1 March 03, 2008

Present: Paul Brindza, Alexandre Camsonne, J.P. Chen, Don Crabb, Al Gavalya, Kees De Jager, John LeRose, Mike Seely, Karl Slifer.

This was the first Hall A planning meeting for the g_2^p experiment. Kees explained the purpose of this and subsequent meetings: to define the resources needed to implement the experiment (manpower/money) and to find a way in which this experiment can be made compatible with QWeak. Because of Qweak, Kees points out that running with the cryo septa may be difficult. Asks for spokesmen to provide justification for why the warm septa can not be used. Kees also requests that we provide a solution in which the beam can be run 'straight-thru' the chicane for ease of transition to subsequent experiments which do not use the chicane.

We presented a short overview of the experiment and the necessary equipment. During this presentation, several issues were discussed by the group:

1. **Target:** The target roots pumps will need to be serviced prior to the run (balance the rotors, service the motors). There may be money in the budget next year to do this.

   Kees requests details of target operation. For example, how often do we have to exchange target material?

   Hall C used three platforms. The only platform that is really essential is the platform that contains the target support ring. Other equipment could probably be located on the floor. The buffer dewar must be close to target. Roots pumps can be on the floor. We should ensure that any new platforms are compatibile with Hall A space constraints (ie. produce schematics and drawings).

   We will need a well shielded location for the EIO power supply.

2. **Beamline:** Alexandre is working with Jay on the beamline design. He points out that all planned changes are downstream of the Moller quad. The Moller detector is unmoved, but the "French Bench" has to be pulled. The question is raised as to whether the beamline schematic accounts for the upstream target shift.

   Paul suggests to use the Moller dipole as the first chicane magnet, by changing the polarity. This would require a straight-thru path for standard Moller operation. This will be investigated further.

The planned chicane supports will obstruct use of the man-lift on the far side of the hall.

Hall C has requested that we locate a replacement magnet for HKS magnet if we want to use it for our chicane. There appears to be many workable replacements.

We plan to move the target back 140 cm from the pivot center in order to allow some space between the two septa for passage of the beam. This is 60 cm more than was done previously. The question is raised as to whether this coincides with the location of the distribution can support beam.

The overhead clearance above the target is complicated by moving the target upstream. The polarized target is not much different in size from the standard cryotarget, but shifting up stream means its very tight overhead. We need to produce diagrams/drawings to ensure that the target can be located where we have planned.

(**Note:** After the meeting we asked Al Gavalya to check using his Hall A model and a model of the SANE target can. There appears to be sufficient clearance infront of the post to put the target at -140cm. This must be verified in the hall.

The beam spotsize depends on energy and materials traversed. With rastering and multiple scattering we expect atleast a 3 cm beamspot after the target. Retracting the target to -140 cm allows the cold septa to be separated by 12 cm (2*60 cm * tan(6) = 12 cm). If we can only retract the target to -120 cm we will still have 8 cm space between the cold septa.

The yoke of the warm septa would need to be modified to pass the beam. Also, the warm septa coils are only separated by 3 cm in the present design. We'll need to perform a full simulation to verify the beam can pass for either choice of septa.

We should remove the whole downstream beampipe section instead of modifying hot pipe. There is a blue beam which supports the down-stream pipe and carries utilities. It would interfere with the beamdump if the dump is below the beamline. Ed notes that the beamline sup-ports have to come out along with the shielding at the dump. The instrumentation and controls that go back to support the dump will have to be rerouted.

3. **Septa :** We discussed 4 possible Septa options:

   (a) Two Cold Septa: This is what we assumed in the proposal and is the ideal situation from physics standpoint, but requires repairs to the right septum. It may also be difficult to run both septa during QWEAK.

   (b) One Cold Septa: Allows us to obtain all physics goals, and reduces cryo needs. Would require some additional beamtime. Minimizes repair overhead. Lose valuable cross check of two arms. Paul points out that if we are using only one septa, we should warm up the right HRS to reduce the load.

   (c) Two Warm Septa: In this scenario, we lose a significant portion of high Q^2 portion of the proposal. We need to follow up with Paul on the possibility of using the warm Septa at angles greater than 8 degrees, by moving the target. The warm septa will not pass the primary (vertically deflected) beam as they are now configured since the vertical deflection angle can be as great as 11 degrees. The design would need to be modified to accomodate this. John points out we will lose acceptance and probably have worse systematics.

   (d) Two Warm Septa plus a HRS only run. Good for physics, but requires significant overhead to remove the septa and relocate the target. In the displayed scenario, there is a gap introduced in the Q^2 coverage, but it could easily be filled with an additional energy. Kees and Ed point out that if you move the target, the beam pipe (girder) between the second chican magnet and the target chamber will no longer be aligned.

2 Conclusions/Open Issues

1. Ed estimates 5-6 month installation time. Kees says this fits with the planned 6 month down for 12 GeV upgrade.

2. Regarding cryo consumption: The buffer dewar requires something like 1 g/s. The target needs something like 5L/hr (5% impact on hall). Qweak has a two kW target. A rough estimate is that they will require half of the ESR capacity plus all of the available CHL capacity. This

leaves 1/2 of the ESR capacity for Hall A. Hall B has no impact on this.

3. Cryo Septa: Ed estimates 1 man-year to repair the right Septum. Ed will test the flow needed for left septum this summer (time permitting before Transversity which runs mid October to mid January). He believes it is best to do this in the Hall. Some of the Septa controls have been scavenged and have to be located. Ed does not have time to train the left septum this summer. This can possibly be done during transversity, but only if right Q1 can be warmed up.

4. Open Questions:

   - We need a description of target operations. Specifically what happens if we loose the ESR? Does the traget get warmed up and do we then have to replace the target? We might not have the overhead room to do that in place, etc.
   - We need to get realistic drawings of the target layout with supports in the Hall.
   - What modifications are needed to the chicane if the target is at the standard position?
   - We need to discuss with Jay to get details of the movable beam pipe.
   - Passage of beam after the target should be verified via simulation.
   - How far upstream can we move the target?

5. We will meet again in April or May.

3 Note

We later met with Al Gavalya, Joyce Miller and Bert Metzger. Bert provided CAD models of the SANE target can to Al who then placed them in the Hall A model. In the model it appears that there is sufficient space to retract the target to 140 cm upstream as planned without interfering with the support beam. Al and Joyce will work (as their schedule permits) to create full target models and verify this completely. We will also perform visual inspection in the hall.

Also Don Crabb informed us that the target 'donut' which takes much of the overhead clearance can actually be rotated to horizontal (pointing to the left HRS side).