CDF PROC – 424 "Procedure for Opening/Closing Endplugs In the CDF Collision Hall"

This procedure details the necessary steps required to open or close the End Plugs in the CDF Collision Hall. There are two 100-ton End Plug assemblies that move in an east-west direction on a guided rail system in the collision hall. Each detector assembly is moved using a dedicated screw drive system that is capable of moving the assembly 66 inches in approximately 30 minutes. This motion is necessary to allow access to other detector systems in the collision hall. A checklist is included in this procedure that is to be used for every End Plug move.

Editorial Hand-Processed Changes Other Than Spelling
Require Co-Project Manager Approval

HPC Number	Date	Section Number	Initials
1.	6-4-07	3.0 App.1, Section I	D.Allspach
2.	6-4-07	3.0 App.1, Section VIII	D.Allspach
3.			
4.			
5.			
6.			
7.			
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9.			

Approvals

(CDF Co-Project Manager) (Date)

(Particle Physics Division Head) (Date)

(Beams Division Head) (Date)

1.0 Controlled Copies of this procedure.

Two controlled copies of this procedure will exist.

One will be held in the CDF Department Office Library.

The others will be on the CDF web page at

http://www-cdf.fnal.gov/cdfsafe/cdfproclist.html

All other copies will be marked, " INFORMATIONAL COPY ONLY "

2.0 The Procedure

The End Plugs shall be open and closed in accordance with the checklist provided in the next section. No other procedure is required for this move operation.

3.0 Checklist

The next several pages contain the checklist for moving the end plug detectors in the CDF Collision Hall. A separate checklist is to be filled out for each IMU being moved and for each direction of movement. Completed checklists are to be placed in the binder marked “Plug Move Checklists” in the CDF control room.

Appendix One: Endplug OPEN Checklist

The minimum number of personnel required to conduct this operation is five, at least 3 of which has been trained in this operation. The 5 people include the responsible engineer who manages the operation, equipment operator who operates the hydraulics, a task manager, and two observers. The observers function is to watch for any problems/interferences at the along each plug rail system, the endwall, as well as the bore of the endplug (CLC, miniplug, beam pipe) while the move is in progress. The task manager is responsible that each observer understands his role. During the move operation, no other work is to be performed in the immediate area around the equipment being moved. **NOTE: A separate checklist shall be completed for each endplug move operation.**

Plug Being Opened :_____

Date of Move Operation:_____

Printed Name of Responsible Engineer:_____

Printed Name of Task Manager:_____

Printed Name of Equipment Operator:_____

Printed Name of Observers:_____

Printed Name of Person Completing This Checklist:_____

I. Preoperational Inspection

Solenoid

☐ Verify that solenoid is powered down [HPC #1]

Miniplug Inspection

☐ Inspect clc miniplug region for tools, loose cables, improper cables
☐ Page Sil Rad Co pager to remove BLM's and associated hardware
☐ Remove Teflon beampipe spacer from inside CLC bore
☐ Verify "graboid" is attached to IMU and miniplug
☐ Insure that miniplug is free to "move" on its rail system – no locking set screws (eye-bolts removed)
☐ Check no interferences on low beta quad magnet

Endwall Inspection

☐ Verify that curved "monkey bar" scaffolding has been removed from top of plug
☐ Check that nothing from cryo platform is creating interference if East plug is being moved.

- ☐ Open Plug Relay racks and install platforms
- ☐ Verify CMX arches are pushed back to within 6 inches of silicon racks
- ☐ Inspect plug rails for debris/interferences
- ☐ Preinstall snout platform if so desired
- ☐ Install miniskirt platforms if so desired
- ☐ Loosen plug with hydraulic system
  - o Pretension to 1000 lbs and check that all hydraulics are working
  - o Tension to 6000 lbs and loosen nuts
- ☐ Remove hydraulics and associated equipment
- ☐ Verify that upper 4 swing bolts are elevated above the mounting forks

II. Preparation for Move

Position spotters

- ☐ One watching each plug cable festoon (from inside CMP muon walls on lifts)
- ☐ One in plug bore watching miniplug, luminosity monitor and beampipe clearances
- ☐ One on the floor watching inside the bore, cmx power cables etc
- ☐ Drive operator positioned in front of hydraulic equipment
- ☐ Task Manager responsible for move has no assigned position

III. Move Operation

- ☐ Drive plug out maintaining uniform gap in bore between plug calorimeter and 30 degree covers as well as electromagnetic calorimeter and solenoid bore.
- ☐ STOP position is defined by clearance between CLC AND Miniplug. Leave a 2" stay clear gap. Roughly, this means the plug will be 7" shy of the rails end.

Note: During the move operation, the operator must remain in close proximity to the controller box so that the emergency stop button can be reached at any instant.

