TEST PLAN WORKSHEET

PROGRAM DEPUTY APPROVAL	COMPLETION INFORMATION
PD Signoff: _____ Date: _____	Completion Date: _____
Ops Reviewer Signoff: _____ Date: _____	Crew Chief Signoff: _____
Expiration Date (max. 90 days from approval): _____	Comments (partial completion, etc.):
Presentation Required? ❑ yes ❑ no	☐

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: **Spin Dance 2001**

Author(s): Joe Grames

Date Submitted: September 11, 2001

Revision Number: Rev. 4, (*September 14, 2001*)

Brief Purpose of Test

To compare polarimeter analyzing powers and measure precisely the beam energy.

Anticipated Benefits

Facility development.

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	yes, for access
Pulsed (std. current = 8 μA)[a]	yes, for tuning
CW	low (<10uA), high (~75uA)

a. The standard current for pulsed beam operation is 8 μA. If your test requires pulsed beam current >8 μA, 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)
x					5.7 GeV	5.0 MeV

Beam Termination Point (select one)

Hall A	Hall B	Hall C	BSY Dump	45 MeV Dump	Other (specify)
x	x	x			Mott

Type of Test (select one)

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

Time Required

a. Setup Procedure: n/a

b. Test Procedure: 6 shifts (machine) + 1 shift (injector)

c. Backout Procedure: n/a

Preferred Time of Test

September 15-16, 2001

Staff Required to Execute the Test (including contact info)

Run Coordinator (RC) for the spin dance is Joe Grames (cell: **876-5116**).

Hall A RC is Eugene Chudakov
Hall B RC is Arne Freyberger
Hall C RC is (no reply from Roger Carlini)

Other:

Baseline Equipment	*Contact*
Polarized Source	Matt Poelker
Injector Mott	Joe Grames
Hall A Compton	Sirish Nanda
Hall A Moller	Eugene Chudakov
Hall B Moller	Arne Freyberger
Hall C Moller	Howard Fenker
Injector Energy	Joe Grames
Hall A arc energy	Arun Saha
Hall A e/p energy	Bodo Reitz
Accelerator	Michael Tiefenback

Controlled Access Requirements

Injector access ~1hr required for Step #12; Sunday 9/16 OWL or DAY.

Hall A access for MPS BCM trip-point increase for Step #1

Hall B access for Arne Freyberg expected on 9/15.

Hall C access for survey group starting 9/15 OWL (0700).

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.).

hardware: Hall A MPS BCM trip-point increase to 90uA

hardware: Hall C chicane straightened by survey group on 9/15 DAY

hardware: RF separator reconfiguration for 3 Hall separation

hardware: Gun laser reconfiguration to provide DC/RF pulse structure

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.)**:**

none

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*)**:**

none

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

none

Program Overview

1. Magnetic separation to Hall A
2. Hall Energy Measurements (Hall A e/p + Arc, other?)
3. Hall A polarimeter setup & checkout (good tunes)
4. 1st spin dance: **RF MODE ONLY** for Mott + Hall A Moller + Compton
5. RF sepration to Halls A/B/C
6. 3-Moller polarimeters setup & checkout (good tunes)
7. Setup DC laser mode
8. 2nd spin dance: **DC MODE ONLY** for Mott + Hall A/B/C Mollers
9. Injector energy measurement

Shifts Overview

Project	*ACCEL.*	*HALL A*	*HALL B*	*HALL C*
SWING	physics	physics	physics	physics
9/15 OWL	**Hardware Reconfigurations** 1. Hall A MPS BCM 2. RF separators 3. Injector rf/dc mode Test RF separator 3-way split Setup Hall A magnetic extract. Support energy measurements Setup Hall A Compton (~75uA) and Hall A Moller polarimeters	**beam** e/p energy arc energy setup polarimeters	**no beam**	**no beam** GeN work Safe the target for chicane removal
DAY	Deliver to Mott and Hall A polarimeters RF separator hardware reconfi.	**beam** polarimetery	**no beam**	**no beam** survey group remove the chicane
SWING	Deliver to Mott and Hall A polarimeters	**beam** polarimetery	**no beam**	**no beam** GeN work
9/16 OWL	Setup RF extraction to 3-halls Support polarimeter setup and checkout	**beam** polarimeter setup and checkout	**beam** polarimeter setup and checkout	**beam** polarimeter setup and checkout
DAY	Deliver to Mott and 3-Halls	**beam** polarimetery	**beam** polarimetery	**beam** polarimetery
SWING	Deliver to Mott and 3-Halls	**beam** polarimetery	**beam** polarimetery	**beam** polarimetery
9/17 OWL	Injector for energy measurement	**no beam**	**no beam**	**no beam**

