



Electron-Ion Collider

BABAR DIRC Bar Refurbishment Final Design Review

April 1-2, 2025

FINAL

Performed Remotely at Jefferson Lab

Newport News, Virginia

April 1-2, 2025

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1. Executive Summary

The Final Design Review (FDR) of the BABAR DIRC bar refurbishment project focused on evaluating the technical readiness, planning, and risk mitigation strategies involved in refurbishing the DIRC bars for integration into the high-performance DIRC (hpDIRC) detector.

The review committee found that the project is technically sound, well-documented, and aligned with the overall detector and project schedule. The refurbishment strategy—reusing the BaBar DIRC bars—is considered feasible and efficient, with appropriate contingencies and risk-mitigation strategies in place.

Technical Requirements & Interfaces: The performance requirements and subsystem interfaces for the bars are complete and thoroughly documented.

Disassembly & Validation: Disassembly procedures and validation plans for the DIRC bars are comprehensive and consistent with the broader project timeline.

Safety and Quality Assurance: Environmental Safety & Health (ES&H) and Quality Assurance (QA) have been properly integrated into planning and execution.

Performance & Risk: The planned refurbishment and integration are expected to meet hpDIRC performance targets. While some uncertainty in risk assessment remains, adequate contingency measures (especially financial) are in place.

Reuse Strategy & Mitigation: The approach to bar reuse is well-justified. However, the committee recommends a clearer timeline and decision-making framework for procuring additional bars should refurbishment yields fall short, or quality be compromised.

The review committee supports including the BaBar DIRC bar refurbishment within the CD3B project scope, emphasizing the importance of continued risk monitoring and strategic planning for procurement contingencies.

2. Responses to Charge Questions and Comments

Charge Question 1: Are the technical performance requirements and subsystem interfaces for the bars complete and documented?

Yes, they are complete and well documented.

Charge Question 2: Are the disassembly procedures and the plans for validation of the DRIC bars complete and consistent with the overall project and detector schedule?

Yes, they are complete and consistent with the overall project and detector schedule.

Charge Question 3: Have ES&H and QA considerations been adequately incorporated in the disassembly and bar validation planning?

Yes, they have been adequately incorporated in the disassembly and bar validation planning.

Charge Question 4: Do the plans for bar validation and bar integration into long bars meet the high-performance DIRC performance requirements with low risk of cost increase, schedule delays, and technical problems?

Yes, the plans and current progress on refurbishment meet the performance requirements for the hpDIRC. It is difficult at this stage to assess the risk; however, the contingency plan seems adequate in terms of funds. (See also the comment in charge question 5.)

Charge Question 5: Is the overall approach for reuse of the bars sound and the risk mitigation sufficient?

Yes. Detailed assessment in the comment.

Comment: We suggest making a more detailed plan of the decision-making on the procurement of additional bars if the yield of refurbished bars is either smaller than expected or the quality is uncertain. For example, working backward from the bar box assembly schedule to when this decision should be made, assuming nominal timelines for procurement and production of new bars.

3. Recommendations

1. We support the refurbishment of the BaBar DIRC bars is included in the CD3B scope.

4. Appendices

4.1 Appendix A: Charge to the Review Committee



Date: March 5, 2025

To: Peter Krizan (U Ljubljana), Floris Keizer (CERN), Ana Amelia Machado (UniCamp), Koji Nakamura (KEK), Justin Stevens (W&M)

From: Elke Aschenauer and Rolf Ent

Subject: Charge for the BABAR DIRC Bar Refurbishment Final Design Review - April 1-2, 2025

The scope of this review includes only the BABAR DIRC bar box disassembly and the validation of the disassembled and cleaned bars, such that they are ready for a future assembly of the high-performance DIRC detector. This future assembly is separate and not part of this Final Design Review.

You are asked to address the following questions:

1. Are the technical performance requirements and subsystem interfaces for the bars complete and documented?
2. Are the disassembly procedures and the plans for validation of the DIRC bars complete and consistent with the overall project and detector schedule?
3. Have ES&H and QA considerations been adequately incorporated in the disassembly and bar validation planning?
4. Do the plans for bar validation and bar integration into long bars meet the high-performance DIRC performance requirements with a low risk of cost increases, schedule delays, and technical problems?
5. Is the overall approach for reuse of the bars sound and the risk mitigation sufficient?

cc: Katherine Wilson

4.2 Appendix B: Review Committee

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4.3 Appendix E: Agenda

Incremental Preliminary Design and Safety Review of the pfRICH, dRICH, and hpDIRC

April 1 – 2, 2025

AGENDA

[Click here for Zoom \(Open Session\)](#)

Day 1 – Tuesday, April 1, 2025

Time	Talk	Speaker	Duration
8:00 am	Executive Session	(Closed Session)	20 mins
8:20 am	Welcome and Introduction	Elke Aschenauer / Rolf Ent	20 mins
8:50 am	PID Systems Overview and Requirements	Beni Zihlmann	30 mins
9:30 am	Detector Integration Status and CAD Design	Alex Eslinger	30 mins
10:10 am	Break	All	30 mins
10:40 am	dRICH: Forward PID	Marco Contalbrigo	30 mins
11:25 am	pfRICH: backward Region	Brian Page	30 mins
12:10 pm	hpDIRC: Barrel Region	Grzegorz Kalicy	30 mins
12:55 pm	Quartz Bars: Specifications and Refurbishment	Jochen Schwiening	30 mins
1:35 pm	Lunch	All	25 mins
2:00 pm	Executive session	Closed Session	60 mins

Day 2 – Wednesday, April 2, 2025

Time	Talk	Speaker	Duration
8:00 am	Q&A: dRICH, pfRICH, hpDIRC	All	60 mins
9:00 am	Photo Sensors dRICH	Roberto Preghenella	20 mins
9:25 am	Photo Sensors pfRICH and hpDIRC	Alexander Kiselev	30 mins
10:05 am	DAQ streaming readout Overview	David Abbott	20 mins
10:35 am	Break	All	25 mins
11:00 am	Executive Session	Closed Session	120 mins
1:00 pm	Closeout	All	30 mins