ACCEPTANCE SUMMARY FOR LHC MAGNETS BUILT AT BNL
Magnet: D2L105

Date of this summary: 20 August 2003

This document has a short summary of the acceptance status (in italics, just below), the minutes of the acceptance meeting, and actions taken after the acceptance meeting [in square brackets with the text of the minutes, or as footnotes].

Acceptance Status: The BNL committee has approved the magnet for shipment to CERN. However, several items need further work:

- *CERN acceptance of the waiver on pipe positions in the interconnect region*
- *Determine LHC part number, sign "BNL acceptance" certificate, make official name plate*
- *BNL/CERN resolve dry N2 fill of cold mass before shipment*
- *Decision about tracking: use FQ data available now or wait for all D2 FQ data.*
- *Software to rotate the survey and field angle data into the magnet frame (including measurement of a magnet tilted about its axis, to check the transformation), followed by shipment of the FQ data to CERN*
- *Review and acceptance of the survey data by CERN*
- *Determine ID card format, fill in for this magnet*
- *MEB approval*

MINUTES OF ACCEPTANCE MEETING
Date of acceptance meeting: 14 August 2003
Present at acceptance meeting: Escallier, Fischer, Gaffney, Hocker, Jain, Muratore, Plate, Wanderer, Willen

Quench Data: Muratore showed the quench behavior of the magnet. For the quench tests, the warm bore tubes were installed in the magnet and (to minimize the heat leak) evacuated. With forced flow cooling, the magnet quenched at 7009A, well above the current specified for this test, 6600A. In liquid helium, the magnet quenched lower, as expected on the basis of previous experience with quenching in forced flow and liquid with the warm fingers installed. The quenches in liquid were at 6082A and 6414A, exceeding the performance specification (one quench above 6 kA to verify correct operation of the level sensing instrumentation). The quench plot and tabulation are available on the Web at http://www.bnl.gov/magnets/LHC_Acceptance/default.asp

Field Quality: Jain showed the warm data (from all nine D2's) and cold data (from three D2's). The field quality of this magnet had no unusual features. Jain's report is posted on the Web at the address given above.

Fischer has compared this magnet's field quality to Versions 1.0 and 2.0 of the table of expected values. Version 1.0 is part of the D2 functional specification and was prepared on the basis of RHIC data only. Version 2.0 takes into account measurements of the first two 3m D2 prototypes and is therefore a much better indicator of the expected field

quality. However, it is not in the functional specification, and no beam tracking at BNL has been performed with these values. Fischer found the field quality of this magnet to be satisfactory [1].

Engineering: Escallier reviewed the electrical tests of the magnet and reported that the magnet met the electrical specifications. Schmalzle reviewed the mechanical features of the magnet and, in a brief email to Wanderer (11August 2003), reported that it met specifications with the exception of the pipe positions in the interconnect region. Plate reported that CERN had not yet accepted the pipe position waiver, M0306, but that it was likely to do so since the pipes were too short to adjust to be within tolerances.

QA: Hocker reported that there were no issues beyond those reported by the engineering staff.

Safety: Gaffney stated that the magnet satisfied the safety requirements (specifically, pressure and electrical) established for it.

Survey: The survey data were reviewed and approved by Plate. Plate emailed the data to Missiaen and Quesnel the day of the acceptance meeting.

These notes written by P. Wanderer

FOOTNOTES

[1] Email from W. Fischer, August 11, 2003:

Dear Peter,
(1) So far we have only used D2 error table V1.0 for tracking.
The only time the effect of dipoles was looked at, is reported in BNL C-AD/AP/21 were we doubled the warm D1 errors. This had no effect on the computed corrector strength.

(2) Comparison of D2L105 vs. error table V1.0.
The main concern is b2 at injection. All other values are either within the specification or outside by a small amount. b2 would affect the tune, but the tune needs correction anyway. This should not cause a problem.

(3) Comparison of D2L105 vs. error table V2.0
The main concern here would be b3 at injection. This would affect the chromaticity. The chromaticity too will be corrected, octant-by-octant, and this should not be a problem.

In general, the magnets under consideration fill only 80m of the 27km of the ring (or 0.3% of the circumference), at moderate beta-functions compared to the triplets. Their effect on the overall beam dynamics is therefore small.