



# 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: **Special FOPT for Diagnosing Machine Transport - Make-Up for Bad Data**

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**Date Submitted:** Dec. 14, 2005

**Revision Number:** 1

### Brief Purpose of Test

Examine transport quality of October 2005 setup with new energy

Address question identified by 12 GeV task force of ability of CEBAF to realize design optics and beam profile propagation.

### Anticipated Benefits

Same as above.

### 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>	X
CW	

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)
						5.41 GeV

**Beam Termination Point (select one)**

Hall A	Hall B	Hall C	BSY Dump	NE Stub Dump	45 MeV Dump	Other (specify)
X <sup>a</sup>	X	X	X			

a. Any of the above with 5 pass beam

**Type of Test (select one)**

Invasive (disrupts beam delivery)	Non-invasive (does not disrupt beam delivery)
X	

**Time Required**

Total time required: 1 hour.

- a. Setup: 5 minutes (can be done prior to test non-invasively)
- b. Main test: 25-35 minutes.
- c. Backout Procedure: 1 minute

**Preferred Time of Test**

Any time before 2005 November-December machine optics is undone.

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

OPS can execute test plan.

**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.).

**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 (ArcN to ArcN+1)**

**Refer to Table 1 for relevant run parameters. A Worksheet (Table 2) is provided at the end of this test plan to help keep track of its progress. Please**

**also make ELOG entries as indicated in the procedure to ensure proper information transfer.**

1. Refer to [Table 1](#) for test configuration and parameters pertinent to the selected test.
2. The accelerator must be known to have been set up prior to this test with the following hardware & transport properties satisfied up to the end of 5 pass.
  - a. XY-coupling in entire beam path is suppressed to ORFP spec.
  - b. Dispersion in entire beam path is suppressed to ORFP spec.
  - c. Orbit aperture measured by AC 30 HZ is to ORFP spec.
  - d. Stable RF in both linacs
3. Make sure all quadrupoles are properly cycled in **NS, NE, NA, NR, [N+1]S, [N+1]E, [N+1]A and [N+1]R** regions.
4. Twiddle save all corrector settings in **NS, NE & NA** region.
5. FSD mask all BLM's.
6. Open an X-window. Go to the directory  
[/a/opsdata/optics/Gold\\_daily/](#)  
Data acquisition will be done here.
- 7.

## Test Procedure (ArcN to ArcN+1)

1. Keep all locks specified under “**Locks to be left on**” in Table 1 for test of interest running. Any additional orbit lock **upstream** of **Arc N-1** may be run if it helps stability.
2. **Important!!!** Turn all correctors shown under “**Correctors taken off loop**” in Table 1 off loop corresponding to test of interest.
3. Display relative BPM spikes for **Arc N**, **Linac N+1** and **Arc N+1**. This is best done through the BPM view-by-pass screens.
4. Zero POS once (for later orbit restoration if needed).
5. Run the special FOPT **v5** script:
  - a. From third mouse button, go to  
     **Optics Tools -> Fopt v5**  
     FOPT GUI will appear in a few seconds.
  - b. Under **Regime** tab,  
     Select “Custom with excitation Specified in File”  
     Enter -1 for “Minimum Current”  
     Enter 15 for “Number of Samples”  
     Enter 5 for “Test Samples”  
     Turn **ON** the “partial data” selector.  
     Turn **OFF** the “lock” selector. This will prevent FOPT from turning off locks.  
     Turn **ON** the “auto scale” selector.
  - c. Under **Files** tab, enter, or browse to select, the path and file name given under “**FOPT File**” in Table 1 corresponding to test of interest. For example,  
     **/a/opsdata/optics/fopt3/1Ekick1005.cor**
  - d. Under **Select** tab, select the data acquisition region as specified under “**Data region selected**” in Table 1. (Table 2 if new FOPT is used).
  - e. **Very Important!!!** Make sure the locks specified under “**Locks to be left on**” in Table 1 corresponding to test of interest (see footnote) are still running. All other locks should be off.
  - f. In the X-window opened in Setup step 7, type the command listed under “**EZLOG Command**” in Table 1 corresponding to test of interest. In this case, type  
     **ALLPOS**  
     A **time stamp**<sup>1</sup> should appear, followed by the message “**msg: all connected**”. Let this process run until the end of current FOPT session.

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1.This will be recorded in the worksheet. See step 6.

If instead error messages appear such as complaining about not being able to connect to some signals, the signals in questions should be addressed first.

