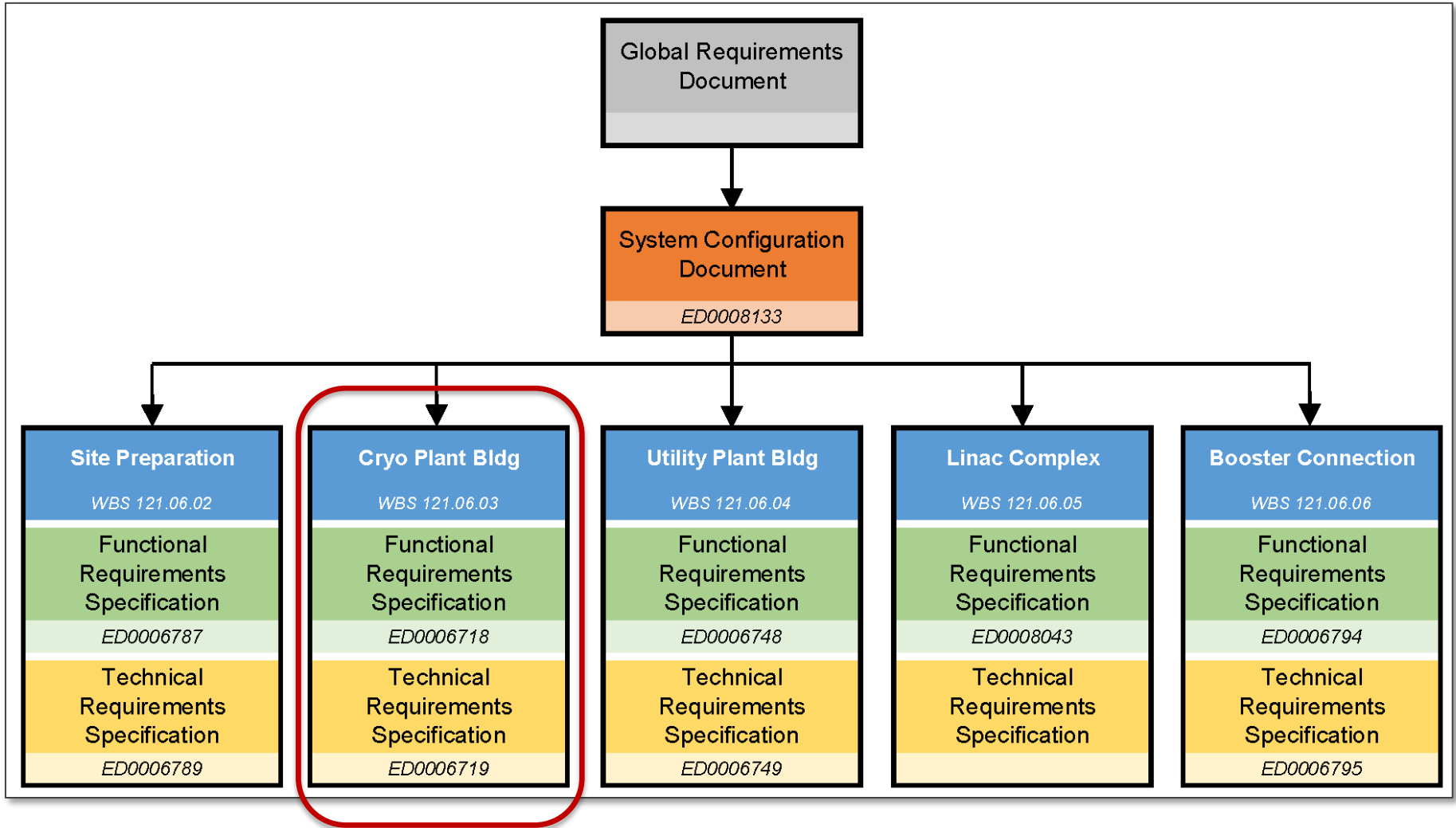
- Scope/Deliverables
- Requirements
- Preliminary Design, Maturity
- Technical Progress to Date

Scope and Deliverables ^[1]

