Mini-review of the Magnet Systems
March 27, 1996

David M. Lee, April 2,1996

The magnet mini-review was conducted during the DC meeting, March 27, 1996 via a video conference between BNL and LLNL. Presentations on the Central Magnet, Muon Magnet North, and the Muon Magnet south were given by Joel Bowers, Robert Yamamoto, Tom Vercelli, and Marcus Libkind of LLNL. Integration issues were addressed by Pete Kroon at BNL. The mapper system was discussed last by Jim Thomas and Wolfgang Stoeffl. A summary of the review with action items follows for the magnet systems and integration. The mapper discussion will not be given here. For a summary of the mapper discussion refer to Shiva Kumar.

Central Magnet and Muon Magnet North - Mechanical - Joel Bowers

The magnet steel for the Central Magnet, Muon Magnet north, and the Muon ID is on the ship for transport to the US. The expected date of arrival in Brooklyn, NY is April 14 where it will be offloaded to barges and shipped to Shorem. LI, NY. Documentation for the dimensions and chemistry is being shipped with the magnets. Several samples were brought back to LLNL for testing and they all agreed with the Russian tests. No documentation of the dimensions for the preassembly in Russia are available. Except for a 1mm gap in the top of one central magnet pole, all dimensions of the individual pieces are within the drawing tolerance. The 2 cm observed difference in the distance between the piston and the lower lampshade may or may not be observed at BNL. The uniformity of the distance between piston and the lampshade will not be known until the MMN magnet is assembled at BNL. These dimension are not part of the specifications and can change depending on how it is assembled. Since Rigging International (RI) will be assembling the magnets and welding the bottom lampshade plates, an idea of the critical survey tolerances must be known prior to assembly. Rigging International is responsible for the assembly location. RI is currently responsible only to locate the entire magnet. They will probably assist in adjustments during assembly if it is well defined. They will not come back and redo anything.

Action Item - Pete Kroon must know the critical assembly tolerances needed by each subsystem before magnet assembly. Since assembly will be complete 3 months after delivery, this information must be transmitted as soon as possible. Some plan for defining when the piston to lampshade dimension is ‘ good enough’ must be formulated.

Pete Kroon is the main technical interface at BNL between the detector subsystems and RI and Joe Collins serves as the on-site day-to-day liason with

BNL. The primary reference for placement of all magnets and the muon ID will be the 206 inches beam height. RI will assemble the CM outer coil into the magnet. BNL is responsible for all other ancillary equipment, i.e.,water manifolds, power distribution, cooling water, temp power. No one is identified for the safety and operation of the magnets at BNL.

Action Item - Someone must be identified who is responsible for the testing and operation of the magnets at BNL .

Central Magnet and Muon Magnet North -Coils and testing - Bob Yamamoto

The Central Magnet outer coils are on site at BNL and have been tested at full power (1719 amps) in Japan. All CM and MMN bus bars, manifolds , etc are on site. CM coil installation fixture is under fabrication at LLNL. The copper conductor for MMN has been shipped to Japan for fabrication by Mitsubishi but the wood shipping containers arrive crushed. Tests have not been done but will be to determine if the conductor has been damaged. There appears to be enough time to replace damaged conductor if it is found to be necessary without delaying the magnet testing. Scheduled completion date for the MMN coil is June 1996. BNL will assemble the MMN coils into the magnet but no definite plane for this is in place.

Action Item - A plan by BNL for rigging the MMN coils into the magnet should be initiated.

The power supplies for the CM and MMN are in fabrication by Inverpower and will be completed in early Summer 1996. Pete Kroon says temporary water and power will be available in December 1996 (Pete at one time said in the Fall). It will be from a temporary closed pool system, not from a chilled water tower. The system will allow for testing ONE magnet only and not for long term operation. The cooling tower will be complete on July 1997. The phase 1 testing plan of Bob Yamamoto includes lengthy tests that should take approximately 2 months/magnet. It is not clear how much of phase one testing can be done with the temporary cooling system.

Action Item - BNL and LLNL should revisit the initial testing and operation plans to determine what can be done and how long it will take. Who will take responsibility for phase 1 testing?

Action Item - Someone at BNL/LLNL should be tasked with the responsiblity for writing the SOP's for operation of the magnets.

Action Item - Measurements of magnet motion under excitation and final as built drawings are not planned at the present time. Plans should be written to define the request to the BNL surveyors for making the measurements.

Action Item - Written documentation for the safe translation of the Central/South Muon magnets is needed

Muon ID Steel and Dynamic Analysis of MMN- Marcus Libkind

Marcus reported that the Muon ID steel meet all specifications. He reminded everyone that the detector planes in slots 5 and 6 as well as the last steel plate are only 33 ft tall. BNL will be responsible for checking the RI placement of the plates as they go in. Marcus has agreed to do the dynamic analysis for MMN back wall if Dave Lee requests it. He can start in May.

South Muon Magnet - Tom Vercelli

All MMN design changes have been incorporated in MMS designs, ie. non magnetic fins,etc. LLNL handed off the design to theJapanese in late February.but it is not known when it will be signed. Work started. RI will drill seismic anchor holes in the floor for the south magnet. LLNL is reponsible for the track system in the collision hall but BNL is responsible for the track system in the assembly hall. A preliminary design review will be held at LLNL on May 1, 1996 with representatives from mitsubishi and the Japanese Institutions. The south magnet coil will be built by Mitsubishi and they will be responsible for purchasing the copper conductor. Bob Yamamoto will be responsible for QA. LLNL has no plans to obtain or provide as built drawings of the MMS (see action item above). Delivery is scheduled for Mar 1997. BNL is responsible for all MMS rigging.

Integration - Pete Kroon

BNL is responsible for the hydraulic system and assembly hall track system. The hydraulics will be ready in 1996 and the assembly hall tracks around May 1997. BNL will work with the BNL survey crew and ussystem personnel to provide the as assembled measurements of the magnets and the distortions of the magnet under load. They need input from subsystems (see action item above). Utilities for phase 1 tests will be available December 1996.

Action Item - The schedule for the initial phase 1 testing of all three magnets plus mapping of all three magnets seems to be rather fluid and ill defined. A realistic schedule should be produced by LLNL/BNL and made available so conflicts can be resolved with the subsystems involved. It is also not clear what activites can go in parallel and what activities prevent other activities from taking place.