

Hall D Central Drift Chamber (CDC) Fabrication Readiness Review

October 21 2010. The agenda is attached at the end of this document for reference.

Review Committee: Benedikt Zihlmann (JLab contact for CDC), Tim Whitlatch (Hall D mechanical engineer), Eugene Chudakov (JLab Hall D group leader).

Participants CMU: Curtis Meyer (CDC project manager)

Purpose: Review and approval of the assembly of CDC tracking chamber and overall schedule of the project.

Schedule: Curtis Meyer and Gary Wilkin (construction manager) gave us a tour of the clean room, the assembly room, machine shop and storage areas at the beginning of the review. During this tour Naomi Jarvis postdoc, Amy Woodhall (technician) and Kate Mueller (technician) were also present and demonstrated details of the gluing procedures and tube preparations. Many aspects of the assembly procedures were discussed in detail.

Comments on infrastructure: The infrastructure at Carnegie Mellon University for support of the CDC fabrication and assembly will be a prime resource for our 12 GeV CDC project needs. One large room is subdivided into a the clean room with an adjacent preparation room. The particle density in the clean room is monitored and recorded twice a day and is found to be below 10000 with personnel present in the room. The machine shop is located just right next door also occupying the office of the construction manager.

Findings:

1. Key personnel for the project have been identified and are already at work. The key personnel include
 - a. Curtis Meyer (project manager)
 - b. Gary Wilkin (construction manager)
 - c. Amy Woodhall (full time technician)
 - d. Kate Mueller (full time technician)
2. The critical aspects of the assembly will be done only by the full time hired technicians having expert training or even developed the procedures together with the construction manager.

3. Each working step is tested and trained in the preparation room and necessary modifications to the procedures implemented. These procedures are outline in documentations including pictures and serve as training procedures.
4. Part time students are hired to prepare all necessary parts for assembly while the actual assembly will be done by the full time technicians.
5. Pneumatic driven syringes allow full control over the gluing process at any stage of the gluing procedures.

Comments (JLab responsibilities are specifically identified, otherwise they are the responsibilities of CMU):

1. All assembly procedure need to include the part numbers that are used in the described procedure in the form of drawing numbers and revision level from the signed JLab assembly drawings.
2. There was a change to the support rods in adding an o-ring groove to the end faces. Any deviation from the signed Jlab assembly drawings need to be communicated to JLab and approved by JLab. JLAB will update and reissue the drawing under a new revision letter
3. Document and record the straw lot such that this information can be traced back to the straws in the assembly.
4. Add curing times and other specifications of each glue type used into the procedure documentations.
5. Test conductivity between inner surface of straws and upstream aluminum end plate for all straws after glued into frame. (maybe this can be done for each batch of conductive epoxy)
6. Before stringing of wires add one additional step to clean the surfaces of the upstream and downstream end plates of any residue from tape adhesive to guarantee cleanliness of the gas volume.
7. One concern was raised that during the stringing operation the wire is fed in its full length through the top crimp pin potentially causing damage to the surface of the wire. This point will be addressed during tests of the stringing procedure in the preparation room.
8. Add a record of which wire spool is used in the straws.

9. Develop a test procedure to verify the gas flow through the individual straws after the wires are strung, e.g. the pin holders are in place.
10. Need to develop a plan and procedures to determine the positions of the crimp pins on the end plates. (maybe it is actually the crimp pin insert since it is round)
11. Develop a plan how and where to mount the temperature sensors in the gas volume and cabling.
12. Open points in the assembly drawings need to be addressed together with JLab in the following items
 - a. Outer shell assembly: collar ring and procedures.
 - b. Upstream and downstream gas plenum construction and materials.
 - c. Connector assembly and soldering procedures
 - d. Detailed specifications of all parts used in the assembly of the upstream wire feed though grounding fixtures and connector parts.
13. Use bi-weekly tracking meetings by video conference to report on status and progress of the CDC assembly. The minutes of these meetings will serve as written reports.
14. Develop a plan and procedures for shipping the detector to JLab.
15. Update QA plan to reference [overall](#) assembly drawing numbers, update names of people at CMU, update document control section to indicate JLAB will control drawings and revisions and CMU to control procedures and travelers. QA plan will be a released JLAB document when completed.
16. Need to determine range of acceptable tension in wires (30-35 grams?)
17. On procedures, all safety items should be listed if if simply gloves or safety glasses.
18. JLAB to include alignment tolerance of 2 mils on frame assembly drawing
19. JLAB to update lengths of straws as indicated in the procedures.
20. Glue is probably not needed on pin inserts to hold in place since parts are snug.

21. JLAB to supply crimp pin tooling drawings for crimping.

Recommendations:

1. The committee had no recommendations.

Target Dates

1. CMU and JLab will finalize all necessary drawings of all assembly steps till the end of the calendar year.
2. Finalize all procedures and travelers by the end of the calendar year.

Discussion on Billing, Financial and Reporting

Additional participants: Beth Calloway and David Thomas (CMU accounting) at JLab via video Elton Smith, Lubomir Pentchev and Kathleen Jones.

1. Format of the Invoice was discussed.
2. JLab requests a detailed break down of expenses with each invoice. The salary details which JLab has received for the month of June and July. An additional list of hardware purchases is also requested with the invoice. CMU agreed on providing this information with each invoice.

CDC Fabrication Readiness Review

Venue [Carnegie Mellon University](#)

Topics that need discussion/resolution

1. Schedule, revision of any milestones based on present projections
2. Lessons learned from current work
3. Training of personnel
4. Testing
5. Shipping
6. Billing and invoicing guidelines

Documents to Review

1. Provide links to relevant documentation
2. [Contract Documentation](#) (needs password)
3. [CDC Construction Readiness Review Checklist](#)

JLab Participants and schedules

- % Benedikt Zihlmann (Hall D contact for FCAL)
- % Tim Whitlatch (Hall D mechanical engineer)
- % Eugene Chudakov (Hall D leader)

Tentative Agenda

Thursday October 21

% Arrival Pittsburgh:

% Flights:

% US 2545: PHF / CLT:

% US 996: CLT / PIT:

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% **12:30 – Arrival CMU**

% **13:00 – Project overview**

% **13:30 – Tour of the construction facilities**

% **14:30 – Technical documents review**

% **15:30 – Coffee**

% **16:00 – Video meeting with Jlab/CMU accounting**

% **17:00 – Continue document review**

% **18:00 – Closeout**

% **18:30 - Adjourn**

% **18:45 – Shuttle to airport**

% Flights:

% US 96: PHF / CLT:

% US 3578: CLT / PIT:

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