- **WBS 121.06.03.01 – Project Management and Coordination**
Project management for the Cryoplant Building including the oversight and coordination of the technical effort, project planning and scheduling, cost estimating, risk and contingency analysis, and reporting. Includes travel costs for management, technical coordination, and vendor visits.
- **WBS 121.06.03.02 – Detailed and Final Design**
Services needed for the design of the Cryo Plant Building work scope. It describes the labor resources, materials and services, including architectural/engineering services, necessary for planning, oversight and engineering and design.
- **WBS 121.06.03.03 – Construction on Site**
Procurement and management for all contracted labor, materials, tools, equipment, and services needed for the construction of the Cryo Plant Building work scope. It describes the labor resources, materials and services necessary organization, planning, oversight and engineering, design, inspection and administration (EDIA) of the construction work on the Fermilab site.

[1] Definitions from WBS Dictionary, PIP-II-doc-599

WBS L3 System Requirements



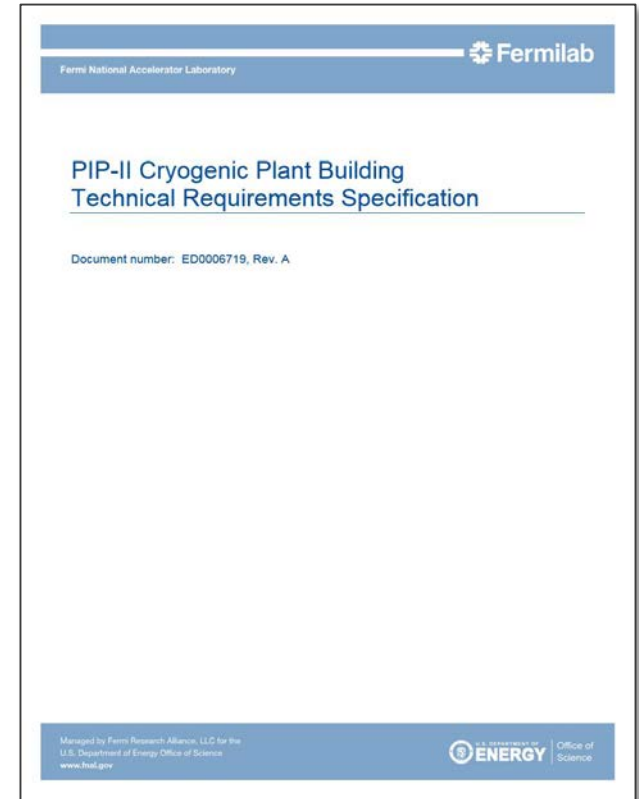
Functional Requirements Specification [1]

Requirement #	Requirement Statement
F-121.06.03-A001	The CPB shall provide a safe environment for employees and the public.
F-121.06.03-A002	The CPB shall provide space and infrastructure with the proper floor load rating for the warm compressors.
F-121.06.03-A003	The CPB shall provide space and infrastructure with the proper floor load rating for the cold box.
F-121.06.03-A004	The CPB shall provide space and infrastructure for unloading/loading activities
F-121.06.03-A005	The CPB shall provide exterior space for storage tanks/dewars.
F-121.06.03-A006	The CPB shall provide space for operating the cryopant including control room space, meeting/planning space and support space.
F-121.06.03-A007	The CPB shall comply with the overall character of the PIP-II campus and applicable portions of the Fermilab Campus Plan.
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.
F-121.06.03-A009	The CPB shall be located adjacent to the PIP-II Linac Complex such that the cryogenic distribution system feeds the front end of the Linac.
F-121.06.03-A010	The CPB shall provide foundations for gaseous helium storage tanks.
F-121.06.03-A011	The CPB shall provide foundations for a liquid helium dewar.
F-121.06.03-A012	The CPB shall provide foundations for a liquid nitrogen dewar.
F-121.06.03-A013	The CPB shall provide truck access for helium and nitrogen deliveries.
F-121.06.03-A014	The CPB shall provide space and infrastructure to support a 4.5 K cold box upgrade option

[1] See TeamCenter Document ED0006718

Technical Requirements Specification [1]