IV. Secure from Move Operation

- ☐ Install platform inside 30 degree bore
- ☐ Install handrail on 30 degree bore
- ☐ Install beampipe protection inside bore
- ☐ Install lights in bore
- ☐ Clean up the area

Endplug CLOSE Checklist

The minimum number of personnel required to conduct this operation is five, at least 3 of which has been trained in this operation. The 5 people include the responsible engineer who manages the operation, equipment operator who operates the hydraulics, a task manager, and two observers. The observers function is to watch for any problems/interferences at the along each plug rail system, the endwall, as well as the bore of the endplug (CLC, miniplug, beampipe) while the move is in progress. The task manager is responsible that each observer understands his role. During the move operation, no other work is to be performed in the immediate area around the equipment being moved. **NOTE: A separate checklist shall be completed for each endplug move operation.**

Plug Being Closed :_____

Date of Move Operation:_____

Printed Name of Responsible Engineer:_____

Printed Name of Task Manager:_____

Printed Name of Equipment Operator:_____

Printed Name of Observers:_____

Printed Name of Person Completing This Checklist:_____

V. Preoperational Inspection

Prepare inside of bore for plug closure

- ☐ Remove lights, extension cords, beampipe protection, platforms, shelves, handrail, ladders, etc from inside the bore
- ☐ Verify baggie seal is ok
- ☐ Check carbon fiber beam pipe stiffener is installed properly and joints taped
- ☐ Verify all rib bolts have been replaced
- ☐ Inspect all 30 degree covers to insure they are lying flat
- ☐ Vacuum inside bore to remove any loose debris
- ☐ Inspect the top of the plug to make sure it is free of debris

Miniplug Inspection

- ☐ Inspect clc miniplug region for tools, loose cables, improper cables
- ☐ Verify "graboid" is attached to IMU and miniplug
- ☐ Insure that miniplug is free to "move" on its rail system – no locking set screws (eye-bolts removed)

Endwall Inspection

- ☐ Remove all extension cords etc
- ☐ Check that nothing from cryo platform is creating interference if East plug is being moved.
- ☐ Check swing bolts on top of detector are elevated to clear mounting forks
- ☐ Verify swing bolts behind relay racks have been removed
- ☐ Verify CMX arches are pushed back
- ☐ Inspect plug rails for debris/interferences

VI. Preparation for Move

Position spotters

- ☐ One watching each plug cable festoon
- ☐ One in clc bore watching miniplug, luminosity monitor and beampipe clearance
- ☐ One on the floor watching inside the bore, cmx power cables etc
- ☐ Drive operator positioned in front of hydraulic equipment
- ☐ Task Manager responsible for move has no assigned position

VII. Move Operation

- ☐ Drive plug in maintaining uniform gap in bore between plug calorimeter and 30 degree covers as well as electromagnetic calorimeter and solenoid bore.
- ☐ When 18" from final location, stop motion, open plug relay racks and position people in there to verify that cables are not crushed by hydraulic fixturing.

Note: During the move operation, the operator must remain in close proximity to the controller box so that the emergency stop button can be reached at any instant.

VIII. Secure from Move Operation

- ☐ Tighten plug with hydraulic system and nuts
  - o Pretension to 1000 lbs and check that all hydraulics are working
  - o Tension to 6000 lbs and tighten nuts
- ☐ Remove hydraulics and associated equipment
- ☐ Remove the "graboid" from the IMU steel
- ☐ Install eye bolts on miniplug rails to prevent miniplug from moving
- ☐ Install Teflon beampipe spacer between pipe and CLC bore
- ☐ Page Silicon Rad Co to reinstall BLM apparatus and cables
- ☐ Clean up the area
- ☐ Remove end plug relay rack platforms and close plug relay racks (using a spotter and dressing cables behind the racks as you go)
- ☐ Notify the CDF Control Room (x2080) that the Plug move is complete and that the Solenoid may be powered when they are ready [HPC #2]

4.0 Deviations from the Procedure

All deviations from the above procedure must be approved by the Department Head, after consultation with the head of the I&I group or their deputies.

5.0 Required Training and Authorized Training Personnel.

The required training for this (CDF-II 424) procedure is in the form of "hands-on" Experience gained while participating in an actual IMU move conducted by trained Personnel. All personnel participating in this operation must be approved for CDF Supervised Access or CDF Controlled Access.

LIST OF AUTHORIZED TRAINING PERSONNEL FOR THIS PROCEDURE:

Name (Last, First)	I.D.#
Carter, Harry	3236
Voirin, John	4940
Roser, Rob	11910
Moccia, Stefano	12246
Allspach, Del	7201

Either a procedure practice run led by an authorized trainer or a verbal discussion with an authorized trainer is the only required training. This choice depends on the specific procedure being performed and experience of the trainee.

6.0 Training Materials.

A copy of this procedure

7.0 List of Trained People for this procedure.

The list of trained people for this procedure will exist in written form in the CDF Department copy of this procedure. Only CDF personnel will be trained in the procedure.

Harry Carter
Rob Roser
Pat Lukens
Stefano Moccia
Dervin Allen
John Voirin
Del Allspach
Craig Olson

8.0 References and Supporting Documentation

None