PIP-II ACLK Preliminary Design Review Report

Document number: ED00014583

Document Approval

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| --- | --- |
| Name:  Org:  Contact:  Role: Committee Member | Date: |
| Name:  Org:  Contact:  Role: Committee Member |  |
| Name:  Org:  Contact:  Role: Committee Member |  |
| Name:  Org:  Contact:  Role: Committee Member |  |
| Name: Ed Cullerton  Org: AD/Proton source  Contact:  Role: Committee Chair |  |

Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Revision | Date Release | Originator:  Role: | Description of Change |
|  |  |  |  |
|  |  |  |  |

*Revision control is managed via Fermilab Teamcenter Workflows.*

Table of Contents

[1. Introduction 4](#_Toc10125436)

[2. Review Agenda 4](#_Toc10125437)

[3. Review Charge Statement 6](#_Toc10125438)

[4. Attendance List 6](#_Toc10125439)

[5. Reference Documents 6](#_Toc10125440)

[6. Reviewed Document List 7](#_Toc10125441)

[7. Findings 7](#_Toc10125442)

[8. Comments 7](#_Toc10125443)

[9. Recommendations 7](#_Toc10125444)

[10. Response to Charge Questions 8](#_Toc10125445)

[11. Value Engineering Opportunities 8](#_Toc10125446)

# Introduction

* The review committee is charged with critically evaluating the preliminary design of the PIP-II ACLK timing system to assess design, implementation, procurement, fabrication and installation activities’ maturity. For the PIP-II project, preliminary design is defined as 60% complete.
* The focus of a PDR is primarily of a technical nature; a ‘sanity check’ of cost, schedule, QC, etc. is requested to ensure that these aspects are also on track, but at a lower priority.
* The PIP-II The ACLK system will serve as the global, high-level event-based timing system for the entire accelerator complex providing machine synchronization for all operating scenarios.
* The review committee is requested to present an initial closeout at the conclusion of the LLRF review and within two weeks issue a formal review report.

# Review Agenda

This section shows the details of a typical review agenda which can be tailored to suit the review being held. Changes should be indicated if different from the Review Charge.

Agenda Example:

| Accelerator Clock (ACLK) Preliminary Design Review Agenda |
| --- |

|  |  |
| --- | --- |
| Location: | Virtual via Zoom |
| Date: | 7 December 2021 |
| Time:  Indico Site: | [Meeting Time]  https://indico.fnal.gov/event/45277/ |

Participants:

|  |  |  |
| --- | --- | --- |
| Participant’s Name and Contact Information | Organization | Role: Coordinator |
| Greg Vogel, vogel@fnal.gov | AD/Controls | Role: Review coordinator, Presenter |
| Ed Cullerton, ecullert@fnal.gov | AD/Proton Source | Role: Review Chair |
| Stan Johnson, srj@fnal.gov | AD/Operations | Role: Reviewer |
| Aisha Ibrahim, cadornaa@fnal.gov | AD/Instrumentation | Role: Reviewer |
| Peter Prieto, prieto@fnal.gov | AD/Instrumentation | Role: Observer  (unavailable as Reviewer) |
| Mark Austin, maustin@fnal.gov | AD/Controls | Role: Presenter |
| Dan McArthur mcarthur@fnal.gov | AD/Controls | Role: Presenter |

Agenda details:

**Table 1 – Preliminary Design Review Agenda**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Agenda   |  |  |  | | --- | --- | --- | | Time | Presentation | Speaker | | 0830 | Welcome, PDR Introduction | Jeremiah Holzbauer, Elvin Harms | | 0855 | ACLK System Overview | Greg Vogel | | 0925 | ACLK Generator | Mark Austin | | 0955 | Break |  | | 1010 | TLG & ACLK Distribution | Greg Vogel | | 1040 | ACLK Decoding | Dan McArthur | | 1100 | ESH, QC, Cost & Schedule, Procurement, etc. | Greg Vogel | | 1120 | Path to Final Design & Summary | Greg Vogel | | 1130 | Q&A, Group Discussion | all | | 1200 | Lunch |  | | 1300 | Executive session |  | | 1500 | Closeout |  | |

## Introduction: Review Coordinator

### [To replace tip text (such as this) with your own, just select a paragraph and start typing.]

### [For best results when selecting text to replace, don’t include space to the left or right of the characters in your selection.]