Requirement ID	FRS Reference	Requirement Statement
General		
T-121.06.03-A001	F-121.06.03-A009	The CPB shall be located at the upstream end of the Linac Complex
Architectural		
T-121.06.03-B001	F-121.06.03-A007	<p>The CPB shall be developed based on the 2018 Fermilab Campus Master Plan including the desire that the "design of buildings and open spaces should encourage interaction, creating the settings to bring staff, users and visitors together, becoming vibrant centers of laboratory life."</p> <p>To this end, the CPB will incorporate the appropriate portions of the design guidelines including:</p> <ul style="list-style-type: none"> • Entrances and ground floors that are welcoming and provide an opportunity for interactions; • Entrances that are evident in the daytime and at night; • The ground floor will emphasize transparency; • Service and utilities areas will be located so as to not negatively affect pedestrian paths or building entrances; • Provide long term flexibility and life cycle value; and • Uphold the unique character of Fermilab.
Cold Box Station		
T-121.06.03-C001	F-121.06.03-A004	<p>The Cold Box Station (CBS) shall include an overhead bridge crane with the following criteria:</p> <ul style="list-style-type: none"> • Capacity of 25 tons (50,000 pounds); • Hook limits to provide coverage for the major equipment and loading dock; • Hook height of 20 feet above finished floor;
T-121.06.03-C002	F-121.06.03-A004	The CBS shall include at grade loading dock space to accommodate a standard 55-foot-long semi-trailer.
T-121.06.03-C003	F-121.06.03-A004	The CBS shall include, as a minimum, a 16-foot-wide by 16-foot-tall overhead door;
T-121.06.03-C004	F-121.06.03-A003	The flatness and levelness of the new floor slabs built as part of the conventional facilities shall be designed for normal construction tolerances and a ASTM E1155 floor flatness value of F(F) 25 and a floor levelness F(L) of 20.

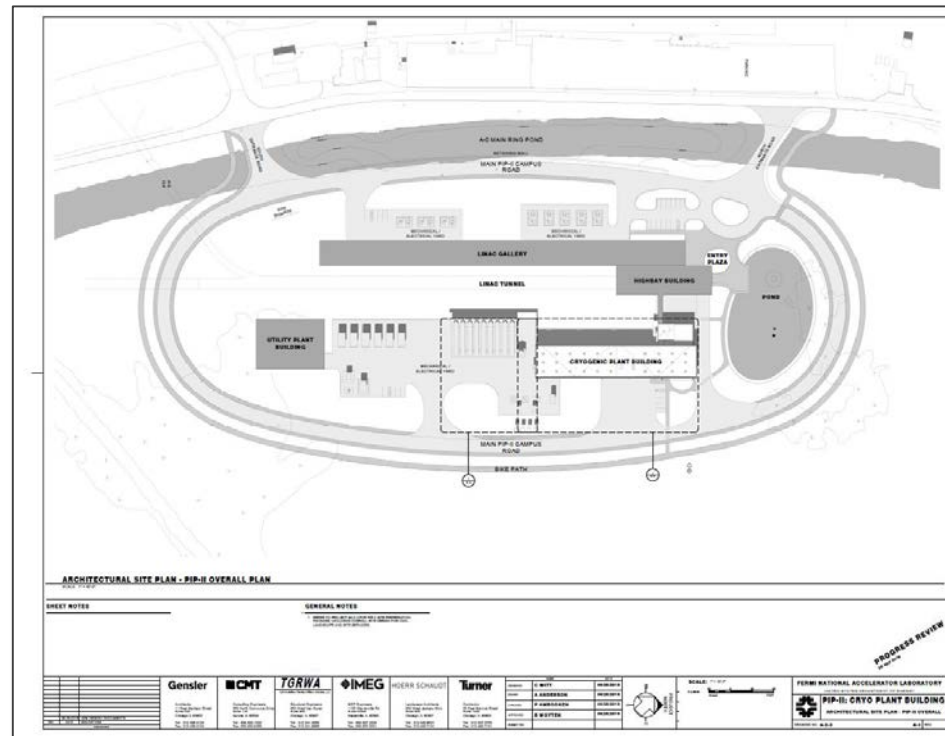


This is the focus of the review

[1] See TeamCenter Document ED0006719

Progress to Date

- Industrial Cooling Water Quality Testing Complete [1]
- Technical Requirements Phase (40% Design) [2]



[1] See PIP-II-doc-155

[2] See TeamCenter ED0008373

From TeamCenter Document ED0008373

END