Saturday, September 15 - OWL

Quick Summary:

Accelerator	*Hall A*	*Hall B*	*Hall C*
1. Re-configuration/accesses 2. Test RF 3-way split 3. Hall A magnetic extraction 4. Support Hall A e/p & arc 5. Setup Hall A polarimeters	1. CW beam 2. e/p & arc energy 3. polarimeter setup	1 No beam	1. No Beam 2. GeN target work

Special Notes:
When delivering high current to Hall A be mindful that the empty physics target still has a surrounding target ladder, i.e., be careful of striking ladder.

Detailed Summary:

Step	*Time*	*Lasts*	*Activity*
1	00:00	2	**1. Ops perform passdown** **2. Hall A MPS BCM trippoint increase to 100uA (Woodworth/Diggs)** **3. Hall C access to de-energize & safe magnet/targert** **4. AES re-configure RF separators** **5. Injector Access to add laser rf/dc switch** **6. Injector prepare injector** Consider spot move to increase QE Set Wien=+10 deg **7. Ops test 3-way RF extraction split** **8. Ops Magnetically separate to Hall A** Cease RF separation. Load Benesch's *halla_5734_spindance.snap* file Use corrector MBCAT05V for magnetic separation to Hall A Setup beam straight to the dump, not through the chicane

Step	*Time*	*Lasts*	*Activity*
2	02:00	4	**1. Ops co-ordinate with Hall A for arc energy measurements (Point of contact is Arun Saha)** Use magnetic extraction to Hall A. Use straight-ahead (non-chicane) tune. Ultimately requires 5uA CW beam. First make measurement with achromatic optics. Second make measurement with dispersive optics. Third restore achromatic optics. Move on to e/p measurement. **2. Ops co-ordinate with Hall A for e/p energy measurement (Point of contact is Bodo Reitz)** Use magnetic extraction to Hall A. Use straight-ahead (non-chicane) tune. Use procedure + co-ordination to complete test. Ultimately requires 5uA CW beam.
3	06:00	2	**1. Injector make high current setup** Phase prebuncher Find slit parameters for Mott/Moller and Compton **2. Ops setup Hall A polarimeters (Points of contacts are Alexandre Camsonne & Eugene Chudakov)** Use magnetic separation to Hall A Tune beam through Compton chicane to dump at high current Compton polarimeter checkout Tune beam to Moller target at low current

Saturday, September 15 - DAY

Quick Summary:

Accelerator	*Hall A*	*Hall B*	*Hall C*
1. Hall A polarimetery	1. CW beam	1. No beam	1. No beam. 2. Survey group 3. GeN target work

Detailed Summary:

Step	*Time*	*Lasts*	*Activity*
4	08:00	3	**1. Wien=+10 deg mesaurement** Hall A Moller Hall A Compton Setup beam to Mott polarimeter Mott
5	11:00	2	**2. Wien=+105 deg** Set Wien to +105 deg Mott Setup beam to Hall A Moller Compton
6	13:00	3	**3. Wien=+70 deg** Set Wien to +70 deg Compton Moller Setup beam to Mott Mott
7	16:00	3	**4. Wien=+35 deg** Set Wien to +35 deg Mott Setup beam to Hall A Moller Compton

Saturday, September 15 - SWING

Quick Summary:

Accelerator	*Hall A*	*Hall B*	*Hall C*
1. Hall A polarimetery	1. CW beam	1. No beam	1. No beam. 2. GeN target work

Detailed Summary:

Step	*Time*	*Lasts*	*Activity*
8	19:00	3	**1. Wien=-105 deg mesaurement** Set Wien to -105 deg Hall A Compton Hall A Moller Setup beam to Mott polarimeter Mott
9	22:00	3	**4. Wien=-70 deg** Set Wien to -70 deg Mott Setup beam to Hall A Moller Compton

Sunday, September 16 - OWL

Quick Summary:

Accelerator	*Hall A*	*Hall B*	*Hall C*
1. Hall A polarimetery 2. Setup 3 Hall RF separation 3. Setup 3 Hall Moller 4. Injector access for laser	1. CW beam	1. CW beam	1. CW beam

Speical Notes:
Beam limit to Hall C is 1uA. Deliver beam per GeN intensities, i.e., ~200uA. When the Hall C Moller target is in their raster can be off. When the Hall C Moller target is out their raster must be on.

Detailed Summary:

Step	*Time*	*Lasts*	*Activity*
10	01:00	3	**1. Wien=-35 deg mesaurement** Set Wien to -35 deg Hall A Compton Hall A Moller Setup beam to Mott polarimeter Mott
11	04:00	3	**2. Setup beam for 3 Hall operation** Verify that RF separators are properly configured Setup 3 Hall separation to dumplettes Setup Halls A & B to dump as before Use Benesch Hall C procedure to setup Hall C to dump: a. make sure both hall C chicane magnets and the target solenoid are off. b. use MST to change hall C magnets to fifth pass. Moller quads off c. steer beam through line using standard optics d. use BURT to download special file hallc_5734_combined.snap e. ask hall C personnel to set currents at Q1 = 121.4A and Q2 = 1248.5 A (these currents are also in the comments for the special file) f. resteer line as required g. work with hall C personnel to adjust Moller quads to optimal settings for measurements. h. pop in the target and dump viewers to make sure the beam isn't absurd in size - profile doesn't matter. It should be a lot bigger than usual at the physics target - close to a cm in diameter. i. turn on hall C physics raster j. go CW when appropriate
12	07:00	1	**1. Injector access for laser setup**

Sunday, September 16 - DAY

Quick Summary:

Accelerator	*Hall A*	*Hall B*	*Hall C*
1. Hall A/B/C polarimetery	1. CW beam	1. CW beam	1. CW beam

Detailed Summary:

Step	*Time*	*Lasts*	*Activity*
13	08:00	3	**1. Polarimeter checkout** Ops support 3 Hall polarimeter checkout
14	11:00	2	**2. Wien=-35 deg** 3-Moller Setup beam to Mott Mott
15	13:00	2	**3. Wien=-70 deg** Set Wien=-70 deg Mott Setup beam to 3-Moller 3-Moller
16	15:00	2	**4. Wien=-105 deg** Set Wien=-105 deg 3-Moller Setup beam to Mott Mott

Sunday, September 16 - SWING

Quick Summary:

Accelerator	*Hall A*	*Hall B*	*Hall C*
1. Hall A/B/C polarimetery 2. Beam off at shift's end	1. CW beam	1. CW beam	1. CW beam

Detailed Summary:

Step	*Time*	*Lasts*	*Activity*
17	17:00	2	**1. Wien=105 deg** Set Wien=+105 deg Mott Setup beam to 3-Moller 3-Moller
18	19:00	2	**2. Wien=+70 deg** Set Wien=+70 deg 3-Moller Setup beam to Mott Mott
19	21:00	2	**3. Wien=+35 deg** Set Wien=+35 deg Mott Setup beam to 3-Moller 3-Moller
20	23:00	1	**4. Wien=+10 deg** Set Wien=+10 deg 3-Moller
21	24:00	0	**5. Beam off to halls**

Monday, September 17 - OWL

Quick Summary:

Accelerator	*Hall A*	*Hall B*	*Hall C*
1. Injector beam	1. No beam	1. No beam	1. No beam

Detailed Summary:

Step	*Time*	*Lasts*	*Activity*
22	00:00	1	**1. Wien=+10 deg** Setup beam to Mott Mott
23	01:00	1	**2. Injector energy measurement**
24	02:00	?	**3. Injector tests**
25	07:00	0	**4. Beam off and injector secured**