## Presentation XYZ: Presenter Name

### [Primary Review Content Overview. E.g. organization, requirements, cost & schedule, etc.]

## Presentation XYZ: Presenter Name

### [Technical Content]

## Presentation XYZ: Presenter Name

### [Technical Content]

## Presentation XYZ: Presenter Name

### [Safety, QA, Risk Analysis, etc.]

## Closeout – Review Chair

### [Summary Statement]

### [Preliminary Findings]

### [Preliminary Comments]

### [Preliminary Recommendations]

|  |
| --- |

# Review Charge Statement

*The review committee is requested to perform an independent technical evaluation of the Preliminary Design of the PIP-II ACLK system.*

The ACLK system will serve as the global, high-level event-based timing system for the entire accelerator complex providing machine synchronization for all operating scenarios. ACLK will additionally serve as the replacement source for the existing TCLK transmission (legacy hardware timing system support), with both the ACLK and TCLK transmissions synchronized. The ACLK system is also required to incorporate the existing Timeline Generator (TLG) functionality along with an event monitor and display capability equivalent to the existing TCLK UCDA and its associated console application.

The committee is asked to consider and respond to the following questions:

* Are the design requirements clearly stated and reasonable?
* Is the proposed system architecture and chosen technology sound and viable?
* Is the design maturity at the preliminary design level (60%)
* Are the available technical drawings and documentation consistent with this level of design maturity?
* Are risks and interfaces sufficiently identified?
* Has ESH, especially *Prevention through Design*, been addressed adequately for this level of design?
* Are the interfaces and risks identified, quality control and procurement plans, and cost and schedule presented generally reasonable and consistent with the technical scope presented?
* Does the committee recommend approval of the design under review and endorse proceeding to Final Design?

# Attendance List

List review attendees here, including committee, speakers, and prominent audience members. Remote attendees should be included and noted as remotely attending.

|  |  |
| --- | --- |
| Name | Organization |
|  |  |
|  |  |
|  |  |

# Reference Documents

The documents listed below establish the framework for all technical reviews held during the PIP-II Project Lifecycle.

|  |  |
| --- | --- |
| 1 | PIP-II Technical Review Plan – TC ED0008163 |
| 2 | PIP-II Quality Assurance Plan DocDB # [142](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=142) |
| 3 | PIP-II Systems Engineering Management Plan – TC ED0008164 |
| 4 | PIP-II IESH Management Plan DocDB # [141](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=141) |
| 5 | 121.02 SRF and Cryo Systems Design Plan DocDB # [2605](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=2605) |
| 6 | 121.03 Accelerator Systems Design Plan DocDB # [2599](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=2599) |
| 7 | 121.04 Linac Installation and Commissioning Design Plan DocDB # [2581](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=2581) |
| 8 | 121.05 Accelerator Complex Upgrades Design Plan DocDB # [2593](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=2593) |
| 9 | 121.06 Conventional Facilities Design Plan DocDB # [2587](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=2587) |
| 10 | PIP-II Value Engineering Plan DocDB # [2830](https://pip2-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=2830) |

The review coordinator should populate this following table with the document list for this review from their SDP.

Table - Document Deliverables for this review from the System Design Plan

|  |  |  |  |
| --- | --- | --- | --- |
|  | Document Title | Status  (preliminary, final, released) | Comments |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |
| 6 |  |  |  |
| 7 |  |  | . |
| 8 | Design Basis |  | Not a document per se but the basis for these designs should be presented, preferably embedded in each presentation |

# Reviewed Document List

This section indicates which documents the committee reviewed as part of this review. The document list provided should match the documents identified in the relevant WBS L2 System Design Plan referenced above.

Table - Documents presented at this Review

|  |  |  |  |
| --- | --- | --- | --- |
|  | Document Title | Status  (preliminary, final, released) | Comments |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |
| 6 |  |  |  |
| 7 |  |  | . |
| 8 | Design Basis |  | Not a document per se but the basis for these designs should be presented, preferably embedded in each presentation |

Committee comments should note any of the following:

* Documents that were expected but not presented.
* Documents that were in a state not commensurate with the review in question (e.g. conceptual design documents at a final design review).
* Standard documentation that, in the committee’s expert opinion, should have been in the SDP and presented but was not included.

# Findings

General, factual observations about material presented which require no response.

# Comments

Observations with value judgments, or “soft” recommendations that require action by the design/engineering team, but where a formal written response is not requirement.

# Recommendations

Items that require formal action and closure in writing prior to receiving approval to move into the next phase of the project, or items that require formal action and closure in writing prior the next review.

# Response to Charge Questions

If the charge is written in the form of questions, duplicate them and directly respond to them here. These responses should reference the relevant recommendations/comments/findings as appropriate.

# Value Engineering Opportunities

Value Engineering (VE) opportunities are often discovered during conceptual and preliminary design reviews.  The Review Committee will consider Value Engineering in their assessment of the reviewed materials proposed design and provide a list of suggested opportunities below. The PIP-II Project established a *PIP-II Value Engineering Plan* to support this effort [10]. VE opportunities are not intended to be recommendations. Recommendations are captured in Section 9 above. If no VE opportunities are identified, please indicate.