- g. Wait 5 seconds. Press the “**Begin**” button in FOPT GUI.
- h. Monitor the progress of FOPT from the display under the **Progress** tab. Verify that the BPM spikes show orbit changes consistent with the displayed progress.
- i. Make sure final data is complete as reported by FOPT progress report. In case of FOPT abort due to current loss or other reasons, and if operational condition permits, repeat steps 1 through 5 until FOPT succeeds in completing the data. Also in case of FOPT failure type **Cntrl-C** to stop EZLOG in the X window, and restart it when restarting FOPT. The entire FOPT run from beginning to end should be contained in a single EZLOG run. Namely, FOPT “begin” should follow the start of an EZLOG session and FOPT completion should precede the stopping of the **same** EZLOG session. **No abortion of EZLOG should happen in the middle of an FOPT run, even if FSD caused FOPT to suspend for many minutes.**
- j. If beam loss occurs (e.g. FSD caused by BLM) too often (more than every other kick):
  - Beam current can be reduced to no less than 3 mu-A. Abort and restart FOPT and EZLOG each time this is redone.
  - Examine orbit at location of BLM trip.

**Abort and restart FOPT and EZLOG each time this is redone.**

- k. After a successful FOPT run, wait 5 seconds then type **Cntrl-C** to stop EZLOG in the X window.
6. If at the end of FOPT run it was determined that beam loss has dominated the data, put the beam on 2R dump instead of Hall B (or BSY) and re-run step 5. This should happen relatively faster than the above.
  7. Make entry in attached Worksheet (Table 2) marking completion of specific test. Record the following:
    - a. Date & time test completed.
    - b. ELOG number for FOPT autolog
    - c. ELOG number for test report of step 6.
    - d. EZLOG file time stamp (not the whole string, only the last 4 numbers indicating hour and minute such as 14\_22).
  8. Make ELOG entry on important information concerning the test (e.g., suspected machine anomaly during test, BPM failure, etc.).
  9. Go to twiddle save panel saved in Setup step 5. Make sure all correctors are restored to original settings. If not, manually restore.
  10. Restore locks to running configuration.

**Acquire GOLD model for the whole machine:**

**This part does not need beam. It needs be done once at the end of the test plan.**

**Machine can be returned to normal operation.**

11. Execute the following:

- a. Bring up an x-term on an ops computer.
- b. Go to the /a/opsdata/optics/Gold\_daily/ directory:

```
cd /a/opsdata/optics/Gold_daily
```

- c. Type the following command:

```
GetFOPTModel
```

Note: As part of normal running, this script may spit out the following message that can be ignored:

```
CDEV Directory Warning: No service matches "MMSHLBPASS" - "get VAL",  
default to caService
```

Also ignore the following message if it appears:

```
cdevClientService::connect Error: Cannot find host for server "designModel" in  
domain "ARTMODEL"
```

Also: In some UNIX shell you may need to type

```
source GetFOPTModel
```

instead

12. However note any other anomaly during this run (Model server errors etc.) in the ELOG. If in doubt, contact Software Oncall to make sure model is correctly logged.

13. **Make sure all UNIX processes invoked in this procedure are terminated.** This is done by typing in the X-window the following:

```
ps -ef | grep ezlog
```

and look for nontrivial entries indicating ongoing ezlog processes. If any is found under the current username, kill it.

**Table 1: FOPT files used & Correctors to be cycled before FOPT for each matching region**

Test	FOPT File in <a href="#">/a/opsdata/optics/fopt3/</a>	Correc- tors taken <b>OFF</b> loop	Locks to be left <b>ON</b>	Data region selected	SEE BPM pass selec- tion	Dumplet <b>IN</b>	EZLOG Com- mand
OR-AT	0Lkick <b>121405</b> .cor	None	enlk0r	5 MeV 60 MeV+ NL All Arcs AT Hall B	auto	<b>Hall B (pref- ered) or BSY dump</b>	ALLPOS
OR-2A <b>(Only if above fails)</b>	0Lkick <b>121405</b> .cor	None	enlk0r	5 MeV 60 MeV+ NL Arc 1 Arc 2	1	<b>2R</b>	ALLPOS

**Table 2: Worksheet for Automatch Software Preparation Test**

Test	Time of Test	FOPT Autolog Number	Test Report ELOG Number	EZLOG Time Stamp	Executed by
OR-AT					
OR-2A (if needed)					

## Backout Procedure

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1. Restore twiddle saved correctors in **NS/NE/NA**.
2. Put correctors back on loop (except lock correctors)
3. Restor standard locks

## Test Results

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Result & automatically logged data will be analyzed off-line.

- 1.

**Table 3: Worksheet for Automatch Software Preparation Test**

Test	Time of Test	FOPT Autolog Number	Test Report ELOG Number	EZLOG Time Stamp	Executed by
0R-AT					
0R-2A (if needed)					