HAPPEX (E99-115 and E00-114)
Installation Plan for June, 2004

May 28, 2004

1 Overview

1.1 Schedule Overview

Anticipated Run Schedule	
May 17-20	Source Installation
May22-June 1	Beam Commissioning (parasitic to E04-012)
June 4-7	Installation (target, detectors, sieve)
June 8	Optics Commissioning (sieve slit)
June 9	Configuration change (sieve slit removal, targets)
June 10-11	Target Cooldown
June 11-16	HAPPEX-^{4}He
(approximately) June 17-18	Configuration change (detector change)
June 19-July 2	HAPPEX-H
July 3-7	Down (Lab holiday and maintenance)
July 8	Restore
July 9-25	HAPPEX-H

The installation period (June 4-8) might require additional time if additional survey and alignment is necessary. In this case, the schedule may slide, with optics commissioning occuring as late as June 10.

The date for the configuration change from HAPPEX-^{4}He to HAPPEX-H is not firm. Depending on progress during the HAPPEX-^{4}He run and the cryopower needs in Hall C and the FEL, the change-over to HAPPEX-H may shift by several days.

The run coordinators for this period will be Kent Paschke (June 2-12) and Robert Michaels (June 13 -22).

2 HAPPEX Installation

There are four major projects necessary during the installation period for HAPPEX, three of which are in the Hall. (The fourth is the source installation, which was not completed during May.) In Hall A, the major work involves the detector installation in the spectrometer shieiding huts, the septum shield installation (and survey/realignment of target area related to this), and changes to the target/collimators. The work in the Hall will start June 4, and it is hoped that, with no major setbacks, the Hall will be closed by June 7, Swing, and ready to take beam on June 8, Owl.

No support from the survey group will be necessary for the detector installation in the spectrometer huts.

Detector Installation

- Re-positioning of R-HRS gas Cerenkov, removal of S1
- Installation of (single-segment) electron calorimeter, Right-HRS.
- Installation of high-rate scanner, Right-HRS.
- Removal of Left HRS RICH, A1, A2, S1.
- Installation of (single-segment) electron calorimeter, Left-HRS.
- Installation of high-rate scanner Left-HRS.
- Spectrometer trigger configuration (R.Michaels)

Septum Shielding

- As-found survey of scattering chamber, Left Septum, Right Septum.
- Installation of additional septum shielding.
- Survey (and possibly realignment) of scattering chamber, Left Septum, Right Septum.

Scattering Chamber / Target installation

- Warm target chamber at least above 0° C (water freeze point)

- Bleed-up scattering chamber vacuum to atmosphere and open.
- Piping change to 20 cm H racetrack cell (from beercan cellblock)
- Installation of new solid targets and water cell target.
- Insertion of sieve-slit collimators
- Re-survey of target ladder (only necessary if mis-alignment due to installation is suspected).

Target Ladder for Optics Commissioning	
Target	Note
20 cm He Racetrack	Warm for optics commissioning
20 cm H Racetrack	Warm for optics commissioning
15 cm & 4 cm beercan	Warm for optics commissioning
24 cm optics	2 Carbon foils, 100 mg each, 24 cm separation
12 cm optics	2 Carbon foils, 100 mg each, 12 cm separation
Al "dummy" target	2 Aluminum foils, 20 cm separation
single C	single Carbon foil, 100 mg
Empty	empty position, required for operation
BeO	viewer
water cell	novel target to provide Hydrogen and Oxygen for determination of central ray angle

3 Optics commissioning

Approximately 4 shifts will be required. If necessary some calibration (energy measurement) can be delayed until later run periods.

- Establish beam, spectrometer checkout (0.5 shifts)
- Arc beam energy measurement (0.5 shifts)
- BPM calibration (1 shift)
- Optics measurements (1.5 shifts)

3.1 Configuration change: Optics to HAPPEX-He

Collimator / Target change

- Bleed-up scattering chamber vacuum to atmosphere and open.
- Removal of sieve-slit collimators
- Install HAPPEX collimator inserts
- Remove water cell target
- Insert Lead target
- pump down scattering chamber
- Cool He gas target
- Re-survey Left and Right Septum Magnets, Scattering chamber, to check for continued sagging.

Target Ladder for Helium Production	
Target	Note
20 cm He Racetrack	cold, production target
20 cm H Racetrack	hydrogen loop
15 cm & 4 cm beercan	He purge
24 cm optics	2 Carbon foils, 100 mg each, 24 cm separation
12 cm optics	2 Carbon foils, 100 mg each, 12 cm separation
Al "dummy" target	2 Aluminum foils, 20 cm separation
single C	single Carbon foil, 100 mg
Empty	empty position, required for operation
BeO	viewer
Lead	PRex target for testing, uncooled.
Empty	unused position

4 Configuration Change: HAPPEX-He to HAPPEX-H

The specific time and schedule for this configuration change has not been determined. The survey group should be prepared for both of two possible tasks: a survey may be required for each detector installation in the spectrometer huts, and a re-survey of the scattering chamber and septa may be required, if additional "sagging" of the stand is suspected.

Spectrometer Huts

- R-HRS, remove profile scanner.
- R-HRS, remove single-segment detector.
- R-HRS, install two-segment detector.
- R-HRS, survey (if necessary) and position two-segment detector.
- R-HRS, install profile scanner.
- L-HRS, remove profile scanner.
- L-HRS, remove single-segment detector.
- Assemble second 2-segment detector.
- L-HRS, install two-segment detector.
- L-HRS, survey (if necessary) and position two-segment detector.
- L-HRS, install profile scanner.
- Spectrometer trigger configuration (R.Michaels)

Collimator / Target change

- Warm He gas target, place on He purge
- Cool and Condense 20 cm LH2 target
- Resurvey Left and Right Septum Magnets, Scattering chamber, to check for continued sagging, (if necessary)

Target Ladder for HAPPEX-H	
Target	Note
20 cm He Racetrack	He purge
20 cm H Racetrack	LH2 filled
15 cm & 4 cm beercan	He purge
24 cm optics	2 Carbon foils, 100 mg each, 24 cm separation
12 cm optics	2 Carbon foils, 100 mg each, 12 cm separation
Al "dummy" target	2 Aluminum foils, 20 cm separation
single C	single Carbon foil, 100 mg
Empty	empty position, required for operation
BeO	viewer
Lead	PRex target for testing, uncooled.
Empty	unused position