



# TEST PLAN WORKSHEET

## PROGRAM DEPUTY APPROVAL

PD Signoff: \_\_\_\_\_ Date: \_\_\_\_\_  
 Ops Reviewer Signoff: \_\_\_\_\_ Date: \_\_\_\_\_  
 Expiration Date (max. 90 days from approval): \_\_\_\_\_  
 Presentation Required?  yes  no

## COMPLETION INFORMATION

Completion Date: \_\_\_\_\_  
 Crew Chief Signoff: \_\_\_\_\_  
 Comments (partial completion, etc.): \_\_\_\_\_

**NOTE:** Information addressing the appropriate content of each of the following sections can be found in Section 2.0 of the Test Plan Instructions.

### Test Plan Title: **Hall C Moller Kicker and Wire Target Commissioning**

**Author(s):** Dave Gaskell and Yan Wang

**Date Submitted:**

**Revision Number:** Rev. 1, (enter rev. date here)

### Brief Purpose of Test

Find nominal operating parameters and commission the kicker magnet that will be used in conjunction with a new iron wire target in the Hall C Moller polarimeter.

### Anticipated Benefits

This system will allow Hall C to make measurements of the electron beam polarization at higher currents and may in the future allow quasi-continuous monitoring of the beam polarization.

### Beam Conditions Required

Complete all of the following tables, entering a value or an **X** in the appropriate spaces:

#### Beam Type/Current (enter value)

Beam Type	Beam Current
Beam Off	
Pulsed (std. current = 8 $\mu$ A) <sup>a</sup>	
CW	0.5-40 $\mu$ A

a. The standard current for pulsed beam operation is 8  $\mu$ A. If your test requires pulsed beam current >8  $\mu$ A, then specify the required current and provide a brief explanation next to the specified current.

#### Beam Energy (select one)

Beam Off	845 MeV (1-pass)	1.645 GeV (2-pass)	2.445 GeV (3-pass)	3.245 GeV (4-pass)	4.045 GeV (5-pass)	Other (specify)
						3.026

**Beam Termination Point (select one)**

45 MeV Dump	Hall A	Hall B	Hall C	BSY Dump	In-line Dumplette (specify)	Other (specify)
			X			

**Type of Test (select one)**

Invasive (disrupts beam delivery to . . .)				Non-invasive (does not disrupt beam delivery)
All Halls	Hall A	Hall B	Hall C	
				X

**Time Required**

- Setup Procedure: 20 minutes
- Test Procedure: 7-16 hours
- Backout Procedure: 20

**Preferred Time of Test**

As requested by G0. This test plan may be broken into two parts.

**Staff Required to Execute the Test (including contact info)**

Dave Gaskell, Yan Wang

**Controlled Access Requirements**

None

**Hardware and/or Software Changes Required**

**NOTE:** If software changes are part of the test plan, include the name of the application, the old revision level, the new revision level, and if applicable, whether or not it is possible to roll back to the old revision level (are there hardware limitations, etc.).

None

**Special Hazards/Safety Considerations (enter "None" if not applicable)**

**HAZARD** (describe the specific potential hazard[s]; e.g., MPS or PSS interlocks disabled, work near energized equipment, etc.):

**RISK** (characterize the risks involved [e.g., beam damage to beamline components, electrocution of personnel by contact with magnet leads, etc.] and assess the level of risk per the *EH&S Manual, Section 3210, Hazard Identification and Characterization*):

**CONTROLS** (describe what specific measures will be used to mitigate the hazard; if the risk assessment [i.e., risk code] is  $\geq 3$ , list the applicable work control document [SOP, OSP or TOSP]):

## Setup Procedure

---

1. If position fast feedback is on, turn it off.
2. Follow the standard procedure for setting up beam for delivery to the Hall C Moller (MCC-PR-04-009). The Moller quads will likely already be on, so it should be unnecessary to tune up the Moller quads.

## Test Procedure

---

1. Hall C personnel will insert the new “iron-wire” target. At their request, begin delivery of low current ( $0.5 \mu\text{A}$ ) beam. During this initial period, Hall C will be moving the target horizontally (with beam on) to find the edges of the target frame.
2. Hall C will then ask for vertical positioning of the beam in order to find the position of the thin wire targets. The beam will likely need to move a few mm. For this step and the remainder of the test, the usual constraints on beam position at 3C16 and 3C17 will be relaxed (however, try to keep the beam within 4.0 mm of zero on the BPMs downstream of 3C17). Once Hall C has determined the vertical position of the iron wires, they will set the nominal beam position about 0.5 mm below that point.
3. The next step involves calibrating the vertical steering of the kicker magnet. At the Hall's request, establish  $2 \mu\text{A}$  CW beam and take note of the ion chamber readings. The Hall will then ask for the kicker magnet to be turned on to a nominal set point of 1 mm. At this point, turn on the dump viewer - if the kick is visible, Hall personnel will attempt to calibrate the kick amplitude using the dump viewer. Even if the kick is not visible, the Hall will attempt to calibrate the kick amplitude using the signals in the Moller detectors. In both cases, they will ask for the amplitude to be changed several times.
4. Once the Hall has determined the kicker amplitude calibration information, they will tell you the new calibration if it is different from what is set in the software.
5. This part of the test plan is to determine safe beam current and kicker amplitude combinations for the kicker magnet. The Hall will request higher currents at various kicker amplitudes. During this stage, take careful note of the ion chambers. If the rates are approaching trip points, communicate this information to the Hall. This is the maximum acceptable current for a given configuration. The goal is to establish the maximum safe current (up to  $40 \mu\text{A}$ ) at several kicker amplitudes. At each kicker amplitude take careful note of the maximum safe current.
6. The remaining part of this test plan involves making actual polarization measurements. The Hall will ask for various combinations of currents and kicker amplitudes. Be careful to note that the current does not exceed the maximum acceptable level determined above.

## **Backout Procedure**

---

1. Turn off the kicker magnet.
2. Restore beam to nominal positions and currents as requested by experiment (G0).

## **Test Results**

---